MILITARY READINESS ACTIVITIES AT FALLON RANGE TRAINING COMPLEX
ENVIRONMENTAL IMPACT STATEMENT

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Military Readiness Activities at Fallon Range Training Complex, Nevada

Draft Environmental Impact Statement

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DRAFT ENVIRONMENTAL IMPACT STATEMENT for FALLON RANGE TRAINING COMPLEX, NEVADA

Lead Agency: United States Department of the Navy
Cooperating Agency: Bureau of Land Management
Title of the Proposed Action: Military Readiness Activities at Fallon Range Training Complex, Nevada
Designation: Draft Environmental Impact Statement

Abstract

This Draft Environmental Impact Statement (EIS) has been prepared by the United States (U.S.) Department of the Navy (Navy) in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S. Code §4321 *et seq.*), the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [C.F.R.] §§1500-1508), and Navy Procedures for Implementing NEPA (32 C.F.R. §775). The Navy is the lead agency for this EIS pursuant to 40 C.F.R. §1501.5, and the Bureau of Land Management (BLM) is a cooperating agency pursuant to 40 C.F.R. §1501.6 and §1508.5. The Navy identified its need to support current and future training activities at the Fallon Range Training Complex (FRTC), Nevada. Three alternatives are analyzed in this EIS.

- The No Action Alternative will continue training activities at FRTC of the same types and at same levels of training intensity and frequency (as averaged over the years of 2010–2012), without a change in the nature or scope of military activities.
- Alternative 1, in addition to accommodating training activities addressed in the No Action Alternative, would support an approximately 6 percent increase in the types of training activities and the number of training events conducted at FRTC, and accommodate force structure changes. The increased activities are Combat Search and Rescue exercises, Gunnery Exercise (Air-to-Ground), High-speed Anti-radiation Missile Exercises, and Missile Exercises (Air-to-Ground) (Table 2-4). In addition, two new activities, Ground Light Amplification by Stimulated Emission of Radiation (LASER) Targeting and Dismounted Fire and Maneuver, would be conducted under Alternative 1.
- Alternative 2 would include all training and range investment elements of Alternative 1 (accommodating currently conducted and increased training activities). In addition, under Alternative 2, training activities of the types currently conducted would be increased by 10 percent over levels identified in Alternative 1.

This EIS addresses the potential environmental impacts that result or could result from activities under the No Action Alternative, Alternative 1, and Alternative 2. Environmental resources evaluated include soils; air quality; water quality; noise; biological resources; land use and recreation; socioeconomics, environmental justice, and protection of children; transportation; cultural resources; and public health and safety. This EIS also addresses the cumulative impacts of the direct and indirect effects of past, present, and reasonably foreseeable future actions coupled with the Proposed Action on the human environment.

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ES EXECUTIVE SUMMARY

ES.1 INTRODUCTION AND BACKGROUND

The National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] §4321 et seq.) is the basic charter for environmental planning within the United States. It requires federal decision makers to inform themselves and the public of the environmental consequences of proposed actions that may significantly affect the environment and to consider those consequences in determining courses of action. An Environmental Impact Statement (EIS) is a public document that provides a detailed assessment of the potential effects that a major federal action may have on the quality of the human environment.[1] The United States (U.S.) Department of the Navy (Navy) prepared this Draft EIS (hereafter referred to as "EIS") to assess the potential environmental effects associated with ongoing and proposed Navy training activities (described in detail in Chapter 2, Description of Proposed Action and Alternatives) within the Fallon Range Training Complex (FRTC), Nevada and associated airspace (Figure ES-1). The Navy is the lead agency for this EIS pursuant to 40 Code of Federal Regulations (C.F.R.) §1501.5 and §1508.5. The Bureau of Land Management is a cooperating agency pursuant to 40 C.F.R. §1501.6 and §1508.5. This EIS was prepared in compliance with NEPA (42 U.S.C. §4321 et seq.), Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (Title 40 C.F.R. §§1500–1508), and Navy Procedures for Implementing NEPA (32 C.F.R. §775).

ES.2 STRATEGIC IMPORTANCE OF THE FALLON RANGE TRAINING COMPLEX

The FRTC is located in northern Nevada and spans multiple county jurisdictions, from Elko County to the east and Washoe County to the west (see Figure ES-1). The FRTC consists of Special Use Airspace (SUA) (detailed descriptions are provided in Section 2.2.1, Special Use Airspace); land training ranges (four air-to-ground training ranges [B-16, B-17, B-19, and B-20], the Shoal Site, and the Dixie Valley Training Area; see Section 2.2.2, Training Ranges, for detailed descriptions); air, simulated sea, fixed and mobile land targets; control facilities; threat Electronic Warfare (EW) and surface-to-air missile systems and emulators; and instrumentation facilities. The FRTC SUA and land training ranges support U.S. Pacific Fleet, U.S. Atlantic Fleet, U.S. Marine Forces Pacific, U.S. Marine Corps Forces Atlantic, U.S. Army Reserve, U.S. Air Force Reserve, Nevada National Guard and joint and international forces.

The Navy's mission is to organize, train, and equip combat-ready naval forces capable of winning wars, deterring aggression, and maintaining freedom of the seas. This mission is mandated by federal law (10 U.S.C. §5062), which ensures the readiness of the United States' naval forces.[2] The Navy executes this responsibility by establishing and executing training programs, and ensuring naval forces have access to the ranges, operating areas, and airspace needed to develop and maintain skills for conducting naval activities.

[1] According to CEQ Quality Regulation 40 CFR §1508.14, the "Human Environment" shall be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment.

[2] Title 10 U.S.C. §5062 provides: "The Navy shall be organized, trained, and equipped primarily for prompt and sustained combat incident to operations at sea. It is responsible for the preparation of naval forces necessary for the effective prosecution of war except as otherwise assigned and, in accordance with integrated joint mobilization plans, for the expansion of the peacetime components of the Navy to meet the needs of war."

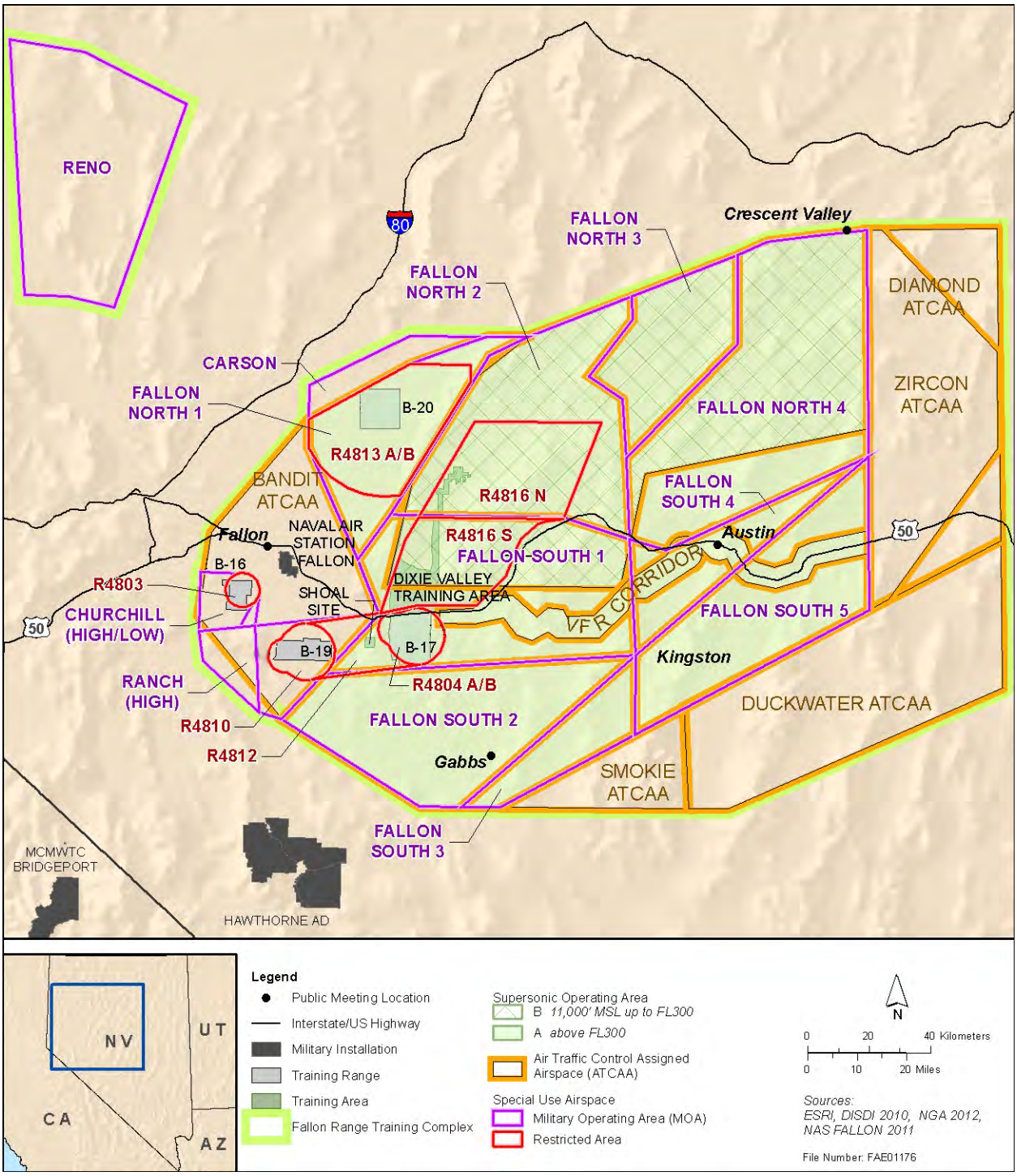

Figure ES-1: Fallon Range Training Complex and Surrounding Bases

The FRTC, with Naval Air Station Fallon, is the only naval training complex that can support, house, and train an entire carrier air wing (upward of 60 aircraft and support crews) for advanced integrated strike training warfare, EW, and anti-air warfare training. The FRTC's unique attributes include collocation with Naval Strike and Air Warfare Center (NSAWC), overland supersonic capability (where aircraft can exceed Mach 1, or the speed of sound), a sophisticated threat Integrated Air Defense System, Tactical Combat

Training System range, multiple target types, high-altitude weapons training, and on-site adversary (opposition forces) aircraft.

The FRTC also provides joint integrated training opportunities that are vital to advanced-level carrier air wing training and includes support to Air Force, Marine Corps, and National Guard units; support for other mission areas and Tactical Development and Evaluation (including military Unmanned Autonomous System [both armed and unarmed] and other intelligence, surveillance, and reconnaissance platforms); and support for proposed training activities of other services and government agencies.

Training areas and ranges provide controlled and safe environments that enable military forces to conduct realistic combat-like training as they undergo all phases of the graduated buildup needed for combat-ready deployment. The Navy's training cycle, the Fleet Readiness Training Plan (FRTP), ensures that naval forces achieve and maintain the capabilities to carry out the requirements of combatant commanders. The FRTP formalizes the traditional Navy building block approach to training in a way that brings the strike groups to the required level of combat readiness earlier in the training cycle and sustains that readiness for a longer period of time. Training proceeds on a continuum, advancing through four phases: (1) maintenance, (2) basic training, (3) integrated/advanced training, and (4) sustainment. Training activities at the FRTC would involve unit-level events, coordinated events, and major exercises. This is commonly referred to by the military as the "crawl, walk, run" approach to training.

ES.3 Purpose and Need for the Proposed Action

The purpose of the Proposed Action is to provide sustainable and modern airspace, range, maneuver areas, training facilities, and range infrastructure and resources to fully support training activities occurring on the FRTC in accordance with the assigned roles and missions for the NSAWC.

The Proposed Action is needed to achieve and maintain military readiness by using the FRTC to support and conduct military readiness activities. In this regard, FRTC furthers the Navy's execution of its roles and responsibilities under 10 U.S.C. §5062. To comply with its Title 10 (10 U.S.C. §5062) mandates, the Navy needs to:

- maintain current levels of military readiness by enhancing training at the FRTC;
- accommodate possible future increases in training activities at the FRTC;
- accommodate training activities associated with force structure changes; and
- maintain the long-term viability of the FRTC as a military training and testing range.

The Navy has developed alternatives pursuant to 40 C.F.R. §1502.14, which are discussed in Chapter 2 (Description of Proposed Action and Alternatives), based on this statement of the purpose and need.

ES.4 The Environmental Review Process

NEPA requires federal agencies to examine the environmental effects of their Proposed Actions. This EIS is a detailed public document that provides an assessment of the potential environmental impacts associated with a proposed major federal action. The impacts to be analyzed are those that occur to the human environment, including natural and physical resources.

ES.4.1 National Environmental Policy Act Public Participation

When an agency decides to prepare an EIS, the first step in the NEPA process is to conduct public scoping. Public scoping is initiated with the preparation and publication of a Notice of Intent (NOI) to develop the EIS. Scoping is an early and open process for developing the "scope" or range of issues to be addressed in the EIS and for identifying significant issues related to a Proposed Action. The NOI provides an overview of the Proposed Action, the scope of the EIS, and announces public scoping meetings (Appendix A, Federal Register Notices). The NOI for this project was published in the Federal Register (FR) on May 28, 2013 (78 FR 31909 and Appendix A, Federal Register Notices), and throughout May 2013 in four local newspapers (Lahontan Valley News, Battle Mountain Bugle, Nevada Appeal, and Reno Gazette-Journal), which cover Fallon, Fernley, Lahontan Valley, and the general western Nevada region as well as the major metropolitan center of Reno and Carson City, Nevada. The NOI and newspaper notices included information about comment procedures, the project website address (www.frtceis.com), a list of information repositories (public libraries), the dates and locations of the scoping meetings, and the duration of the public scoping meeting.

The scoping meetings for this EIS were held in Fallon, Crescent Valley, Gabbs, and Austin, Nevada. Comments from the public meeting that occurred June 10–13, 2013, as well as from agencies and public interest groups (such as the State Historic Preservation Officer [SHPO] and other non-governmental organizations), including comments regarding the development of alternatives, have been considered in the preparation of this EIS. Additionally, during preparation of this Draft EIS, the Navy met and discussed the Proposed Action and potential issues to be analyzed in the EIS with the U.S. Fish and Wildlife Service, Nevada Department of Wildlife, and the Nevada SHPO (see Appendix F, Public Participation, for further detail).

Subsequent to the scoping process, this Draft EIS has been prepared to assess the potential effects of the Proposed Action and Alternatives on the environment. A Notice of Availability for this Draft EIS has been published in the *Federal Register*, and notices have been placed in the aforementioned newspapers announcing the availability of the Draft EIS. The Draft EIS is available for general public and agency review and has been circulated for review and comment for a 46-day period. A public meeting will be advertised and held to receive public comments on the Draft EIS. A Final EIS, including responses to public comments received on the Draft EIS, will be prepared. Responses to public comments may take various forms as necessary, including correction of data, clarifications of and modifications to analytical approaches, and inclusion of additional data or analyses. The Final EIS will then be issued, followed by a 30-day waiting period.

Finally, after consideration of the administrative record, a Record of Decision (ROD) will be signed by the Secretary of the Navy. The ROD will document the Navy's final decision on the Proposed Action, the rationale behind that decision, and any commitments to mitigation and monitoring. A *Notice of Availability of the Record of Decision* will be published in the *Federal Register*, and the ROD will be distributed to agencies and interested parties and posted on the FRTC EIS website (www.frtceis.com). The ROD will also be announced in local newspapers.

ES.5 Proposed Action and Alternatives

The Navy proposes to continue and enhance training activities within the existing FRTC by:

- Increasing existing aviation and ground training activities;

- Conducting training activities with new platforms and systems as they transition into the fleet to replace older platforms and systems; and
- Conducting new ground training activities (i.e., Dismounted Fire and Maneuver Training and Ground Light Amplification by Stimulated Emission of Radiation [LASER] Training).

The proposal includes adjusting activities from current (baseline) levels to levels needed to accommodate evolving mission requirements. The Proposed Action is a step toward ensuring the continued vitality and viability of the FRTC as an essential training resource. The Proposed Action would result in critical increases in training activities and range facilities, range infrastructure, and additional development of existing ranges selectively focused to achieve and maintain a state of military readiness commensurate with the Navy national defense mission.

ES.5.1 No Action Alternative: Current Training Activities at the Fallon Range Training Complex

Each military activity described in this EIS meets a requirement that can be ultimately traced to requirements from the National Command Authority.[3] Over the years, the tempo and types of activities at the FRTC have fluctuated due to changing requirements, the dynamic nature of international events, introduction of new equipment, advances in warfighting doctrine and procedures, and force structure changes. Such developments influenced the frequency, duration, intensity, and location of required training. Factors influencing tempo and types of activities are variable by nature, and will continue to cause fluctuations in training activities at the FRTC and in its associated airspace. Accordingly, training activity data used throughout this EIS are a representative baseline for evaluating impacts that may result from the proposed training activities.

Navy training activities currently conducted at the FRTC, presented as the No Action Alternative, have been ongoing at various levels and frequencies since the 1940s. Activities averaged over the years of 2010–2012 provide the baseline level for the analysis. Under the No Action Alternative, the Navy would not increase the training activities or provide for range investments.

Training activities at the FRTC would continue to involve unit level events, coordinated events, and major exercises. Unit level events are typically of relatively short duration involving few participants focused on individual and team training within a unit. The coordinated event is typically conducted by several participants of the same type (e.g., two or more air platforms) or several participants of different types working together on the same mission (e.g., a helicopter or an FA-18). During major exercises, the number of participants varies and more than one type of training event is conducted. The Navy would continue to use the airspace and provide the range operations support. Evaluation of the No Action Alternative in this EIS provides a baseline for assessing environmental impacts of Alternative 1 and Alternative 2, as described in the following subsections.

ES.5.2 Alternative 1 – Increase Training Activities by 6 percent

Alternative 1, in addition to accommodating training activities addressed in the No Action Alternative, would support an approximately 6 percent increase in the types of training activities and the number of

[3] The "National Command Authority" is a term used by the U.S. military and government to refer to the ultimate lawful source of military orders. The term refers collectively to the President of the United States (as Commander-in-Chief) and the U.S. Secretary of Defense.

training events conducted at FRTC, and accommodate force structure changes. The specific activities that contribute to this overall 6 percent increase are Combat Search and Rescue exercises, Gunnery Exercise (Air-to-Ground), High-speed Anti-radiation Missile Exercises (simulation only, non-firing), and Missile Exercises (Air-to-Ground) (Table 2-4). In addition, two new activities, Ground LASER Targeting and Dismounted Fire and Maneuver, would be conducted under Alternative 1.

ES.5.3 Alternative 2 (Preferred Alternative) – Alternative 1 Plus a 10 Percent Increase in Training Activities

Implementation of Alternative 2 (which has been selected by the Navy as its Preferred Alternative) includes all elements of Alternative 1 (accommodating currently conducted and increased training activities and range enhancements). In addition, under Alternative 2, all training activities identified in Alternative 1 would increase by an 10 percent over Alternative 1 (for a 16% total increase over baseline [no action] conditions).

ES.6 Affected Environment and Environmental Consequences

The EIS describes existing environmental conditions and assesses the environmental effects of the Proposed Action and alternatives. The affected environment and environmental consequences are described and analyzed according to categories of resources. The categories of resources addressed, and their respective section numbers in the EIS, are listed in Table ES-1.

Table ES-1: Categories of Resources Addressed in the Environmental Impact Statement

Soils (3.1)	Land Use and Recreation (3.6)
Air Quality (3.2)	Socioeconomics, Environmental Justice, and Protection of Children (3.7)
Water Quality (3.3)	Transportation (3.8)
Noise (3.4)	Cultural Resources (3.9)
Biological Resources (3.5)	Public Health and Safety (3.10)

During the environmental impact analysis process, the resources analyzed are identified and the expected geographic scope of potential impacts for each resource is defined. Known as the resource's region of influence, this area is defined as the geographic area in which impacts to the subject resource have the potential to occur. For most resource categories, the region of influence coincides with the air and land training areas of the FRTC. For some resources, the region of influence encompasses broader regions.

Describing the environment and analyzing impacts require a comprehensive and systematic review of relevant literature and data to ensure that only the best available information is used for analysis. Section 3.0.1 (Data Sources) describes the data used and the characteristics of the best available data.

The general approach to analysis is provided in Section 3.0.2 (General Approach to Analysis). This section describes how the Proposed Action is broken down into stressors that are analyzed for each resource. It provides a general analysis framework, preliminary impact screening, resource-specific individual stressor analysis, synthesis of ecosystem effects of the Proposed Action, and introduction to cumulative impacts analysis.

Chapter 3 (Affected Environment and Environmental Consequences) concludes by assessing impacts on physical resources (soils, air quality, and water quality), biological resources (wildlife and vegetation), and human resources (land use and recreation; socioeconomics, environmental justice, and protection of children; transportation; cultural resources; and public health and safety) (Sections 3.1 through 3.10). Each resource section has a more focused description of the regulatory framework applicable to that resource, a more focused approach to analysis, a discussion of the affected environment of that resource, the environmental consequences of the Proposed Action and alternatives, a summary of the impacts to that resource, and the regulatory determination of impacts on that resource.

In determining environmental consequences, this chapter incorporates current resource protection measures such as standard operating procedures (SOPs), best management practices (BMPs), and conservation measures that are integral to the activities covered by the Proposed Action and its alternatives. If the analysis in a resource section identifies potential impact on the resource from the Proposed Action, methods are proposed that would minimize or mitigate the potential impacts identified. These mitigation measures are discussed at the end of each resource section and summarized in Chapter 5 (Best Management Practices, Monitoring, and Mitigation Measures).

ES.7 Summary of Effects

Environmental effects which may result from the implementation of the Proposed Action or alternatives are summarized at the end of this summary in Table ES-2. Analysis of the activities described in the action alternatives and conclusions for all resource categories can be found in Chapter 3 (Affected Environment and Environmental Consequences).

Table ES-2: Summary of Effects

Resource	No Action Alternative	Alternative 1	Alternative 2
3.1 Soils	• Potential Release of Contaminants: Long-term effects in the form of accumulation of military munitions, metals, and explosives in surface soils. Effects would be localized. • Physical Disturbance: Long-term, minor effects from training activities in the form of soil erosion, compaction, and displacement. Effects would be localized. ***Impact Conclusion*** • The No Action Alternative would not result in significant impacts on soils.	• Potential Release of Contaminants: Long-term effects in the form of accumulation of munitions, metals, and explosives in surface soils. Effects would be localized. • Physical Disturbance: Long-term, minor effects from training activities in the form of soil erosion, compaction, and displacement. Effects would be localized. ***Impact Conclusion*** • Alternative 1 would not result in significant impacts on soils.	• Potential Release of Contaminants: Long-term effects in the form of accumulation of munitions, metals, and explosives in surface soils. Effects would be localized. • Physical Disturbance: Long-term, minor effects from training activities in the form of soil erosion, compaction, and displacement. Effects would be localized. ***Impact Conclusion*** • Alternative 2 would not result in significant impacts on soils.
3.2 Air Quality	• Criteria Air Pollutant Emissions: Changes to air quality would not be detectable and would be below or within historical or desired air quality conditions. • Hazardous Air Pollutant: Changes to air quality would not be detectable and would be below or within historical or desired air quality conditions. • Fugitive Dust Emissions: Changes to air quality would not be detectable and would be below or within historical or desired air quality conditions. ***Impact Conclusion*** • The No Action Alternative would not result in significant impacts on air quality.	• Criteria Air Pollutant Emissions: Small increase relative to baseline Nevada emissions. Measurable changes in air quality would be expected locally, but the attainment status in the Northwest Nevada Intrastate Air Quality Control Region and Nevada Intrastate Air Quality Control Region would not be affected. • Hazardous Air Pollutant: Small increase relative to baseline Nevada emissions. Measurable changes in air quality would be expected locally, but the attainment status in the Northwest Nevada Intrastate Air Quality Control Region and Nevada Intrastate Air Quality Control Region would not be affected. • Fugitive Dust Emissions: Long-term, minor, and localized effects from dust during ground-based training. Best management practices would minimize dust. ***Impact Conclusion*** • Alternative 1 would not result in significant impacts on air quality.	• Criteria Air Pollutant Emissions: Small increase relative to baseline Nevada emissions. Measurable changes in air quality would be expected locally, but the attainment status in the Northwest Nevada Intrastate Air Quality Control Region and Nevada Intrastate Air Quality Control Region would not be affected. • Hazardous Air Pollutant: Small increase relative to baseline Nevada emissions. Measurable changes in air quality would be expected locally, but the attainment status in the Northwest Nevada Intrastate Air Quality Control Region and Nevada Intrastate Air Quality Control Region would not be affected. • Fugitive Dust Emissions: Long-term, minor, and localized effects from dust during ground-based training. Best management practices would minimize dust. ***Impact Conclusion*** • Alternative 2 would not result in significant impacts on air quality.

Table ES-2: Summary of Effects (continued)

Resource	No Action Alternative	Alternative 1	Alternative 2
3.3 Water Quality	• Potential contaminants would not migrate to surface waters or groundwater. • Extremely low risk of spills based on current activities. • Low risk of soil sediments migrating into surface waters or groundwater. • Portions of ranges compacted by ground vehicles would be very small relative to the overall range area. ***Impact Conclusion*** • The No Action Alternative would not result in significant impacts on water quality.	• Potential contaminants would not migrate to surface waters or groundwater. • Extremely low risk of spills based on current activities. • Low risk of soil sediments migrating into surface waters or groundwater. • Portions of ranges compacted by ground vehicles would be very small relative to the overall range area. ***Impact Conclusion*** • Alternative 1 would not result in significant impacts on water quality.	• Potential contaminants would not migrate to surface waters or groundwater. • Extremely low risk of spills based on current activities. • Low risk of soil sediments migrating into surface waters or groundwater. • Portions of ranges compacted by ground vehicles would be very small relative to the overall range area. ***Impact Conclusion*** • Alternative 2 would not result in significant impacts on water quality.
3.4 Noise	• Aircraft overflights would create discrete brief noise events that, while noticeable because they would exceed the ambient background sound level, would contribute very little to the hourly average sound level. • Community sound levels from aircraft activities are compatible with land uses such as residences, transient lodging, and medical facilities. • Noise-generating events from ordnance would be intermittent, occur in areas removed from sensitive receptors, and would not expose sensitive receptors to high noise levels. ***Impact Conclusion*** • There are no incompatible land use areas, and the No Action Alternative would not represent degradation in the noise environment.	• Aircraft overflights would create discrete brief noise events that, while noticeable because they would exceed the ambient background sound level, would contribute very little to the hourly average sound level. • Community sound levels from aircraft activities are compatible with land uses such as residences, transient lodging, and medical facilities. • Noise-generating events from ordnance would be intermittent, occur in areas removed from sensitive receptors, and would not expose sensitive receptors to high noise levels. ***Impact Conclusion*** • There are no incompatible land use areas, and Alternative 1 would not represent degradation in the noise environment.	• Aircraft overflights would create discrete brief noise events that, while noticeable because they would exceed the ambient background sound level, would contribute very little to the hourly average sound level. • Community sound levels from aircraft activities are compatible with land uses such as residences, transient lodging, and medical facilities. • Noise-generating events from ordnance would be intermittent, occur in areas removed from sensitive receptors, and would not expose sensitive receptors to high noise levels. ***Impact Conclusion*** • There are no incompatible land use areas, and Alternative 2 not represent degradation in the noise environment.

Table ES-2: Summary of Effects (continued)

Resource	No Action Alternative	Alternative 1	Alternative 2
3.5 Biological Resources	• Noise may elicit physiological and behavioral responses in wildlife. Exposed individuals would be expected to quickly recover from these responses and exposure would be intermittent and infrequent. The short-term behavioral responses are not expected to affect the fitness of individuals. Therefore, population-level effects would not occur. • Animals may respond to a laser beam, but exposed individuals would be expected to quickly recover from these responses, and exposure would be intermittent and infrequent. The short-term behavioral responses are not expected to affect the fitness of individuals, and population-level effects would not occur. • Aircraft strikes that might occur would have minor localized effects on birds and bats and are not expected to affect other mammals, amphibians, or reptile populations. • Munition strikes are not expected to have population-level effects on wildlife species. • Other ground-disturbing activities would not result in additional loss of vegetation communities or additional direct alteration of habitat. • Implementation of the No Action Alternative would not adversely affect sediments, water, or air quality and, therefore, would not indirectly impact terrestrial species or habitats. ***Impact Conclusion*** • The No Action Alternative would not result in significant impacts on biological resources.	• Noise may elicit physiological and behavioral responses in wildlife. Exposed individuals would be expected to quickly recover from these responses and exposure would be intermittent and infrequent. The short-term behavioral responses are not expected to affect the fitness of individuals. Therefore, population-level effects would not occur. • Animals may respond to a laser beam, but exposed individuals would be expected to quickly recover from these responses, and exposure would be intermittent and infrequent. The short-term behavioral responses are not expected to affect the fitness of individuals, and population-level effects would not occur. • Aircraft strikes that might occur would have minor localized effects on birds and bats and are not expected to affect other mammals, amphibians, or reptile populations. • Munition strikes are not expected to have population-level effects on wildlife species. • Other ground-disturbing activities would not result in additional loss of vegetation communities or additional direct alteration of habitat. • Implementation of the Alternative 1 would not adversely affect sediments, water, or air quality and, therefore, would not indirectly impact terrestrial species or habitats. ***Impact Conclusion*** • Alternative 1 would not result in significant impacts on biological resources.	• Noise may elicit physiological and behavioral responses in wildlife. Exposed individuals would be expected to quickly recover from these responses and exposure would be intermittent and infrequent. The short-term behavioral responses are not expected to affect the fitness of individuals. Therefore, population-level effects would not occur. • Animals may respond to a laser beam, but exposed individuals would be expected to quickly recover from these responses, and exposure would be intermittent and infrequent. The short-term behavioral responses are not expected to affect the fitness of individuals, and population-level effects would not occur. • Aircraft strikes that might occur would have minor localized effects on birds and bats and are not expected to affect other mammals, amphibians, or reptile populations. • Munition strikes are not expected to have population-level effects on wildlife species. • Other ground-disturbing activities would not result in additional loss of vegetation communities or additional direct alteration of habitat. • Implementation of Alternative 2 would not adversely affect sediments, water, or air quality and, therefore, would not indirectly impact terrestrial species or habitats. ***Impact Conclusion*** • Alternative 2 would not result in significant impacts on biological resources.

Table ES-2: Summary of Effects (continued)

Resource	No Action Alternative	Alternative 1	Alternative 2
3.6 Land Use	• Existing land uses are compatible with training-related noise levels. • Existing land uses are compatible with operations in Range Compatibility Zone-I, Range Compatibility Zone-II, and Range Compatibility Zone-III under Alternative 1. • Current access restrictions on Navy-administered lands would not change and impacts would be negligible. ***Impact Conclusion*** • The No Action Alternative would not result in significant impacts on land use and recreation.	• Existing land uses would remain compatible with training-related noise levels. • Existing land uses would remain compatible with operations in Range Compatibility Zone-I, Range Compatibility Zone-II, and Range Compatibility Zone-III under Alternative 1. • Training activities proposed for Alternative 1 would not result in changes to current access restrictions on Navy-administered lands and impacts would be negligible. ***Impact Conclusion*** • Alternative 1 would not result in significant impacts on land use and recreation.	• Existing land uses would remain compatible with training-related noise levels. • Existing land uses would remain compatible with operations in Range Compatibility Zone-I, Range Compatibility Zone-II, and Range Compatibility Zone-III under Alternative 2. • Training activities proposed for Alternative 2 would not result in changes to current access restrictions on Navy-administered lands and impacts would be negligible. ***Impact Conclusion*** • Alternative 2 would not result in significant impacts on land use and recreation.

Table ES-2: Summary of Effects (continued)

Resource	No Action Alternative	Alternative 1	Alternative 2
3.7 Socioeconomics, Environmental Justice, and Protection of Children	• Regional and community economics, employment, housing, and population growth are not affected as a result of the No Action Alternative stressors (i.e., noise, physical disturbance, or economics and usability). • Presents no disproportionately high and adverse human or environmental health effects (from noise or secondary stressors) on minority populations and low-income populations compared to communities of comparison, the state of Nevada, and the United States. • Presents no disproportionate health and safety risks (from noise or secondary stressors) to children. ***Impact Conclusion*** • The No Action Alternative would result in no significant impacts on the regional and community economics, employment, housing, and population. • The No Action Alternative would result in no significant or disproportionately high and adverse human or environmental health impacts on minority populations and low-income populations compared to communities of comparison, the state of Nevada, and the United States. • The No Action Alternative would result in no significant or disproportionate environmental health or safety risks to children.	• Beneficial effects on the local economy would result from increased spending by additional military personnel employed by NAS Fallon and the increased military personnel participating in military readiness activities while in the local area. • Local activities would need to schedule use of airspace, but there would be no significant impact or change in economic activity related to farming and ranching operations. • Presents no disproportionately high and adverse human or environmental health effects (from noise or secondary stressors) on minority populations and low-income populations compared to communities of comparison, the state of Nevada, and the United States. • Presents no disproportionate health and safety risks (from noise or secondary stressors) to children. ***Impact Conclusion*** • Alternative 1 would result in no significant impacts on the socioeconomics of the FRTC Study Area. • Alternative 1 would result in no significant or disproportionately high and adverse human or environmental health impacts on minority populations and low-income populations compared to communities of comparison, the state of Nevada and the United States. • Alternative 1 would result in no significant or disproportionate environmental health or safety risks to children.	• Beneficial effects on the local economy would result from increased spending by additional military personnel employed by NAS Fallon and the increased military personnel participating in military readiness activities while in the local area. • Local activities would need to schedule use of airspace, but there would be no significant impact or change in economic activity related to farming and ranching operations. • Presents no disproportionately high and adverse human or environmental health effects (from noise or secondary stressors) on minority populations and low-income populations compared to communities of comparison, the state of Nevada, and the United States. • Presents no disproportionate health and safety risks (from noise or secondary stressors) to children. ***Impact Conclusion*** • Alternative 2 would result in no significant impacts on the socioeconomics of the FRTC Study Area. • Alternative 2 would result in no significant or disproportionately high and adverse human or environmental health impacts on minority populations and low-income populations compared to communities of comparison, the state of Nevada, and the United States. • Alternative 2 would result in no significant or disproportionate environmental health or safety risks to children.

Table ES-2: Summary of Effects (continued)

Resource	No Action Alternative	Alternative 1	Alternative 2
3.8 Transportation	• There would be no anticipated impacts on ground traffic transportation resources as the activities occur on the FRTC in training areas specifically designed for such activities. • There would be no anticipated impacts on level of service in the Study Area due to ground transportation accessibility factors. • With implementation of Standard Operating Procedures, there would be no anticipated impacts on existing capacity in air transportation such that the proposed level of activity could not be accommodated within established operational procedures and flight patterns. • Implementation of the No Action Alternative would not result in an increased collision potential between military and non-participating civilian operation due to air transportation accessibility factors in the Study Area. ***Impact Conclusion*** • The No Action Alternative would not result in significant impacts on transportation.	• The increase of ground-based training activities will not impact ground traffic transportation resources as the activities occur on the FRTC in training areas specifically designed for such activities. • There would be no anticipated impacts on level of service in the Study Area due to ground transportation accessibility factors. • With implementation of Standard Operating Procedures, there would be no anticipated impacts on existing capacity in air transportation such that the increased level of activity could not be accommodated within established operational procedures and flight patterns. • Implementation of Alternative 1 would not result in an increased collision potential between military and non-participating civilian operation due to air transportation accessibility factors in the Study Area. ***Impact Conclusion*** • Alternative 1 would not result in significant impacts on transportation.	• The increase of ground-based training activities will not impact ground traffic transportation resources as the activities occur on the FRTC in training areas specifically designed for such activities. • There would be no anticipated impacts on level of service in the Study Area due to ground transportation accessibility factors. • With implementation of Standard Operating Procedures, there would be no anticipated impacts on existing capacity in air transportation such that the increased level of activity could not be accommodated within established operational procedures and flight patterns. • Implementation of Alternative 2 would not result in an increased collision potential between military and non-participating civilian operation due to air transportation accessibility factors in the Study Area. ***Impact Conclusion*** • Alternative 2 would not result in significant impacts on transportation.

Table ES-2: Summary of Effects (continued)

Resource	No Action Alternative	Alternative 1	Alternative 2
3.9 Cultural Resources	• The current level of supersonic events (458 during busiest month) is within the parameters (500 supersonic sorties per month or 6,000 sorties per year) defined by Sutherland et al. (1990) as creating negligible to minor damage to caves, rockshelters, or rock formations containing petroglyphs (probability of damage ranging from 0.1 to 1 percent on any given day). Procedures are in place for the identification, evaluation, and protection of such resources as defined in the Programmatic Agreement (PA) (Naval Air Station Fallon et al. 2011). • Protective measures for National Register of Historic Places (NRHP)-eligible cultural resources located in existing ground-based training areas are implemented in accordance with the PA. ***Impact Conclusion*** • The Navy's effects determinations are pending consultation with the SHPO and Native American Tribes.	• The current level of supersonic events (458 during busiest month) is within the parameters (500 supersonic sorties per month or 6,000 sorties per year) defined by Sutherland et al. (1990) as creating negligible to minor damage to caves, rockshelters, or rock formations containing petroglyphs (probability of damage ranging from 0.1 to 1 percent on any given day). Procedures are in place for the identification, evaluation, and protection of such resources as defined in the Programmatic Agreement (PA) (Naval Air Station Fallon et al. 2011). • Protective measures for National Register of Historic Places (NRHP)-eligible cultural resources located in existing ground-based training areas are implemented in accordance with the PA. ***Impact Conclusion*** • The Navy's effects determinations are pending consultation with the State Historic Preservation Office (SHPO) and Native American Tribes.	• The estimated 502 supersonic events during the busiest month is slightly above the parameters (500 supersonic sorties per month or 6,000 sorties per year) defined by Sutherland et al. (1990) as creating negligible to minor damage to caves, rockshelters, or rock formations containing petroglyphs (probability of damage ranging from 0.1 to 1 percent on any given day) and represents a 10 percent increase above the No Action Alternative and Alternative 1. Procedures are in place for the identification, evaluation, and protection of such resources as defined in the Programmatic Agreement (PA) (Naval Air Station Fallon et al. 2011). • Protective measures for National Register of Historic Places (NRHP)-eligible cultural resources located in existing ground-based training areas are implemented in accordance with the PA. ***Impact Conclusion*** • The Navy's effects determinations are pending consultation with the SHPO and Native American Tribes.

Table ES-2: Summary of Effects (continued)

Resource	No Action Alternative	Alternative 1	Alternative 2
3.10 Public Health and Safety	• Training activities at FRTC take place in well-defined locations under the close supervision of experienced military personnel. • The same policies and procedures that protect training participants from injury or adverse health exposures would protect members of the public. • Strict operating procedures are in place, including ensuring clearance of the area before commencing training activities. • Routine training activities conducted within the FRTC pose little risk to public health or safety outside of the training areas. • No significant impacts on public health and safety are expected. ***Impact Conclusion*** • The No Action Alternative would not result in significant impacts on public health and safety.	• Training activities would increase. The Navy would continue to implement range planning and control procedures to avoid public safety issues. • No additional impacts are expected beyond those described in the No Action Alternative because Navy operational procedures and practices are already in place. • No significant impacts on public health and safety are expected. ***Impact Conclusion*** • Alternative 1 would not result in significant impacts on public health and safety.	• Training activities would increase. The Navy would continue to implement range planning and control procedures to avoid public safety issues. • No additional impacts are expected beyond those described in the No Action Alternative because Navy operational procedures and practices are already in place. • No significant impacts on public health and safety are expected. ***Impact Conclusion*** • Alternative 2 would not result in significant impacts on public health and safety.

Notes: FRTC = Fallon Range Training Center, NAS = Naval Air Station, NRHP = National Register of Historic Places, PA = Programmatic Agreement, SHPO = State Historic Preservation Office

ES.8 Cumulative Impacts

Cumulative impacts were analyzed by following the NEPA of 1969, CEQ regulations, and CEQ guidance (40 C.F.R. §§1500–1508). Identifiable impacts of actions occurring in the past and present were analyzed, along with reasonably foreseeable future actions, to assess additive impacts of the Proposed Action, as well as other activities occurring in the region. Analyses indicate that the incremental contribution of the No Action Alternative, Alternative 1, or Alternative 2 to cumulative impacts on soils, air quality, water quality, noise, biological resources, land use and recreation, socioeconomic resources, transportation, cultural resources, and public health and safety would not rise to the level of significance. The No Action Alternative, Alternative 1, or Alternative 2 would make an incremental contribution to greenhouse gas emissions, representing approximately 0.01, 0.01, and 0.01 percent of U.S. 2011 greenhouse gas emissions, respectively.

ES.9 Mitigation Measures

As part of the U.S. Navy's commitment to sustainable use of resources and environmental stewardship, the Navy incorporates measures that are protective of the environment into all of their activities. These include employment of BMPs, SOPs, adoption of conservation recommendations, and other measures that mitigate the impacts of training activities on the environment. Some of these measures are generally applicable, while others are designed to apply to certain geographic areas during certain times of year, for specific types of military training.

Each of the alternatives considered in this EIS includes proposed BMPs and mitigation measures intended to reduce the environmental effects of Navy activities. Both BMPs and mitigation measures are discussed throughout the EIS in connection with affected resources, and are addressed in Chapter 5 (Best Management Practices, Monitoring, and Mitigation Measures).

ES.10 Other Required Considerations

ES.10.1 Possible Conflicts with Objectives of Federal, State, and Local Plans, Policies, and Controls

Implementation of the Proposed Action for FRTC EIS would not conflict with the objectives or requirements of federal, state, regional, or local plans, policies, or legal requirements. The United States Navy consulted with regulatory agencies as appropriate during the NEPA process and before implementation of the Proposed Action to ensure requirements are met.

ES.10.2 Relationship between Short-Term Uses and Long-Term Productivity

In accordance with the CEQ regulations (Part 1502), this EIS analyzes the relationship between the short-term impacts on the environment and the effects those impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. This means that choosing one option may reduce future flexibility in pursuing other options, or that committing a resource to a certain use often may eliminate the possibility for other uses of that resource.

The majority of activities addressed in this EIS would be categorized as long term. For example, although the use of training areas for individual training activities may be of short duration, the training areas would continue to receive increased and repeated use for the foreseeable future. Because the Proposed Action includes an increase in training frequency, areas designated for training would accommodate a higher level of operational uses in the long term that would, in turn, affect the long-term productivity of

environmental resources in those areas. Addressing such shortfalls through planning and accommodation of future training tempo requirements and deployment schedules will allow the Navy to more readily facilitate long-term resource management strategies while achieving the near-term goal of providing the capacity and capabilities to fully support required training tasks and meet the Title 10 mandate to be organized, trained, and equipped for prompt and sustained combat.

ES.10.3 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

Military training activities would increase at the FRTC under the Proposed Action, but these activities would continue to be conducted in the same locations where they currently take place. The only irretrievable commitment of resources associated with increased training activities would be fossil fuel consumption, which would increase proportionately with training activities (in Alternative 1, roughly 6 percent above the No Action Alternative, and in Alternative 2, 10 percent above Alternative 1). As outlined in Table 6-1, the effects of fuel consumption under the Proposed Action are minimized by the Navy's commitment to improving energy security in accordance with Executive Order 13514. Irreversible and irretrievable commitment of resources under the Proposed Action would be negligible.

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ACRONYMS AND ABBREVIATIONS

$\mu g/m^3$	micrograms per cubic meter
µm	micrometers
A-G	Air-to-Ground
AAW	Anti-Air Warfare
ac.	acre(s)
ac./-ft.	acre foot/feet
ACEC	Areas of Critical Environmental Concern
ADNL	A-weight Day Night Level
AGL	above ground level
AIRFA	American Indian Religious Freedom Act
APE	Area of Potential Effect
APKWS	Advanced Precision Kill Weapon System
AQCR	Air Quality Control Region
ARTCC	Air Route Traffic Control Center
ATC	Air Traffic Control
ATCAA	Air Traffic Control Assigned Airspace
B	Bravo
BASH	Bird/Animal Aircraft Strike Hazard
BLM	Bureau of Land Management
BOR	Bureau of Reclamation
BMP	Best Management Practice
BNOISE	Blast Noise Prediction Program
C	°Celsius
C.F.R.	Code of Federal Regulations
cal	caliber
CAS	Close Air Support
CDNL	C-weighted Day Night Level
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CH_4	methane
cm	centimeter(s)
CO	carbon monoxide
CO_2	carbon dioxide
CO_2 Eq.	carbon dioxide equivalent
COA	Certificates of Waiver of Authorization
COMPTUEX	Composite Training Unit Exercise
CONUS	Continental United States
CVW	Carrier Air Wing
dB	decibels
dBA	A-weighted decibels
dBC	C-weighted decibels
dBP	unweighted decibels
DNL	Day-Night Average Sound Level(s)
DoD	Department of Defense
DOE	Department of Energy
DPS	Distinct Population Segment
DVTA	Dixie Valley Training Area
EA	Environmental Assessment
Eagle Act	The Bald and Golden Eagle Protection Act
EIS	Environmental Impact Statement
EO	Executive Order
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
ESA	Endangered Species Act
EW	Electronic Warfare
EXW	Expeditionary Warfare
F	°Fahrenheit
FAA	Federal Aviation Administration
FBI	Federal Bureau of Investigation
FL	Flight level
FONSI	Finding of No Significant Impact
FR	Federal Register
FRTC	Fallon Range Training Complex
FRTP	Fleet Readiness Training Plan
ft.	foot/feet
$ft.^2$	square foot/feet
FY	Fiscal Year
G	gauss
GUNEX	gunnery exercises
ha	hectare(s)
HARM	High-speed Anti-radiation Missile
HARMEX	High-speed Anti-radiation Missile Exercise
HMX	High Melting Explosive
Hwy	Highway
Hz	Hertz
ICRMP	Integrated Cultural Resources Management Plan
in.	inch(es)
INRMP	Integrated Natural Resources Management Plan
IPaC	Information, Planning, and Conservation System
JTFEX	Joint Task Force Exercise
km	kilometer(s)
km^2	square kilometer(s)
kV	kilovolt(s)
L_{eq}	equivalent sound level

LASER	Light Amplification by Stimulated Emission of Radiation
lb.	pound(s)
Ldn	Day-Night Average Sound Level
L_{dnmr}	Monthly Average, Ldn (DNL)
Leq24	continuous sound level
LOGIR	Low Cost Guided Imaging Rocket
LS	Landscaped
M	manual
m	meter(s)
m^2	square meter(s)
MARSA	Military Assumes Responsibility for Separation of Aircraft
MBTA	Migratory Bird Treaty Act
mi.	mile(s)
$mi.^2$	square mile(s)
MLWA	Military Lands Withdrawal Act
mm	millimeter(s)
MOA	Military Operations Area
MOU	Memorandum of Understanding
mph	miles per hour
MSL	mean sea level
MTR	Military Training Route
MW	megawatt(s)
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NAGPRA	Native American Graves Protection and Repatriation Act
NAS	Naval Air Station
Navy	United States Department of the Navy
NDOT	Nevada Department of Transportation
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
nm	nautical mile(s)
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NOI	Notice of Intent
NRHP	National Register of Historic Places
NSAWC	Naval Strike and Air Warfare Center
NSW	Naval Special Warfare
NSWC	Naval Strike Warfare Center
O_3	Ozone
OPNAV	Office of the Chief of Naval Operations
OPNAVINST	Office of the Chief of Naval Operations Instruction
ORC	Operational Range Clearance
PA	Programmatic Agreement
Pb	lead
PL	Playa Habitat
PM (1)	Nevada State Protected Mammal
PM (2)	particulate matter
$PM_{2.5}$	fine particulate matter less than or equal to 2.5 micrometers in diameter
PM_{10}	suspended particulate matter less than or equal to 10 micrometers in diameter
ppb	parts per billion
ppm	parts per million
PS	Piedmont Slope Habitat
PT	Proposed Threatened
PTS	Permanent Threshold Shift
R	Restricted Area
RAICUZ	Range Air Installations Compatible Use Zones
RATCC	Radar Air Traffic
RCRA	Resource Conservation and Recovery Act
RDX	Royal Demolition Explosive
ROC	Range Operations Center
ROD	Record of Decision
SDZ	Surface Danger Zone
SECNAVINST	Secretary of the Navy Instruction
SEL	Sound Exposure Level
SELr	Onset-Rate Sound Exposure Level
SG	Sagebrush Habitat
SHPO	State Historic Preservation Office/Officer
SM	Nevada State Sensitive Mammal
SN	Sandy Habitat
SOA	Supersonic Operating Area
SOP	Standard Operating Procedure
SO_2	sulfur dioxide
sp.	species
spp.	subspecies
STRIKE U	Naval Strike Warfare Center
STW	Strike Warfare
SUA	Special Use Airspace
T	threatened
TAC D&E	Tactical Development and Evaluation
TACTS	Tactical Aircrew Combat Training System
TCTS	Tactical Combat Training System
Tg	teragrams

Tg CO_2 Eq.	teragrams of carbon dioxide equivalents
TNT	trinitrotoluene
TOPDOME	Carrier Airborne Early Warning Weapons School
TOPGUN	Navy Fighter Weapons School
TTS	Temporary Threshold Shift
U.S.	United States
U.S.C.	United States Code
UAS	Unmanned Autonomous System
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VFR	Visual Flight Rules
WAP	Wildlife Action Plan
WT	Wetland

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GLOSSARY

Term	Definition
Best Management Practice (BMP)	An effective and practical method or means for restoring, reducing, or eliminating perceived environmental risks. A BMP may encompass the installation of structural devices or the implementation of non-structural practices or activities, prohibitions of practices, operating procedures, maintenance procedures, and/or other management techniques.
Large Arms	For purposes of this Environmental Impact Statement (EIS), these are weapons that are larger than .50 caliber. Examples include 105 millimeter (mm) mortar rounds.
Live fire	The act of engaging a weapon such that a projectile is forcibly ejected from that weapon. Live fire is different from dry fire in that during a dry fire activity, the weapon is engaged, but no projectile is ejected.
Low-Altitude Tactical Training (LATT)	LATT simulates combat conditions, where aircraft will operate at altitudes as low as 200 feet (ft.) (61 meters [m]) above ground level and at high airspeed (in excess of 250 knots [287.7 miles per hour]) to defeat simulated ground missile radars and avoid sophisticated surface-to-air missiles, anti-aircraft artillery, and enemy fighters.
Military Operations Area (MOA)	Airspace designated outside of Class A airspace (the airspace from flight level [FL] 180 or 18,000 ft. [5,486 m] to FL 600 or 60,000 ft. [18,288 m]), to separate or segregate certain nonhazardous military activities from Instrument Flight Rules traffic and to identify for Visual Flight Rules traffic where these activities are conducted. MOAs are designated to contain nonhazardous, military flight activities including, but not limited to, air combat maneuvers, air intercepts, low altitude tactics, etc. Aircraft utilizing the MOA are not engaged in any firing or bombing activities.
Military Readiness Activity	Readiness activities are defined as all training activities and military operations related to combat and the testing of equipment for combat use.
Mitigation	Methods or techniques that can directly reduce a potential adverse impact through avoidance, minimization, rectification, reduction, or compensation.
Military Lands Withdrawal Act (MLWA)	The MLWA withdraws and reserves certain public land under the jurisdiction of the Secretary of the Interior for military uses, and for other purposes. The MLWA also assigns responsibility of the withdrawn lands to an appropriate Federal agency.
Restricted Area (R)	Airspace established under 14 Code of Federal Regulations (C.F.R.) Part 73 provisions, within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Restricted areas are established when determined necessary to confine or segregate activities. An R denotes an area where unusual, often dangerous, hazards to aircraft such as weapons firing, aerial gunnery, or Unmanned Autonomous System (UAS) activities occur.
Right of Way Lands	Public lands that have been designated for use by a specific project (e.g., roads, pipelines, transmission lines, etc.) by the Bureau of Land Management. These designations authorize rights and privileges for the use of the designated land for a specific period of time (usually the lifetime of the respective project).
Small Arms	For purposes of this EIS, these are weapons that are .50 caliber and below. Examples of small arms include 5.56 mm to 40 mm rounds, and up to 81 mm mortar rounds.
Special Use Airspace (SUA)	Airspace of defined dimensions wherein 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. The types of SUA are Prohibited Areas, Restricted Areas, MOA, Warning Areas, Alert Areas, Controlled Firing Areas, and National Security Areas.
Standard Operating Procedure (SOP)	An established procedure to be followed in carrying out a given operation or in a given situation to provide for the safety of personnel and equipment, as well as the success of the training and testing activities.

Stewardship	The responsibility for management of lands and environment by those whose actions affect those resources. For example, the United States (U.S.) Department of the Navy (Navy) has a responsibility to serve as a good steward of the environment, as training activities utilize resources within the environment. This responsibility is fulfilled by investing in programs that minimize, and in some cases eliminate, the effects of activities on the environment.
Surface Danger Zone (SDZ)	The mathematically predicted, three-dimensional area that a projectile or fragment could travel through and impact the earth, either by direct fire or ricochet from ground weapons firing or demolition activities.
Unmanned Autonomous System (UAS)	An unmanned aircraft (UA) (also known as a “drone”), payload, and all direct support equipment. Direct support equipment includes the ground control station, ground data terminal, launch and recovery system, transport and logistics vehicles, operators and maintainers, and unit leadership. The UA is a machine that functions either by the remote control of a navigator or pilot, or autonomously, as a self-directing entity.
Weapon Danger Zone (WDZ)	The ground and airspace for lateral and vertical containment of projectiles, fragments, debris, and components resulting from the firing, launching, and/or detonation of aviation-delivered munitions.
Withdrawn Lands	Public domain lands that are held back for the use or benefit of an agency by reservation, withdrawal, or other restrictions for a special government purpose. Withdrawn lands can be either open or closed, with open lands generally permitting public access and use.

1 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

The National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] §4321 et seq.) is the basic charter for environmental planning within the United States. It requires federal decision makers to inform themselves and the public of the environmental consequences of proposed actions that may significantly affect the environment and to consider those consequences in determining courses of action. An Environmental Impact Statement (EIS) is a public document that provides a detailed assessment of the potential effects that a major federal action may have on the quality of the human environment.[1]

The United States (U.S.) Department of the Navy (Navy) prepared this Draft EIS (hereafter referred to as "EIS") to assess the potential environmental effects associated with ongoing and proposed Navy training activities (described in detail in Chapter 2, Description of Proposed Action and Alternatives) within the Fallon Range Training Complex (FRTC) and associated airspace in Nevada (Figure 1-1). The Navy is the lead agency for this EIS pursuant to 40 Code of Federal Regulations (C.F.R.) §1501.5 and §1508.5. The Bureau of Land Management (BLM) is a cooperating agency pursuant to 40 C.F.R. §1501.6 and §1508.5. This EIS was prepared in compliance with NEPA (42 U.S.C. §4321 et seq.), Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (Title 40 C.F.R. §§1500–1508), and Navy Procedures for Implementing NEPA (32 C.F.R. §775).

The Navy's mission is to organize, train, and equip combat-ready naval forces capable of winning wars, deterring aggression, and maintaining freedom of the seas. This mission is mandated by federal law (10 U.S.C. §5062), which ensures the readiness of the United States' naval forces.[2] The Navy executes this responsibility by establishing and executing training programs, and ensuring naval forces have access to the ranges, operating areas, and airspace needed to develop and maintain skills for conducting naval activities.

The primary mission of the FRTC is to support Navy and U.S. Marine Corps tactical training by providing the most realistic strike and integrated air warfare training available, conducting Tactical Development and Evaluation (TAC D&E), maintaining and operating facilities, and providing services and equipment to support the U.S. Pacific Fleet, U.S. Atlantic Fleet, U.S. Marine Corps Forces Pacific, U.S. Marine Corps Forces Atlantic, Nevada National Guard, and joint and international forces air and ground training requirements. The FRTC serves as a national range complex, as all Continental United States (CONUS)-based Carrier Air Wings complete their pre-deployment air wing training at Naval Air Station (NAS) Fallon, utilizing the FRTC. The FRTC serves as the premier regional training range complex for a variety of military units and military training activities, including Pacific Fleet forces conducting unit level, integrated, and sustainment phases of strike and air warfare training exercises. Research, Development, Acquisition, Test, and Evaluation activities are also supported provided they do not conflict with the FRTC's primary mission.

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[1] According to Council on Environmental Quality Regulation 40 C.F.R. §1508.14, the "Human Environment" shall be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment.

[2] Title 10 U.S.C. §5062 provides: "The Navy shall be organized, trained, and equipped primarily for prompt and sustained combat incident to operations at sea. It is responsible for the preparation of naval forces necessary for the effective prosecution of war except as otherwise assigned and, in accordance with integrated joint mobilization plans, for the expansion of the peacetime components of the Navy to meet the needs of war."

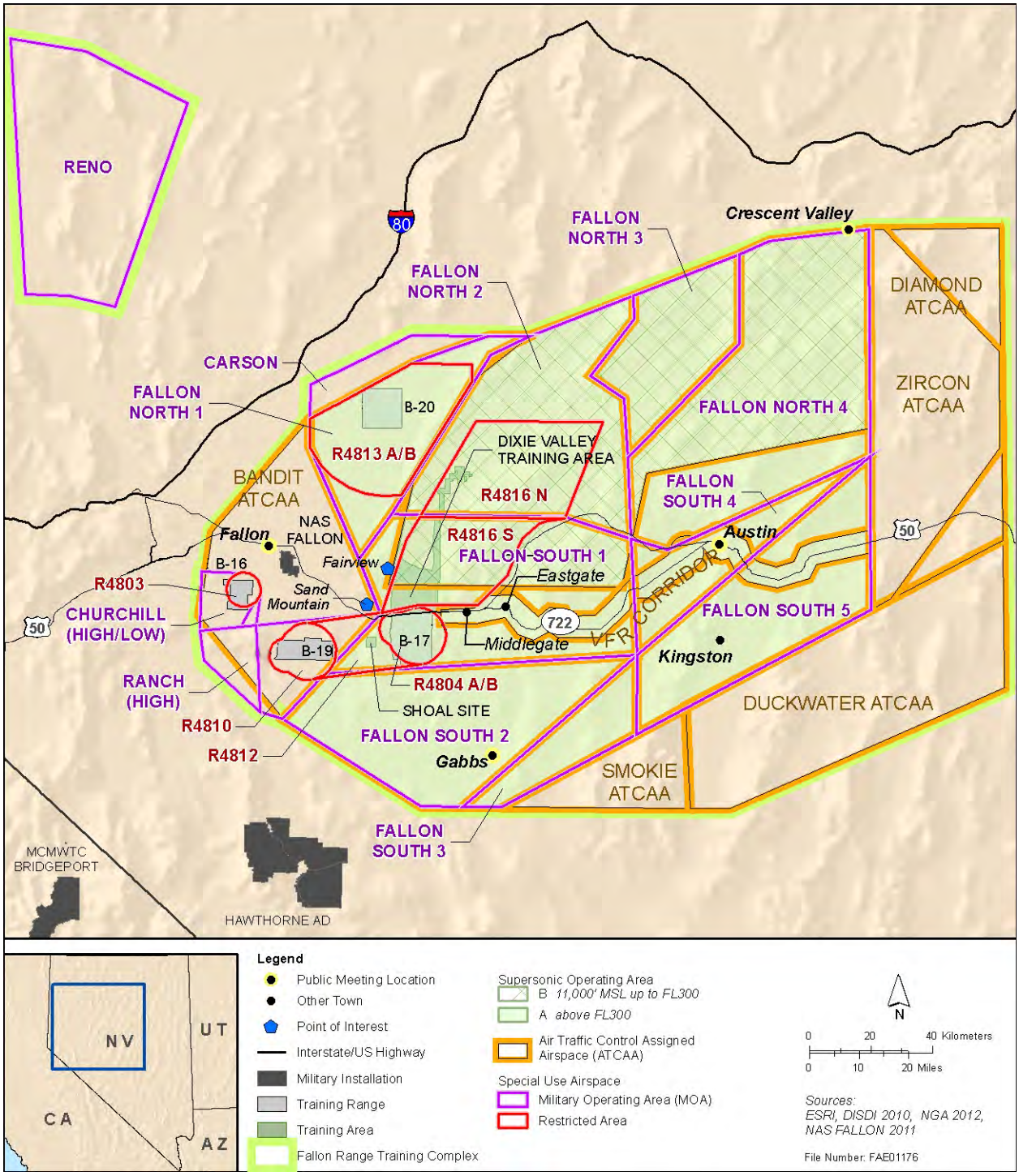

Figure 1-1: Fallon Range Training Complex and Surrounding Bases

As described in Chapter 2 (Description of Proposed Action and Alternatives), the Proposed Action is needed to ensure the continued vitality and viability of the FRTC as an essential training resource. The Proposed Action would result in critical and necessary increases in training activities, range facilities, and range infrastructure selectively focused to achieve and maintain a state of military readiness commensurate with the Navy national defense mission.

Information contained in this EIS will help Navy decision makers determine the scope and level of future military readiness activities at the FRTC. To support an informed decision, the EIS identifies objectives and criteria for military (hereafter referred to as "Service[s]") training activities at the FRTC. The core of the EIS is the development and analysis of different alternatives for achieving these objectives. Criteria set forth in Section 2.3.2 (Alternatives Development) provide the basis for the statement of the Proposed Action and alternatives and selection of alternatives for further analysis, as well as analyses of the environmental effects of the Proposed Action and alternatives (Chapter 3, Affected Environment and Environmental Consequences). Chapter 2 (Description of Proposed Action and Alternatives) also discusses alternatives that were considered but eliminated because they did not meet the purpose of and need for the Proposed Action or were not practical or feasible from a technical or economic standpoint.

1.2 Purpose And Need

The purpose of the Proposed Action is to provide sustainable and modern airspace, range, maneuver areas, training facilities, and range infrastructure and resources to fully support training activities occurring on the FRTC in accordance with the assigned roles and missions for the Naval Strike and Air Warfare Center (NSAWC).

The Proposed Action is needed to achieve and maintain military readiness by using the FRTC to support and conduct military readiness activities. In this regard, FRTC furthers the Navy's execution of its roles and responsibilities under 10 U.S.C. §5062. To comply with its Title 10 (10 U.S.C. §5062) mandates, the Navy needs to:

- maintain current levels of military readiness by enhancing training at the FRTC,
- accommodate possible future increases in training activities at the FRTC,
- accommodate training activities associated with force structure changes, and
- maintain the long-term viability of the FRTC as a military training and testing range.[3]

The Navy has developed alternatives pursuant to 40 C.F.R. §1502.14, which are discussed in Chapter 2 (Description of Proposed Action and Alternatives), based on this statement of the purpose and need.

1.3 Background

1.3.1 History of the Fallon Range Training Complex

NAS Fallon began as a U.S. Army airfield in 1942 and was subsequently commissioned as a Naval Auxiliary Air Station in 1944. The Bravo (B)-20 training range was added in 1943. Training ranges B-16, B-17, and B-19 were established in 1951. NAS Fallon formally established the FRTC in 1977 to provide integrated Special Use Airspace (SUA) and training range facilities for air warfare training. The Naval Strike Warfare Center (NSWC), also known as "Strike U," was based at NAS Fallon in 1984 to be the primary authority for integrated strike warfare (STW) tactical development and training. In 1985, a Tactical Aircrew Training System was implemented at NAS Fallon to provide squadrons, carrier air wings, and students from NSWC with graphic displays of their missions. In 1996, the NSAWC was formed with the consolidation of three commands into a single command structure, joining Strike U with the Navy Fighter Weapons School (TOPGUN) and the Carrier Airborne Early Warning Weapons School

[3] The Proposed Action also serves to allow the Air Wing Fallon training program to maintain accreditation and certification as a Joint National Training Capability program

(TOPDOME), both of which relocated from NAS Miramar, California, as a result of a Base Realignment and Closure decision in 1993.

1.3.2 THE STRATEGIC IMPORTANCE OF THE FALLON RANGE TRAINING COMPLEX

The FRTC has the highest utilization rates of all Navy range complexes for aviation training. The climate offers ideal air training opportunities year round, with an average 355 days a year in which the airspace ceiling is 3,000 feet (ft.) or higher and visibility is 3 nautical miles (nm) or greater for at least 50 percent of each day. The FRTC, with NAS Fallon, is the only naval training complex that can support, house, and train an entire carrier air wing (upward of 60 aircraft and support crews) for advanced integrated STW, electronic warfare (EW), and anti-air warfare (AAW) training. The FRTC's unique attributes include collocation with NSAWC, overland supersonic capability (where aircraft can exceed Mach 1, or the speed of sound), a sophisticated threat Integrated Air Defense System, Tactical Combat Training System (TCTS) range, multiple target types, high-altitude weapons training, and on-site adversary (opposition forces) aircraft. These training areas and ranges provide the space necessary to conduct controlled and safe training scenarios representative of those that the military's men and women would have to face in actual combat.

The FRTC provides joint integrated training opportunities, which are vital to advanced-level carrier air wing training and includes support to Air Force, Marine Corps, and National Guard units; support for other mission areas and TAC D&E (including military Unmanned Autonomous System [UAS] [both armed and unarmed] and other intelligence, surveillance, and reconnaissance platforms); and support for proposed training activities of other services and government agencies.

1.3.2.1 Location and Description of the Fallon Range Training Complex

The FRTC is located in northern Nevada and spans multiple county jurisdictions, from Elko County to the east and Washoe County to the west (see Figure 1-1). The FRTC consists of SUA (detailed descriptions are provided in Section 2.2.1, Special Use Airspace); land training ranges (four air-to-ground training ranges [B-16, B-17, B-19, and B-20], the Shoal Site, and the Dixie Valley Training Area [DVTA]; see Section 2.2.2, Training Ranges, for detailed descriptions); air, simulated sea, fixed and mobile land targets; control facilities; threat EW and surface-to-air missile systems and emulators; and instrumentation facilities. Highway 50 bisects the FRTC and is the main east-west transportation route through the complex.

The complex encompasses approximately 230,000 acres (ac.) (approximately 93,078 hectares) of training land and 12,256 square nautical miles (nm^2) of airspace. The FRTC airspace overlies large parts of Churchill, Lander, and Eureka Counties as well as small portions of Pershing County in the north, Nye County in the south, Mineral County in the southwest, and Lyon County in the west fall under the FRTC boundary. Most of the land area under the FRTC airspace consists of vast open tracts of land scattered in some places with private irrigated agricultural land parcels (Section 3.6, Land Use and Recreation, provides additional information on land use in the Study Area).

The major training components of the FRTC include:

- SUA providing designated airspace for specific training activities. Most SUA usage is established for military and government use but may be accessed for commercial or general aviation use when not reserved for utilization by military or government. Detailed descriptions are provided in Section 2.2.1 (Special Use Airspace). SUA available at the FRTC includes Military Operations Areas (MOAs), Air Traffic Control Assigned Airspaces (ATCAAs), supersonic operating areas,

restricted areas, NSAWC working areas, close air support airspace, training ranges, and training areas.

- Extensive instrumentation capability for real-time scoring and feedback as well as post-mission debrief capability. Aviation tracking systems include the TCTS and Link-16. Scoring systems include Weapons Impact Scoring System, strafe scoring, and laser-capable ranges with video camera and acoustic scoring capability.
- Target facilities that support aviation training events. Land targets include laser, strafe, scored bull's-eye, and tactical targets and military operations in urban terrain targets. Target areas on land are separated sufficiently to allow simultaneous operations over multiple target sets.
- A small arms training range located on training range B-19 includes a pistol/shotgun range, a boresight zero range, an automated-record fire range, and a rifle/machine gun range.

1.3.2.2 Training Supported

The Navy's training cycle, the Fleet Readiness Training Plan (FRTP), ensures that naval forces achieve and maintain the capabilities to carry out the requirements of combatant commanders. The FRTP formalizes the traditional Navy building block approach to training in a way that brings the strike groups to the required level of combat readiness earlier in the training cycle and sustains that readiness for a longer period of time. Training proceeds on a continuum, advancing through four phases: (1) maintenance, (2) basic training, (3) integrated/advanced training, and (4) sustainment. Training activities at the FRTC involve unit-level events, coordinated events, and major exercises. This is commonly referred to by the military as the "crawl, walk, run" approach to training. Unit level events are typically of relatively short duration, involve few participants, and are focused on individual and team training within a unit. Coordinated events are typically conducted by several participants of the same type (e.g., two or more air platforms) or several participants of different types working together on the same mission (e.g., a helicopter and an F-18). During major exercises, the number of participants varies and more than one type of training event is conducted.

These activities also allow Navy personnel to build on their experiences in training in a joint (multiservice) environment. Any training that is joint in nature or augments joint training is invaluable, as most conflicts tend to be fought jointly and the ability of the individual Services to work cohesively together while maximizing each Service's own unique capabilities can be the difference between success and failure.

Navy training activities focus on achieving proficiency in each of several functional areas. The functional areas, known as Primary Mission Areas, supported by the FRTC are: AAW, STW, EW, Expeditionary Warfare (EXW), and Naval Special Warfare (NSW).

The FRTC hosts coordinated events that includes the following activities:

- Strike Fighter Advanced Readiness Program is designed to develop, refresh, and elevate individual aircrew and squadron proficiency in current strike fighter tactics.
- Strike Fighter Tactics Instructor Course trains pilots in air-to-air and air-to-ground advanced tactical, hardware, and threat training in the strike fighter aircraft.
- Seahawk Weapons and Tactics Instructor Course trains pilots and aircrew in skills and techniques required for advanced performance as weapons and tactics instructors.
- Advanced Mission Commander Course is a rigorous course of instruction designed to train combat information center officers and instructor aircraft plane commanders in the proper employment of an airborne early warning aircraft and joint command and control operations.

- Hawkeye Advanced Readiness Program elevates individual aircrew and squadron proficiency in command and control and ensures tactical standardization in an airborne early warning aircraft.
- Rotary Wing Weapons School Strike Syllabus tailors training to helicopter anti-submarine squadron light and helicopter maritime strike squadron crewmembers.
- Electronic Warfare Advanced Readiness Program develops proficiency in current EW and suppression of enemy air defenses tactics.
- Growler Tactics Instructor Course trains aircrew in the art of advanced electronic attack in an EW aircraft.
- Carrier Air Wing Events ensures the air wing is fully capable to execute power projection warfare in any theater of operations.
- Desert Rescue Large Force Exercise is a joint, multi-national Combat Search and Rescue event.
- Long Range Strike (Joint Task Force Exercise/Composite Training Unit Exercise) allows aircraft to engage in air-to-air warfare, encounter EW threats, strike targets, and refueling.

The training areas that these activities occur in are designed to provide the most realistic training in the most relevant environments, replicating to the best extent possible the stresses of warfare. Typically, they also provide instrumentation that captures the performance of tactics and equipment in order to provide the feedback and assessment that are essential for constructive criticism of personnel and equipment. The live-fire portion of training helps to assess the operator's or unit's ability under stress to place munitions on target with the required level of precision.

1.4 THE ENVIRONMENTAL REVIEW PROCESS

1.4.1 THE NATIONAL ENVIRONMENTAL POLICY ACT

When an agency decides to prepare an EIS, the first step in the NEPA process is to conduct public scoping. Public scoping is initiated with the preparation and publication of a Notice of Intent (NOI) to develop the EIS. Scoping is an early and open process for developing the "scope," or range of issues to be addressed in the EIS, and for identifying significant issues related to a Proposed Action. The NOI provides an overview of the Proposed Action, describes the scope of the EIS, and announces public scoping meetings. The NOI for this project was published in the *Federal Register* on May 28, 2013 (78 Federal Register [FR] 31909, Appendix A, Federal Register Notices), and throughout May 2013 in four local newspapers (*Lahontan Valley News*, *Battle Mountain Bugle*, *Nevada Appeal*, and *Reno Gazette-Journal*), which cover Fallon, Fernley, Lahontan Valley, and the general western Nevada region as well as the major metropolitan centers of Reno and Carson City, Nevada. The NOI and newspaper notices included information about comment procedures, the project website address (www.FRTCEIS.com), a list of information repositories (public libraries), the dates and locations of the scoping meetings, and the duration of the public scoping period.

The scoping meetings for this EIS were held in Fallon, Crescent Valley, Gabbs, and Austin, Nevada from June 10 through 13, 2013. Comments from the public, as well as from agencies and public interest groups (such as the State Historic Preservation Officer [SHPO] and non-governmental organizations), including comments regarding the development of alternatives, have been considered in the preparation of this EIS. Additionally, during preparation of this Draft EIS, the Navy met and discussed the Proposed Action and potential issues to be analyzed in the EIS with the U.S. Fish and Wildlife Service (USFWS), Nevada Department of Wildlife, and the Nevada SHPO. Public comments received during the scoping process are categorized and summarized in Table 1-1 and Table 1-2. This summary is not intended to provide a complete listing, but to show the range of comments (see Appendix F, Public Participation, for more detail).

Table 1-1: Public Scoping Comment Summary

Category	Discussion Topic/Summary of Concern
Description of the Proposed Action	• Questions regarding whether training could be located/conducted elsewhere • General support for conducting activities under the Proposed Action • Questions regarding private testing of UASs at the FRTC • Notification of activities, including supersonic areas • Concerns regarding impacts from live-fire training exercises, including potential for wildfires, noise impacts to wildlife, soil and water contamination, and safety risk from unexploded military munitions
Noise	• Concerns over noise associated with training activities and sonic booms from aircraft activities affecting humans, as well as wildlife (sage grouse) • Concerns regarding health effects from aircraft noise
Cultural	• Concerns that Pony Express stations ruins and the fragile adobe ruins at Fort Churchill could be adversely impacted by vibrations generated by overflights and other activities
Mitigation	• Concerns regarding continuance of flood water mitigation for Churchill County and the City of Fallon on B-16
Other current studies (JLUS)	Current JLUS identified numerous concerns that should be addressed in this EIS as well. • Bird and wildlife strike hazards • Concern over size/use of B-17 • Noise • Supersonic flight operations • Flight tracks traversing sensitive wildlife habitat or areas with animal populations • Sage grouse is a candidate for designation as threatened and endangered species • Concerns about air quality • Concern about fuel dumping • Protection of cultural resources • Cultural resources coordination process • Accessing cultural resources by Native Americans

Notes: (1) The Joint Land Use Study (JLUS) is a cooperative land use planning effort conducted as a joint venture between an active military installation, surrounding cities and counties, state and federal agencies, and other affected stakeholders.
(2) B = Bravo, EIS = Environmental Impact Statement, FRTC = Fallon Range Training Complex, JLUS = Joint Land Use Study, UAS = Unmanned Aerial System.

Table 1-2: Categorization of Public Scoping Comment by Resource Area

Resource Issues	Comments[1]
Description of the Proposed Action	7
Noise	7
Wildlife	6
Cultural	5
Public Health and Safety	4
Mitigation	2
Soils	1
Water Quality	1
Air Quality	1
Other	1
COMMENT TOTALS	**35**

[1] Comment totals do not reflect total number of comments from individuals, as some comment responses contained comments on more than one resource area.

Subsequent to the scoping process, this Draft EIS has been prepared to assess the potential effects of the Proposed Action and Alternatives on the environment. A Notice of Availability for this Draft EIS has been published in the *Federal Register*, and notices have been placed in the aforementioned newspapers announcing the availability of the Draft EIS. The Draft EIS is available for general public and agency review and has been circulated for review and comment for a 46-day period. A public meeting will be advertised and held to receive public comments on the Draft EIS. A Final EIS, including responses to public comments received on the Draft EIS, will be prepared. Responses to public comments may take various forms as necessary, including correction of data, clarifications of and modifications to analytical approaches, and inclusion of additional data or analyses. The Final EIS will then be issued, followed by a 30-day waiting period.

Finally, after consideration of the administrative record, a Record of Decision (ROD) will be signed by the Secretary of the Navy. The ROD will document the Navy's final decision on the Proposed Action, the rationale behind that decision, and any commitments to mitigation and monitoring. A *Notice of Availability of the Record of Decision* will be published in the *Federal Register*, and the ROD will be distributed to agencies and interested parties, and posted on the FRTC EIS website (www.FRTCEIS.com). The ROD will also be announced in local newspapers.

1.4.2 Government-to-Government Consultations

As part of this EIS process and in accordance with Executive Order (EO) 13175, *Consultation and Coordination with Indian Tribal Governments*, the Navy has invited Government-to-Government consultations with the Duckwater Shoshone Tribe, Fallon Paiute-Shoshone Tribe, Inter-Tribal Council of Nevada, Pyramid Lake Paiute Tribe, Te-Moak Tribe, Walker River Paiute Tribe, Yerington Paiute Tribe, and Yomba Shoshone Tribe. The Navy will address issues raised as priority matters during the consultation process in a meaningful and timely manner appropriate to the issue. Should the Indian Tribal Governments accept the invitation for Government-to-Government consultation, the Navy will conduct consultations on this Proposed Action before signing the ROD.

1.4.3 Endangered Species Act

The Endangered Species Act (ESA) of 1973 established protection over and conservation of threatened and endangered species and the ecosystems upon which they depend (16 U.S.C. §1531 et seq.). An "endangered" species is a species that is in danger of extinction throughout all or a significant portion of its range, while a "threatened" species is one that is likely to become endangered within the foreseeable future throughout all or in a significant portion of its range. The USFWS and the National Marine Fisheries Service (NMFS) jointly administer the ESA and are also responsible for the listing of species (designating a species as either threatened or endangered). The USFWS has primary management responsibility for terrestrial and freshwater species, while NMFS has primary responsibility for marine species and anadromous fish species (species that migrate from saltwater to freshwater to spawn). The ESA provided for the designation of geographic areas as critical habitat for threatened or endangered species.

The ESA requires federal agencies, in consultation with the USFWS and NMFS, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of designated critical habitat of such species. Under Section 9, the ESA prohibits the take of endangered or threatened species within the United States. The ESA broadly defines "take" to include "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect." Under Section 7 of the ESA, "jeopardize" means to engage in any action

that would be expected to reduce appreciably the likelihood of survival and recovery of a listed species by reducing its reproduction, numbers, or distribution.

The Navy utilized pre-existing survey data on NAS Fallon-administered lands and the USFWS' Information, Planning, and Conservation System (IPaC) to query ESA-listed species underneath FRTC airspace for analysis. Three species of fish were identified in the FRTC Study Area. One is listed as endangered (cui-ui [*Chasmistes cujus*]), and the other two are threatened (Lahontan cutthroat trout [*Onchoryhncus clarkia henshawi*] and Railroad Valley springfish [*Crenichtys nevadae*]). Additionally, IPaC returned one species of bird listed as a candidate species (greater sage grouse [*Centrocercus urophasianus*]), one amphibian listed as a candidate species (Columbia spotted frog [*Rana luteiventris*]), and one conifer listed as a candidate species (whitebark pine [*Pinus albicaulis*]). None of the avian, mammalian, or plant species found on lands administered by NAS Fallon are currently listed or proposed for listing under the ESA, nor is there any critical habitat for ESA-listed species. Section 3.5 (Biological Resources) describes the currently listed species that may occur at the FRTC.

1.4.4 Other Environmental Requirements Considered

The Navy must comply with a variety of other federal environmental laws, regulations, and EOs, which are detailed in their respective resource sections in this EIS. These include (among other applicable laws and regulations):

- Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 C.F.R. §§1500–1508)
- Department of the Navy Procedures for Implementing NEPA (32 C.F.R. §775)
- Migratory Bird Treaty Act (16 U.S.C. §§703–712)
- Bald and Golden Eagle Protection Act (16 U.S.C. §§668–668d)
- Clean Air Act (42 U.S.C. §§7401 et seq.)
- Clean Air Act General Conformity Rule (40 C.F.R. §93[B])
- Clean Water Act (33 U.S.C. §§1251–1387)
- Resource Conservation and Recovery Act (42 U.S.C. §§6901–6908a)
- The Sikes Act of 1960 (16 U.S.C. §§670a–670o, as amended by the Sikes Act Improvement Act of 1997, Pub. L. No. 105-85)
- National Historic Preservation Act (16 U.S.C. §470 et seq.)
- Archeological Resources Protection Act (16 U.S.C. §§470aa–mm)
- Native American Graves Protection and Repatriation Act (25 U.S.C. §§3001–3013)
- American Indian Religious Freedom Act (42 U.S.C. §1996)
- Emergency Planning and Community Right-to-Know Act (Superfund Amendments and Reauthorization Act Title (42 U.S.C. §11001 et seq.)
- Farmland Protection Policy Act (25 U.S.C. §1539 et seq.)
- Plant Protection Act (7 U.S.C. §§7701–7786)
- Wild Free-Roaming Horse and Burro Act (Public Law 92-195)
- EO 11990, *Protection of Wetlands*
- EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*
- EO 13007, *Indian Sacred Sites*
- EO 13045, *Protection of Children From Environmental Health Risks and Safety Risks* (62 FR 19885 [23 April 1997])
- EO 13175, *Consultation and Coordination with Indian Tribal Governments*

- EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*
- EO 13112, *Invasive Species*
- EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*

1.5 Related Environmental Documents

The progression of NEPA documentation for Navy activities has developed from planning individual range complex exercises and testing events, to theater assessment planning that spans multiple years and covers multiple range complexes. The following documents are referenced in this EIS where appropriate:

- *Integrated Natural Resources Management Plan and Environmental Assessment for NAS Fallon*, March 2006 (U.S. Department of the Navy 2014)
- *Final Legislative EIS for Withdrawal of Public Lands for Range Safety and Training Purposes*, May 1998
- *Final Legislative EIS for the Renewal of the B-20 Land Withdrawal*, December 1998
- *Final EIS, Proposed Fallon Training Range Complex Requirements*, January 2000. A ROD was also prepared by the Federal Aviation Administration (FAA) for airspace changes proposed in this EIS.
- *Environmental Assessment for Proposed Addition of Training Activities and Range Enhancements at Naval Air Station Fallon on Training Range Bravo-16, Churchill County, Nevada*, September 2014
- *Environmental Assessment for Airfield Operations at Naval Air Station Fallon*, August 2013

1.5.1 Final Legislative Environmental Impact Statement for Withdrawal of Public Lands for Range Safety and Training Purposes – May 1998

In this Legislative EIS, the Navy proposed to withdraw federally administered land within the FRTC to facilitate and improve the realistic operational and strategic combat training conducted there and to provide public safety buffers. All lands proposed for withdrawal at the time were being administered by the BLM, Bureau of Reclamation, or the Department of Energy (DOE). The focus was on the FRTC ranges B-16, B-17, B-19, the Shoal Site, and Dixie Valley. The land withdrawal renewal for B-20 was evaluated in a separate Legislative EIS (see below). Besides the No Action Alternative, three action alternatives were evaluated in detail in the Legislative EIS. These alternatives proposed to withdraw between 127,365 and 189,080 ac. of public land that would then be placed into two categories related to future public access, Categories A and B. Category A lands would be managed by the Navy and closed to public access. Category B lands would include all other withdrawn lands and would be open for public use. Identified impacts of the withdrawal included the closure of public access and potential effects to mining, visual resources, and recreation from development of small sites and from integrated air and ground training activities. Mitigation measures were provided to reduce the level of impact.

1.5.2 Final Legislative Environmental Impact Statement for the Renewal of the Bravo-20 Land Withdrawal – December 1998

This Legislative EIS supported the Congressional reauthorization of the withdrawal of public lands comprising B-20. Withdrawal of these public lands was previously reauthorized in November 1986 under the Military Lands Withdrawal Act (MLWA) of 1986 (Public Law 99-606). Under the proposed action, the Navy reapplied for the renewal of 21,576 ac. of withdrawn land and continue to use B-20 for training operations consistent with those currently conducted and as specified in Section 1(a)(2)(A) and (B) of PL 99-606. Under the proposed action, there were no increases in aircraft operations.

This EIS analyzed the potential environmental impacts from the Preferred Alternative and the No Action Alternative on land use, biological resources, geology and soils, water resources, cultural resources, environmental justice and socioeconomics, air quality, noise, mineral resources, livestock and wild horse management, recreation and visual resources, public health and safety, and transportation. The EIS also evaluated the potential cumulative effects of the continued use of other existing and proposed NAS Fallon and other Department of Defense (DoD) and DOE land withdrawal and airspace actions. As presented in the analysis of the EIS, the Preferred Alternative would not result in any significant impacts.

1.5.3 Final Environmental Impact Statement, Proposed Fallon Training Range Complex Requirements – January 2000

In 1998, NSAWC conducted an evaluation (resulting in a Training Requirements Document) of the training assets at NAS Fallon and compared these capabilities against Navy tactical aviation training objectives. The purpose was to determine whether these assets necessitated any changes in the training environment at the FRTC to meet current training requirements. The Training Requirements Document assessed and reported current and future training needs and operational requirements for NAS Fallon and outlined changes necessary to both update and consolidate Navy training on public and Navy-administered lands and update existing airspace parameters overlying these lands.

Under the Proposed Action evaluated in the EIS, the Navy proposed to develop EW sites on public and Navy-administered lands, four tracking instrumentation subsystem remote sites on public lands, fiber optic cable routes from the air station to the B-16 and B-19 training ranges, and helicopter gunnery ranges on B-17 and B-19. The Navy also proposed to use Navy-administered lands in Dixie Valley for close air support training, revise the operating hours of the Reno MOA, and raise the ceiling of restricted area airspace to allow for high-altitude weapons delivery training at B-17 and B-20. Actions on public lands required rights-of-way from the BLM. Because actions were going to occur on lands administered by both the Navy and the BLM Carson City and Battle Mountain Field Offices, the Navy and the BLM prepared the EIS as joint lead agencies.

The EIS analyzed the potential environmental impacts from the proposed action, three alternatives to the Proposed Action, and the No Action Alternative. No significant impacts were identified from any of the alternatives analyzed. The ROD, released on 14 April 2000, announced the decision to implement the preferred alternative, Alternative 2, for the Proposed FRTC Requirements at NAS Fallon, Nevada.

1.5.4 Environmental Assessment for the Proposed Addition of Training Activities and Range Enhancements at Naval Air Station Fallon on Training Range Bravo-16, Churchill County, Nevada, September 2014

The Navy proposed to provide additional training activities and training enhancements to the existing Tactical Ground Mobility platform and air/ground inter-operability training conducted at B-16 of NAS Fallon since 2008. The Proposed Action was to improve the B-16 training range to meet Navy and joint training requirements by: (1) closing to public entry two portions of B-16 that are currently open to the public and installing a new fence around these areas; (2) installing rail-mounted moving target systems for live fire training; (3) developing and operating a semi-prepared expedient landing zone for C-130 aircraft; (4) developing and operating a launch and recovery area for unarmed, UAS training; (5) re-routing the primary access road to the Drop Zone to accommodate the new C-130 aircraft and UAS operations; (6) installing a new range tower within the Drop Zone; (7) installing visual cueing items, including relocatable habitat units (RHUs); and (8) establishing two free maneuver areas in the southwestern and northwestern portions of B-16. Implementing the Proposed Action allowed for efficient training or primary use of the space for NSWC over other ground training groups.

The Environmental Assessment (EA) evaluated the environmental consequences of the two action alternatives and a No Action Alternative. Both action alternatives would have provided additional training activities and training enhancements and improved the B-16 training range to meet Navy and joint training requirements. Potential environmental impacts were analyzed for air quality, biological resources, cultural resources, geology and soils, land use, noise, public health and safety, public services and utilities, socioeconomics, transportation and traffic, visual resources, and water resources and hydrology. As described in the Finding of No Significant Impact (FONSI) dated September 29, 2014, the Proposed Action, as described above, was selected for implementation over the other two alternatives as it best met the purpose and need for the project and would not result in significant impacts to the human or natural environment.

1.5.5 Environmental Assessment for Airfield Operations at Naval Air Station Fallon, August 2013

The EA evaluated the potential for environmental impacts from the U.S. Navy Proposed Action to support and conduct airfield operations at NAS Fallon. The Proposed Action was to maintain current/baseline airfield operations, conduct airfield operations with new types of aircraft, and increase airfield operations to support future potential training conditions. At the time, airfield operations at NAS Fallon supported advanced tactical training events by Carrier Air Wings (CVWs) and other aviation units. As aircraft transitions occur, CVWs and other aviation units would arrive at NAS Fallon to participate in training events with newer aircraft, such as the F-35C Lightning II, EA-18G Growler, and RQ-7B Shadow. The Navy would progressively transition from aging aircraft to newer aircraft beginning in 2015, with the transition to be completed by 2028. Training courses with F-35C would begin in 2017. Proposed facility development required to support aircraft missions at NAS Fallon would include space for aircraft maintenance, crew and equipment, administration, training, and a UAS runway and staging area.

Potential environmental impacts were analyzed for airfields and airspace, noise, air quality, land use, socioeconomics and environmental justice, safety, ground traffic and transportation, cultural resources, biological resources, geological resources, water resources, and hazardous materials and wastes. With one exception, described below, no significant impacts were identified for any resource section. One archaeological site (26CH1963) is located within the proposed new hangar's parking apron and is unevaluated and being treated as eligible for listing under the National Register of Historic Places (NRHP). In letters dated June 14 and July 29, 2013, the Nevada SHPO concurred with the Navy's determination that the proposed undertaking will pose an adverse effect to 26CH1963. Depending on what is found through testing and if it is determined eligible, NAS Fallon, in consultation with Nevada SHPO and appropriate Native American tribes, will negotiate a MOA to develop plans and processes for minimizing and mitigating the impact, including but not limited to data recovery. Under NHPA, resolution of an adverse effect through execution of an MOA will reduce impacts to below a level of significance under NEPA; therefore, there would be no significant impacts to cultural resources.

As described in the FONSI dated August 19, 2013, the Proposed Action as described above would not significantly affect the quality of the human environment.

2 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 OVERVIEW

The Proposed Action enhances existing training activities at the Fallon Range Training Complex (FRTC) and would

- increase the types and number of training activities conducted at the FRTC; and
- accommodate force structure changes.

Current baseline training levels would be adjusted to accommodate evolving mission requirements, including those resulting from advances in warfighting doctrine and procedures, new training objectives, tactics development, and the introduction of new platforms (aircraft) and weapons systems into the fleet. Actions to support current, emerging, and future training activities at the FRTC are evaluated in this Environmental Impact Statement (EIS). The Proposed Action responds to the training requirements identified in the United States (U.S.) Department of the Navy's (Navy) Fleet Response Training Plan (FRTP).

2.2 DESCRIPTION OF THE FALLON RANGE TRAINING COMPLEX STUDY AREA

The FRTC consists of Special Use Airspace, Training Ranges, and the Electronic Warfare Complex as discussed in the following sections. The Training Ranges are on lands managed by the Navy and consist of land withdrawn[1] from the Bureau of Land Management (BLM) as well as land owned by the Navy.

2.2.1 SPECIAL USE AIRSPACE

FRTC airspace overlies approximately 10.4 million acres (ac.) (4.2 million hectares [ha]) of land. The airspace includes 9 Federal Aviation Administration (FAA)-designated restricted areas, 15 military operations areas (MOAs), 14 blocks of Air Traffic Control Assigned Airspace (ATCAA), 2 supersonic operating areas, and a Civilian Visual Flight Rules (VFR) corridor (Figure 2-1). The Naval Strike and Air Warfare Center (NSAWC) has also designated working areas (Figure 2-2) within the FRTC airspace for safety and training efficiency. Airspace horizontal boundaries are shown in Figure 2-1, and vertical dimensions are detailed in the *FRTC Range Operations Manual* (U.S. Department of the Navy 2014a).

[1] Withdrawn lands are public domain held back for the use or benefit of an agency by reservation, withdrawal, or other restrictions for a special government purpose.

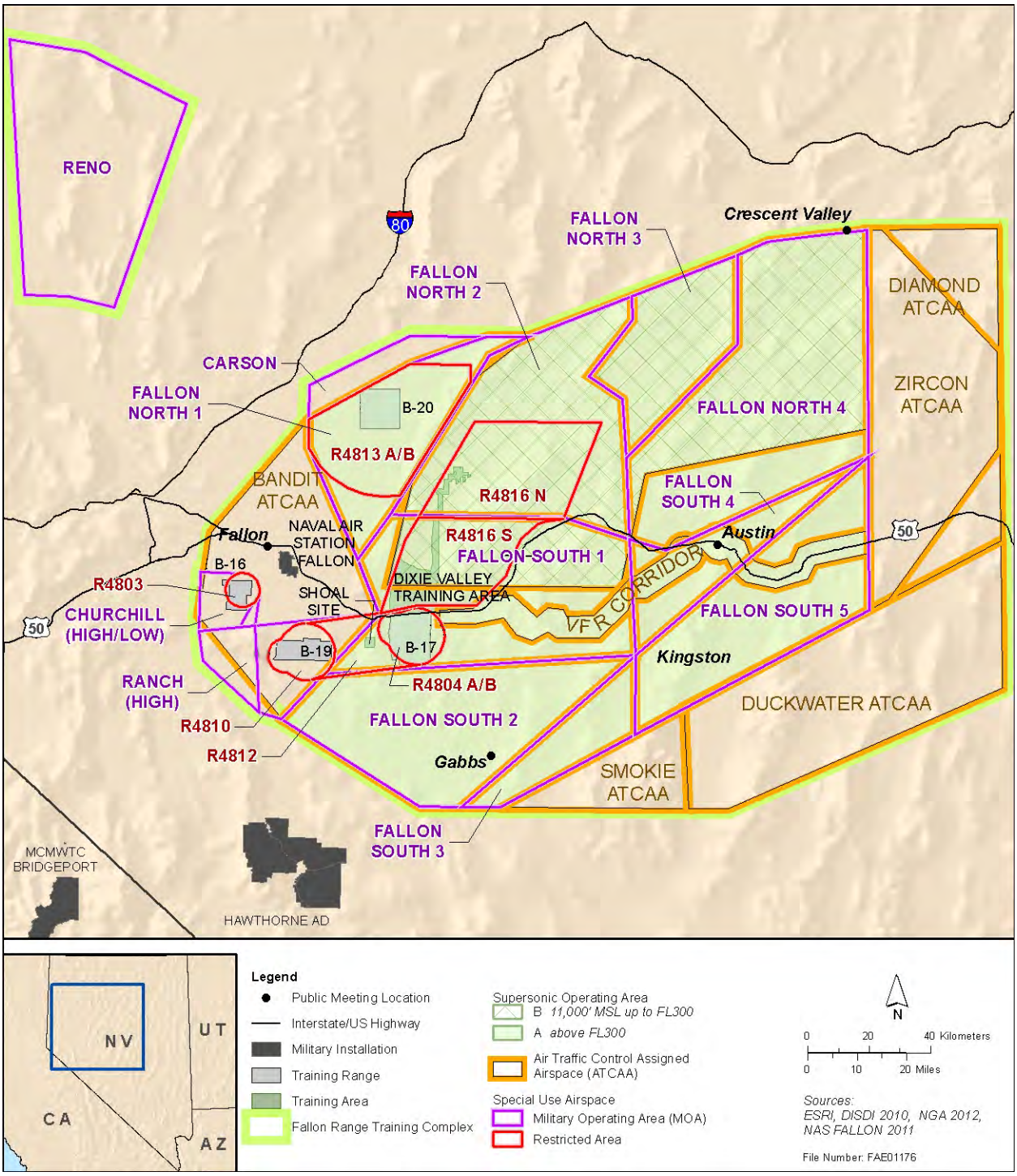

Figure 2-1: Fallon Range Training Complex Military Operations Areas and Air Traffic Control Assigned Airspaces

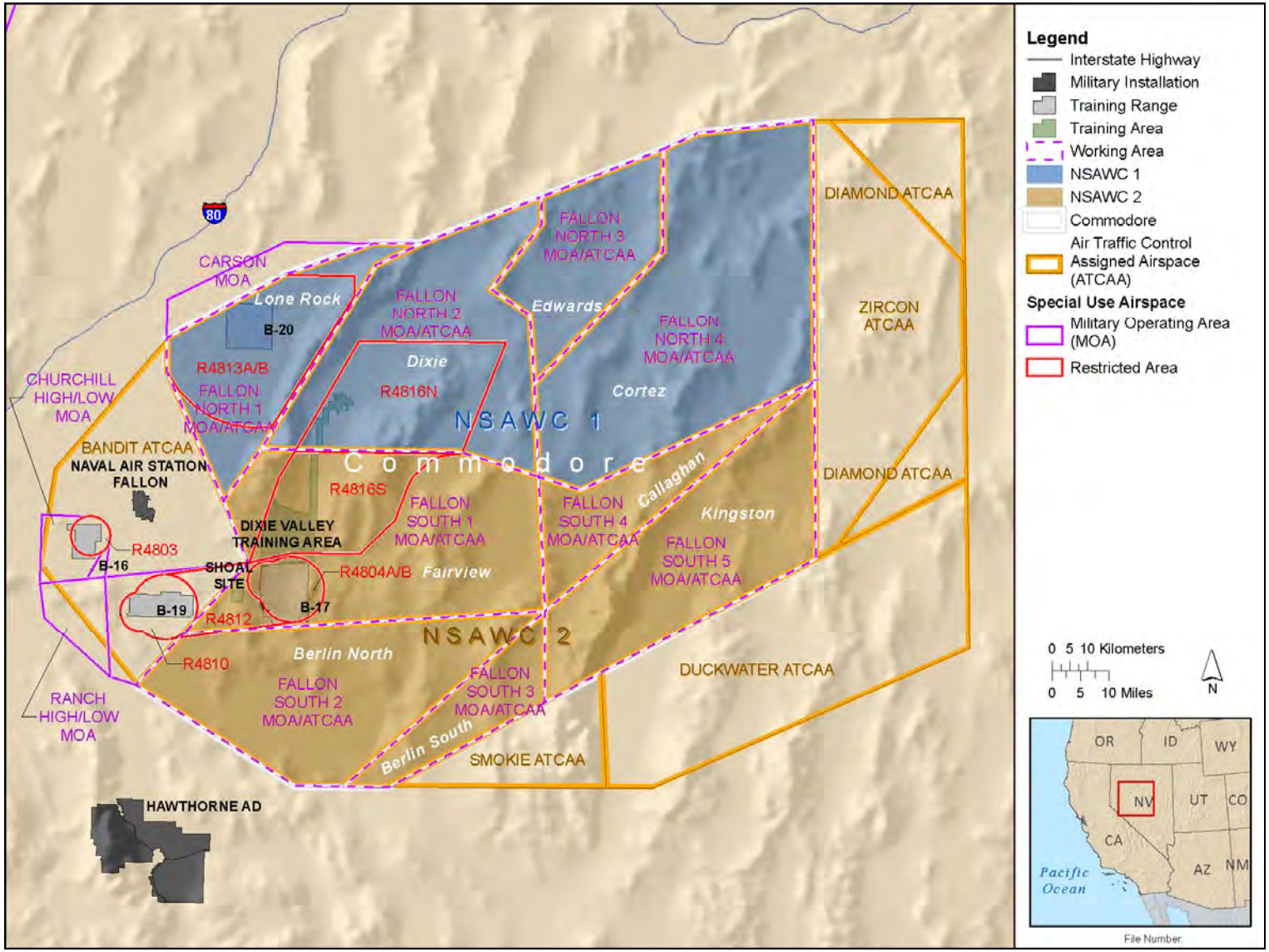

Figure 2-2: Naval Strike and Air Warfare Center Working Areas

2.2.1.1 Restricted Areas

Restricted areas are established under 14 Code of Federal Regulations Part 73 to designate airspace within which the flight of aircraft, while not wholly prohibited, is subject to restriction (Federal Aviation Administration [FAA] 7400.2 Series). Nine FAA-designated restricted areas (R4803, R4804 A and B, R4810, R4812, R4813 A and B, and R4816 North and South) exist at FTRC (Figure 2-1). These restricted areas are activated as necessary to support safe range operations, often in conjunction with scheduling of specific land training ranges (Bravo [B]-16, B-17, B-19, and B-20) and training areas (Dixie Valley Training Area [DVTA] and Shoal Site), via FAA-issued Notices to Airmen.

2.2.1.2 Military Operations Areas, Air Traffic Control Assigned Airspace, Supersonic Operating Areas

The FRTC airspace includes 15 MOAs and 14 ATCAAs designated by FAA (Figure 2-1). MOAs are designated to contain non-hazardous activities, including, but not limited to, air combat maneuvers, air intercepts, and low-altitude tactics. MOAs are joint use, in that Civilian VFR traffic is not denied access and Instrument Flight Rules traffic may be routed through the airspace. ATCAA is defined airspace available for military training use, but it is only activated for military use by the FAA when requested by the military. ATCAAs are most often scheduled in association with an adjacent MOA or MOAs. Collectively, the horizontal boundaries of the MOAs and ATCAAs represent the boundaries of the FRTC Study Area.

Two supersonic operating areas have been established at FRTC (Figure 2-1) to conduct military training that requires high-performance flight profiles, including aircraft flying at supersonic speeds (i.e., greater than the speed of sound or Mach 1). Supersonic Operating Area A is comprised of the entire FRTC boundary for all altitudes above flight level (FL) 300 (standardized pressure altitude of 30,000 feet [ft.]). Area B is from 11,000 ft. (3,353 meters [m]) above mean sea level (MSL) up to FL 300. Area B is above approximately 2,682,705 ac. (1,085,652 ha) of BLM land and 131,424 ac. (53,185 ha) of private land. Land use beneath Area B is mostly ranching, farming, and public land recreation, but recently solar energy development is occurring on both BLM and private land.

2.2.1.3 Visual Flight Rules Corridor

The VFR corridor follows U.S. Highway (Hwy) 50 from Sand Mountain to Austin, Nevada. Altitude restrictions are from 2,000 ft. (610 m) to 8,000 ft. (2,438 m) above ground level (AGL) from Sand Mountain to Fairview Peak and then from 2,000 ft. (610 m) to 10,500 ft. (3,200 m) AGL east from Fairview Peak until exiting the FRTC airspace. From Sand Mountain to Fairview Peak the corridor extends 1 mile (mi.) (1.6 kilometers [km]) north of Hwy 50. From Fairview Peak to State Hwy 722 at East Gate, the width increases to 1 mi. (1.6 km) north and 2 mi. (3.2 km). At East Gate, the corridor widens to 2 mi. on each side of U.S. Hwy 50. The VFR corridor may be used by nonparticipating aircraft to transit the airspace. Military aircraft avoid the VFR corridor between specified altitudes unless abiding by VFR criteria.

2.2.1.4 Working Areas and Close Air Support Airspace

The NSAWC has designated working areas (Figure 2-2) within the FRTC airspace for safety and training efficiency. Working areas consist of standard groupings of FAA-designated restricted areas and MOAs, which are scheduled by NSAWC for specific activities and numbers of aircraft. The nine working areas (Lone Rock, Dixie, Edwards, Cortez, Fairview, Callaghan, Berlin North, Berlin South, and Kingston) may be scheduled individually for unit level training or combined (see NSAWC 1, NSAWC 2, Commodore in Figure 2-2) for Large Force Exercises. Similarly, NSAWC has designated six Close Air Support (CAS)

airspace areas (CAS I through VI) for safety and training efficiency. Each CAS airspace includes a combination of one or more FAA-designated restricted areas and MOAs configured to meet the specific needs of CAS training, which is described in Section 2.4.1.3.2 (Close Air Support). In addition, NSAWC has designated nine noise-sensitive areas beneath the FRTC airspace for Navy aircraft to avoid; these are discussed further in Section 3.4 (Noise).

2.2.2 TRAINING RANGES

The Navy manages approximately 230,000 ac. (2 percent) of the land beneath the FRTC airspace. This Navy-administered land consists of four air-to-ground (A-G) training ranges (B-16, B-17, B-19, and B-20), the Shoal Site, and DVTA (Figure 2-1). Of this land, the Shoal Site and the DVTA are open to public access under the terms of the 1999 Military Lands Withdrawal Act (Public Law 106-65), as are small portions of B-16 and B-19. Table 2-1 provides a summary of the management of FRTC land assets.

Table 2-1: Management of Fallon Range Training Complex Land Assets

Area	Land Category			Management Authorities
	Navy Acquired (acres)	Withdrawn[1]/ Open[2] (acres)	Withdrawn/ Closed[3] (acres)	
B-16	0	4,315	22,938	BLM and BOR – MLWA Navy (stewardship)
B-17	0	0	52,830	BLM – MLWA Navy (stewardship)
B-19	0	5,780	23,496	BLM – MLWA Navy (stewardship)
B-20	19,430[3]	0	21,577	BLM and BOR – MLWA Navy (acquired and stewardship)
Dixie Valley	10,953[2]	68,437	0	BLM – MLWA Navy (acquired and steward-ship)
Shoal Site	0	2,560	0	DOE – MLWA Navy (stewardship)
Totals	**30,383**	**81,092[2]**	**120,841**	

[1] Withdrawn lands are public domain held back for the use or benefit of an agency by reservation, withdrawal, or other restrictions for a special government purpose.

[2] Open to public access. Total includes Navy acquired lands in Dixie Valley.

[3] Closed to public access

Notes: B = Bravo, BLM = Bureau of Land Management, BOR = Bureau of Reclamation, DOE = Department of Energy, MLWA = Military Lands Withdrawal Act, Navy = United States Department of the Navy

Source: U.S. Department of the Navy 2014b

2.2.2.1 Bravo Training Ranges

The FRTC includes four A-G training ranges located in remote areas with limited or no surrounding development. These ranges consist of land withdrawn[2] from the BLM and Bureau of Reclamation (BOR), and private holdings purchased by the Navy (B-20), as shown in Table 2-1. These ranges support the A-G delivery of both live and inert military munitions and contain a variety of targets and target complexes. A brief description of each range follows.

[2] Withdrawn lands are public domain held back for the use or benefit of an agency by reservation, withdrawal, or other restrictions for a special government purpose.

2.2.2.1.1 Bravo-16

Training range B-16 is located approximately 10 nautical miles (nm) west of NAS Fallon. The range is approximately 3,900 ft. (1,189 m) above sea level with topography ranging from alkali flats to sparsely vegetated hills. The range is surrounded by land managed by the BLM and the BOR. Primary use of the range is unit level training. Typical training activities include bomb drops, performed by one or two aircraft, which do not contain explosives (other than a small spotting charge to provide weapon location on the ground [light inert]); helicopter flights with machine gun fire training at ground targets or in association with Combat Search and Rescue; and Naval Special Warfare (NSW) tactical ground mobility training. The Navy completed an Environmental Assessment (EA) for range enhancements on B-16 in August 2014, and a Finding of No Significant Impact for the Proposed Action was signed on September 29, 2014 (U.S. Department of the Navy 2014c). Planned range enhancements will be started in Fall 2014 and include: installation of new target systems, development of a semi-prepared expedient landing zone for C-130 aircraft, development of a launch and recovery area for military unmanned autonomous systems (UASs), and establishment of free maneuver areas for Tactical Ground Maneuver Training.

2.2.2.1.2 Bravo-17

Training range B-17 is the most developed and used range within the FRTC. The range contains a variety of targets and target complexes and provides the highest quality training for all types of training events. The primary mission associated with B-17 is advanced training with multiple aircraft, and it accommodates live and inert ordnance. The range is 22 nm east of NAS Fallon. The range lies in Fairview Valley and is bordered on the north by U.S. Hwy 50. Topography of B-17 is diverse, ranging from an alkali flat at 4,100 ft. (1,250 m) to Fairview Peak at approximately 8,300 ft. (2,530 m). The range is surrounded by land managed by the BLM.

2.2.2.1.3 Bravo-19

Training range B-19 is located 15 nm south of NAS Fallon and lies adjacent to U.S. Hwy 95. The range has an elevation ranging from 3,900 to 5,000 ft. (1,189 to 1,524 m). Topography varies from alkali flats to rugged hills, with large areas of sand dunes being the dominant feature. Land managed by the BLM borders the range to the north, west, and east, with the Walker Indian Reservation located to the south. The primary uses of B-19 are A-G ordnance delivery and rotary-wing inert strafe. The range accommodates a small arms range managed by the Nevada Army National Guard.

2.2.2.1.4 Bravo-20

Training range B-20 is located 28 nm north of NAS Fallon, and has an elevation of 3,900 ft. (1,189 m). B-20 is a relatively flat dry lake bed with Lone Rock being the highest point, rising an additional 140 ft. (43 m). Land adjacent to the range is a mix of BLM and private property. The range contains a variety of target and target complexes with a primary use of A-G delivery of live ordnance.

2.2.2.2 Dixie Valley Training Area

With the exception of the Navy Centroid Facility (range control and communications), Electronic Warfare (EW) sites, and the Urban Training Facility located adjacent to EW Site 70, the land in the DVTA is open to the public. The DVTA is generally rolling, sparsely vegetated hills, with the northern areas of farm/ranch land purchased by the Navy. Horse Creek is a higher elevation area with a perennial stream and adjacent mountain habitat. The area is surrounded by land managed by the BLM. Training activities conducted consist of, but are not limited to, Convoy Training and Combat Search and Rescue activities (Section 2.7, Range Activity Summary Tables).

2.2.2.3 Shoal Site

The Shoal Site is located west of B-17. The site is a portion of an area used by the Department of Energy (DOE) for an underground nuclear test explosion in 1963. The site is continuously monitored in cooperation with the Navy by the DOE and has received a preliminary site assessment that scored the site safe for surface use. Combat Search and Rescue is the major training event conducted at the Shoal Site, and there is no A-G ordnance delivery to the Shoal Site.

2.2.3 Electronic Warfare Complex

The FRTC EW Complex consists of a variety of systems, both mobile and fixed in place, located beneath the FRTC airspace. These systems are widely dispersed on Navy-owned, withdrawn BLM, and BLM rights-of-way lands, but most of the fixed sites are in the general vicinity of B-17 and DVTA. The systems are used to disable the electronic jamming capabilities of the attacking aircraft as well as train the attacking aircraft crew in defense maneuver and tactics. Likewise, the systems score the success of the target defense, the attacking aircraft, and accuracy of ordnance placement. The EW Complex offers various fixed and mobile threats that can be tailored to meet a mission scenario. In addition to strike/attack scenarios, specialized training such as helicopter penetration and reconnaissance, and Combat Search and Rescue can be supported.

2.3 Proposed Action and Alternatives

2.3.1 The Proposed Action

The Navy proposes to continue and enhance training activities within the existing FRTC by:

- Increasing existing aviation and ground training activities
- Conducting training activities with new platforms and systems as they transition into the fleet to replace older platforms and systems
- Conducting new ground training activities (i.e., Dismounted Fire and Maneuver Training and Ground Light Amplification by Stimulated Emission of Radiation [LASER] Training)

The proposal includes adjusting activities from current (baseline) levels to levels needed to accommodate evolving mission requirements. The Proposed Action is a step toward ensuring the continued vitality and viability of the FRTC as an essential training resource. The Proposed Action would result in critical increases in training activities to achieve and maintain a state of military readiness commensurate with the Navy national defense mission.

2.3.2 Alternatives Development

National Environmental Policy Act (NEPA) implementing regulations (40 Code of Federal Regulations [C.F.R.] §1502.14) provide guidance on the consideration of alternatives in an EIS. These regulations require the decision maker to consider the environmental effects of a proposed action and a range of alternatives to a proposed action. The range of alternatives includes reasonable alternatives (including a no action alternative), which must be rigorously and objectively explored. Reasonable alternatives include those that are practical or feasible from a technical, temporal, and economic standpoint, and support the underlying purpose of and need for the proposed action as presented in Chapter 1 (Purpose and Need for the Proposed Action). Additionally, the reasons for eliminating alternatives must be briefly discussed, and are included in Section 2.8 (Alternatives Considered but Eliminated from Further Analysis).

Screening Criteria

Alternatives considered in this EIS were developed by the Navy after careful assessment by subject-matter experts, including units and commands that use the ranges, range management professionals, and Navy environmental managers and scientists. The team developed screening criteria to assess whether a possible alternative supports the underlying purpose of and need for the Proposed Action and is practical or feasible from a technical and economic standpoint. Any alternative considered for analysis must support or employ the following screening criteria:

1. Achievement of training requirements as specified by the FRTP;
2. Realistic, dynamic training in accordance with the FRTC's assigned roles and mission;
3. Requisite air and surface range tracking, instrumentation, and communications capabilities;
4. Alignment of installation infrastructure with Navy force structures within clearly feasible funding and timeframes, including training with existing and foreseeable new weapons, systems, and platforms (aircraft) as they are assigned to units;
5. Sustainable range management practices that reduce potential adverse effects and provide for the management of natural and cultural resources to the maximum extent practicable;
6. Current and future access to training areas and utilization of existing land-based range infrastructure resources, facilities, and range enhancements for future training requirements; and
7. The ability to support, house, and train an entire carrier air wing for advanced integrated Strike Warfare (STW), EW, and Anti-Air Warfare (AAW) training.

Each alternative considered in this EIS includes best management practices intended to reduce the environmental effects of Navy activities, which are discussed in Chapter 5 (Management Practices, Monitoring, and Mitigation Measures).

2.3.3 Alternatives Considered and Analyzed

Three alternatives are analyzed in this EIS:

1) No Action Alternative – current levels of training activities from recent years' representative baseline;
2) Alternative 1 – increase the number of planned training activities by 6 percent over baseline (no action) conditions, accounting for new platforms, weapons, and technologies. The 6 percent increase is driven by increases in certain training activities only (see Tables 2-4 through 2-6); and
3) Alternative 2 – increase the number of all planned training activities by 10 percent over Alternative 1 (for a 16% total increase over baseline [no action] conditions), accounting for new platforms, weapons and technologies. The Navy has identified Alternative 2 as its preferred alternative.

The following sections contain the detailed discussion of alternatives carried forward for analysis in the EIS.

2.4 No Action Alternative – Current Training Activities at the Fallon Range Training Complex

Over the years, the tempo and types of activities at the FRTC have fluctuated due to changing requirements, the dynamic nature of international events, introduction of new equipment, advances in warfighting doctrine and procedures, and force structure changes. Such developments influenced the

frequency, duration, intensity, and location of required training. Factors influencing tempo and types of activities are variable by nature, and will continue to cause fluctuations in training activities at the FRTC and in its associated airspace. Accordingly, training activity data used throughout this EIS are a representative baseline for evaluating impacts that may result from the proposed training activities. Each military activity described in this EIS meets a requirement that can be ultimately traced to requirements from the National Command Authority.[3]

Navy training activities currently conducted at the FRTC, presented as the No Action Alternative, have been ongoing at various levels and frequencies since the 1940s. Training data for the period 2010–2012 were compiled and reviewed by Navy subject matter experts to establish baseline training activities for analysis under the No Action Alternative. The numbers for annual training activities presented in Table 2-4 and analyzed under the No Action Alternative are based on annual averages calculated from the 2010–2012 training data. Under the No Action Alternative, the Navy would maintain the baseline level of training activities.

Training activities at the FRTC would continue to involve unit level events, coordinated events, and major exercises. Unit level events are typically of relatively short duration and involve few participants focused on individual and team training within a unit. The coordinated event is typically conducted by several participants of the same type (e.g., two or more air platforms) or several participants of different types working together on the same mission (e.g., a helicopter or an FA-18). During major exercises, the number of participants varies and more than one type of training event is conducted. The Navy would continue to use the airspace and provide the range operations support. Evaluation of the No Action Alternative in this EIS provides a baseline for assessing environmental impacts of Alternative 1 and Alternative 2, as described in the following subsections.

2.4.1 Description of Current Training Activities at the Fallon Range Training Complex

Descriptions of training activities analyzed in this EIS are organized by the Navy's primary mission areas, regardless of the Service conducting the activity. This grouping or bundling of similar activities helps to streamline the analysis of potential impacts and ensures that the overall potential effects of a particular activity are considered, regardless of the Service conducting the activity. Separate descriptions are presented when a Service's activity does not align with a Navy primary mission area. Primary mission areas conducted at FRTC under the No Action Alternative would include:

- AAW
- EW
- NSW
- STW
- Expeditionary Warfare
- Other Training

[3] The "National Command Authority" is a term used by the U.S. military and government to refer to the ultimate lawful source of military orders. The term refers collectively to the President of the United States (as Commander-in-Chief) and the U.S. Secretary of Defense.

Summary descriptions of current training activities conducted within the primary mission areas at the FRTC are provided in the following subsections. Section 2.7 (Range Activity Summary Tables) contains detailed data for current and proposed training activities at the FRTC, including representative platforms used, annual number of training activities, and location. Section 2.7 also provides additional information, including estimated annual ordnance use by range area and aircraft overflights in the FRTC airspace. Values in these tables are based on historical use, existing requirements, and anticipated future requirements. These values are representative of baseline (No Action Alternative) and anticipated future (Alternatives 1 and 2) range use and are presented for analytical purposes. Actual values will vary based on specific training requirements, which are influenced by factors such as deployments, world events, and non-combat supply events. All values are inclusive of NSAWC-sponsored Tactical Development and Evaluation (TAC D&E) activities, which are routinely conducted at FRTC. TAC D&E activities are the same or similar to training activities conducted within the primary mission areas listed above, but are conducted with the goal of developing, validating, and standardizing combat tactics, techniques, and procedures.

For the purposes of this EIS, military training exercises are described by the term “activity.” As an example, Air Combat Maneuver is a type of training activity included in the AAW Primary Mission Area. Basic Air Combat Maneuver training typically involves two aircraft; however, based upon the training requirement, Air Combat Maneuver training may involve multiple aircraft at the advanced level of training. Even though there are multiple aircraft participating in Air Combat Maneuver training, the total exercise is characterized as one activity. Similarly, ground training includes multiple participants over a duration of time; the total evolution of this training is characterized as one activity.

2.4.1.1 Anti-Air Warfare Training – Air Combat Maneuvers

The mission of AAW is to destroy or reduce enemy air and missile threats (including unmanned airborne threats), thereby serving two purposes: protecting U.S. forces from attacks from the air and gaining air superiority. AAW training conducted at FRTC consists of Air Combat Maneuvers, which include flight procedures and tactics where aircraft engage in offensive and defensive maneuvering against each other. During an Air Combat Maneuver engagement, no ordnance is fired. At the FRTC, strike fighter aircraft conduct air combat maneuvers through the performance of intricate flight maneuvers to achieve a gun or missile firing position conducted by a simulated attack on a threat aircraft.

Typically, Air Combat Maneuver training activities in the FRTC are conducted in the NSAWC 1 and 2 airspace working areas (Figure 2-2) and last about 1 hour. Activities involve two to eight fixed-wing aircraft at altitudes of 5,000–30,000 ft. (1,524–9,144 m) AGL. Aircraft types are variable, as displayed in Section 2.7 (Range Activity Summary Tables).

2.4.1.2 Electronic Warfare Training – Electronic Warfare Operations

The mission of EW is to degrade the enemy's ability to use their electronic systems, such as communication systems and radar, in order to confuse or deny them the ability to defend their forces and assets. EW is also used to recognize a threat and counter an enemy’s attempt to degrade the electronic capabilities of U.S. forces and assets.

Elements of EW operations conducted at FRTC include:

- Electronic Surveillance provides the capability to intercept, identify, and locate enemy emitters.
- Electronic Protection provides protection for friendly assets against enemy EW capabilities such as radar and communication jamming devices.

- Electronic Attack employs tactics such as electronic jamming to prevent or reduce effective use of enemy electronic equipment and command and control capability.

Typical EW activities include signal analysis and use of airborne and surface electronic jamming devices to defeat tracking radar systems. During these activities, aircraft attempt to control critical portions of the electromagnetic spectrum used by threat radars, communications equipment, and electronic detection equipment to degrade or deny the enemy's ability to defend its forces from attack or recognize an emerging threat early enough to take the necessary defensive actions.

The primary function of the EW range at the FRTC is to provide a threat environment and train pilots in how to navigate threats and successfully place weapons on target. Land-based fixed and mobile electronic signal emitters located at the FRTC EW range are used to simulate opposition forces. These signal emitters consist of specialized electronic equipment with the mobile units mounted on trailers. The EA-18G Growler is an electronic combat aircraft and an active participant in training within the FRTC.

A variety of rotary- and fixed-wing aircraft are used to conduct EW training exercises in the FRTC training areas, including the EA-18G Growler, which is an electronic combat aircraft. An EW training activity in the FRTC airspace typically lasts about 1 hour and includes one to three fixed-wing aircraft flying at altitudes typically above 3,000 ft. (914 m) AGL, although infrequently (less than 1.5 percent of the time) they may fly at an altitude below 3,000 ft. (914 m) AGL.

2.4.1.3 Strike Warfare Training

The mission of STW is to conduct offensive attacks on land-based targets such as refineries, power plants, bridges, major roadways, and ground forces to reduce the enemy's ability to wage war. Strike warfare employs weapons by manned and unmanned air, surface, submarine, and NSW assets in support of extending dominance over enemy territory (power projection).

Strike warfare includes training of fixed-wing attack aircraft pilots and aircrews in the delivery of precision-guided munitions, non-guided munitions, rockets, and other ordnance against land-based targets. Not all strike mission training activities involve dropping ordnance, and instead the event is simulated with video footage obtained by onboard aircraft sensors.

2.4.1.3.1 Bombing Exercise (Air-to-Ground)

Bombing Exercises (BOMBEXs) (A-G) at the FRTC and its associated airspace involve fixed-wing aircraft. The exercises typically involve two to four aircraft, and training lasts about 1 hour. During BOMBEXs (A-G), aircraft must identify and attack one of several ground targets. These activities train aircrews in bombing of land targets using precision-guided munitions and unguided munitions. The exercises can be simulated, "captive carry," or active drops of explosive and non-explosive (inert) practice bombs or rockets. Munitions used for BOMBEXs (A-G) are identified in Section 2.7 (Range Activity Summary Tables) for B-16, B-17, B-19, and B-20. Non-explosive practice bombs have a signal cartridge or spotting charge (CXU-3 or MK 4) that produces a flash of light and puff of smoke upon impact, which permits visual evaluation of accuracy. The non-explosive practice bombs typically used are the 25-pound MK-76 and heavier MK-80 series (500–2,000 pounds) of practice ordnance.

LASER-guided training rounds are also dropped. These training rounds are non-explosive missile-shaped rounds that are released by the attacking aircraft and guided into the target by LASER emitted from the aircraft. A BOMBEX (A-G) can also include the use of LASERs by ground units to simulate, identify, or

mark targets for attack by aircraft. The hazard zone for LASER spotting is contained within Navy-administered land where public access is restricted. Standard operating procedures are implemented to protect the public from operational hazards related to LASER spotting. All LASER use areas undergo command review to ensure safety of personnel and the public. LASER spotting hazards are identified and Weapons Danger Zones are developed to ensure safe operations.

2.4.1.3.2 Close Air Support

CAS is an action involving fixed-wing or rotary-wing aircraft against hostile targets that are near friendly forces and that require detailed integration of each air mission with the fire and movement of those forces. Fixed-winged aircraft such as EA-18 and FA-18 deliver bombs, rockets, and cannon fire. H-60 and AH-1 helicopters deliver rockets, missiles, and machine gun fire against ground targets. Precise coordination between air and ground units is critical, and specific procedures and protocols are in place to ensure safety. A basic CAS training activity involves two to four aircraft. The aircraft contact the designated Forward Air Controller, which may also be an FA-18, or Joint Terminal Attack Controller on the ground, and receive information on the targets to be hit. They approach the target from an altitude between 25,000 ft. (7,620 m) AGL and less than 3,000 ft. (914 m) AGL. Typical bomb release altitude is below 5,000 ft. (1,524 m) and within a range of 3,000 ft. (914 m) for unguided munitions, and above 15,000 ft. (4,572 m) and between 4 and 10 nm for precision-guided munitions. Advanced integrated CAS training scenarios may be supported by E-2 aircraft for command, control, and coordination between all units involved.

2.4.1.3.3 Urban Close Air Support

Urban CAS is an advanced training activity that performs CAS procedures within the urban environment of Fallon, Nevada. The activity requires personnel on the ground to locate the target and employ aircraft over the town of Fallon to locate, identify, track, and simulate weapons employment against simulated targets.

Urban CAS activities are conducted at altitudes between 10,000 ft. (3,048 m) and 17,000 ft. (5,182 m) AGL over the town of Fallon, Nevada. The activity is conducted by four FA-18 aircraft during daylight hours only, and no ordnance is carried during these activities.

2.4.1.3.4 Combat Search and Rescue

Combat Search and Rescue missions involve fixed-winged and helicopter aircraft using tactical procedures to rescue military personnel within a hostile area. Combat Search and Rescue training activities can be basic or integrated. During basic Combat Search and Rescue training, H-60 helicopters with 7.62 millimeter (mm) door-mounted machine guns approach the rescue area flying below 3,000 ft. (914 m) AGL. Blank ammunition is used in this activity. Chaff and flares may also be expended to defeat surface-to-air or air-to-air threat or opposing forces. NSW personnel may be embarked during this exercise to act as the rescue party. This NSW squad debarks from the helicopter, “rescue” the personnel to be recovered, and return to the helicopter to be removed from the area. This exercise lasts about 1–2 hours.

During integrated Combat Search and Rescue activities, the added complexity requires coordination between rescue units and support from additional participants. For example, a fixed-wing E-2 aircraft would serve as a command and control element for the exercise while flying at an altitude of about 20,000 ft. (6,096 m) AGL. While remaining within an assigned station, the E-2 aircraft would maintain communications and a tactical picture of the area containing the personnel to be rescued and other

forces involved. Two FA-18 fixed-wing aircraft would serve as a Rescue Combat Air Patrol or Rescue Escort. In this role, they approach the rescue area at altitudes between 3,000 ft. (914 m) and 300 ft. (91 m) AGL to observe the area. They provide protection as required with cannon (A-G Gunnery Exercise) or bombs (A-G Bombing Exercise) for the personnel to be rescued as well as helicopters (HH-60, SH-60, MH-60) and ground forces (NSW or U.S. Marine Corps[USMC]) conducting the rescue. The principal focus of this exercise is integration and coordination of actions between the various platforms involved. At the FRTC, integrated Combat Search and Rescue exercises last between 2 and 3 hours.

2.4.1.3.5 Gunnery Exercise (Air-to-Ground)

Gunnery Exercises (A-G) are conducted by rotary- and fixed-wing aircraft against stationary targets. Rotary-wing aircraft involved in this activity include MV-22, CH-46, H-47, and H-60 helicopters using 7.62 mm door-mounted machine guns and 20 mm fixed forward firing strafe. Rotary-wing aircraft conduct exercises typically in B-17 and B-19, but may also use B-16 and B-20. Fixed-wing aircraft such as F-15, F-16, and FA-18 typically conduct strafing runs at stationary targets located at B-17 and B-19. The term “strafing run” refers to low-altitude attack of ground targets using an automatic weapon such as a machine gun or cannon. Typical fixed-wing training involves two to four aircraft using 20 mm guns. Fixed-wing Gunnery Exercises (A-G) typically last around 1 hour and consist of two to three dry run practice passes (non-firing) and three to five live-fire passes for each aircraft. Each aircraft descends from above 9,000 ft. (2,743 m) to 1,500 ft. (457 m) AGL on each pass and expends 250–500 rounds of 20 mm practice ammunition. Only one aircraft actually shoots during any one pass.

2.4.1.3.6 High-Speed Anti-Radiation Missile Exercise (Simulation Only)

The High-speed Anti-radiation Missile (HARM) is the primary weapon used to suppress Enemy Air Defense systems and is designed to attack emitting radars. Only non-firing (simulation only) HARMs are used during Suppression of Enemy Air Defense activities at the FRTC. During a typical HARM Exercise (HARMEX), aircraft such as an EA-18 or FA-18 flying at an altitude of approximately 3,000 ft. (914 m) AGL would receive and identify an electronic signal from simulated enemy radar. The aircrew would then position themselves for the optimum firing solution and simulate firing a HARM at the electronic signal. HARMEXs are non-firing activities that typically last about 50 minutes.

2.4.1.3.7 Missile Exercise (Air-to-Ground)

Missile Exercises (MISSILEXs) (A-G) are performed by rotary- and fixed-wing aircraft in B-17, B-19, and B-20. The exercises involve two to four aircraft that approach and acquire an assigned target, which is then attacked using guided or unguided rockets or A-G missiles. For guided rocket/missile operations, the missile is LASER-guided, or in some cases video imagery is used. The H-60 helicopters launch one high-explosive AGM-114 HELLFIRE missile per exercise from an altitude of about 300 ft. (91 m) AGL against a specially prepared target. FA-18, F-15, and F-35 fixed-wing aircraft launch missiles from altitudes greater than 20,000 ft. (6,096 m) AGL. MISSILEXs (A-G) typically last 1 hour.

2.4.1.4 Naval Special Warfare Training

Overall, the mission of NSW is highly specialized and requires continual and intense training. The mission of NSW is to

- conduct unconventional warfare,
- direct action,
- combat terrorism,

- conduct special reconnaissance,
- conduct information warfare,
- conduct security assistance,
- conduct counter-drug operations, and
- recover personnel from hostile situations.

Specialized training conducted by NSW at FRTC includes Convoy Operations, Insertion and Extraction Training, Tactical Ground Mobility, and Ground Maneuver Tactics.

2.4.1.4.1 Convoy Operations

During military convoy training, vehicles and individuals transit areas and make contact with hostile individuals, as well as non-hostile individuals in accordance with the training objectives. From 3 to 10 vehicles travel preplanned routes where role players make contact with the convoy. Role players can number up to 30 NSW and other personnel for an activity. Hostile situations are generally initiated with the simulation of some type of improvised explosive device (use of safe pyrotechnics to simulate an explosion—special effects for realism). Upon engagement with hostile forces, the convoy employs defensive maneuvers and requests help from fast-moving aircraft to secure the area's airspace for insertion of helicopters to defeat hostile forces. Rotary-wing aircraft involved in this activity could include H-60s, CH-46s, and CH-47s and fixed-wing aircraft include the FA-18. No live ordnance is involved in Convoy Operations. Operations can vary from 2–6 hours depending upon the complexity of training.

2.4.1.4.2 Insertion and Extraction Training

Insertion and extraction activities train military forces to deliver and extract equipment and personnel using a variety of techniques and at a variety of altitudes. These activities involve insertion from aircraft by parachute or by rope (fastrope and rappelling). Fastrope is a technique by which troops descend a thick rope from an aircraft in places where the aircraft itself is unable or unwilling to touch down. Rappelling is performed on smaller equipment and at a slower rate than fast roping. NSW personnel also train at the FRTC to perform special purpose insertion/extraction techniques. This technique inserts or extracts an entire patrol at one time via helicopter and is designed for use in rough terrain as well as water. C-130 aircraft, MV-22, CH-46, CH-47, and H-60 helicopters are typically used for equipment and personnel insertions and extractions. Training activities typically last from 2 to 8 hours, and no live ordnance is expended.

2.4.1.4.3 Tactical Ground Mobility and Tactical Maneuver Tactics Training

Tactical Ground Mobility activities at the FRTC involve teams driving civilian and military vehicles along preplanned routes of varying types of terrain and conditions, day or night, with the goal of developing highly skilled drivers capable of driving and navigating under most any condition. Vehicles include but are not limited to all-terrain vehicles, pick-up trucks, high-mobility multipurpose wheeled vehicles, and mine-resistant ambush-protected vehicles. Mobility operations are conducted with the purpose of practicing freedom of movement for personnel and equipment in a battle space without delays due to terrain, barriers, obstacles, and/or mines. This activity is primarily conducted on B-16, but on occasion and with prior approval, existing roads and trails on surrounding BLM land are used. Any activity on BLM land is coordinated with the BLM through the NSAWC BLM Liaison.

Training evolves from basic to complex integrated scenarios. A training class contains approximately 70 students who train in small groups, both day and night, for approximately 1 week. More complex

integrated training involves applying basic skills to complex integrated scenarios; for example, a convoy operation with both fixed-wing and helicopter support. Small UASs are used across most tactical ground mobility activities.

Ordnance typically used during Tactical Ground Mobility training includes small arms, 0.50 caliber (cal), 40 mm practice grenades, and smoke grenades. LASER range finders and illuminators are also used.

Ground Maneuver Tactics Training is a specific Tactical Ground Mobility refresher course conducted by NSW for 14 days, approximately four times per year, that incorporates 30 personnel. Training consists of coordinated movement and small arms fire from military vehicles. It may also include rough terrain driving, inter-vehicle command and control, navigation, vehicle recovery training, and transitioning from mounted to dismounted operations.

2.4.1.5 Large Force Exercise

The following large force exercises are conducted at the FRTC and include multiple primary mission areas such as STW, AAW, and EW.

2.4.1.5.1 Carrier Air Wing Large Force Exercise

Carrier Air Wing Large Force Exercises at the FRTC are based on the principle of crawl, walk, run. These training exercises begin with simple scenarios and advance to scenarios involving the entire Carrier Air Wing. The 4 weeks of training brings together various squadrons and teaches them to work together under a combination of real world scenarios. During the advanced phase of training, Large Force Exercise scenarios include standoff strike, force concentration, self escort, defense in depth, long range strike, and other activities.

2.4.1.5.2 Desert Rescue Large Force Exercise

Desert Rescue Large Force Exercises are joint, multi-service, and multinational Combat Search and Rescue activities involving the use of rotary- and fixed-wing aircraft, unmanned autonomous systems, and ground forces (both friend and foe). These exercises are similar to complex Combat Search and Rescue scenarios, but they integrate various service and multinational assets in large-scale battlefield situations. Desert Rescue Large Force Exercises may be conducted in preparation for, in conjunction with, or as a supplement to, an additional large force exercise. Desert Rescue Large Force Exercises last 2–4 hours, with multiple activities occurring on a daily basis for a 1-week period.

2.4.1.5.3 Long Range Strike for Joint Task Force Exercise and Composite Training Unit Exercise

During a Joint Task Force Exercise (JTFEX) or Composite Training Unit Exercise (COMPTUEX), the NSAWC training areas of the FRTC are utilized to simulate a long-range strike, also referred to as “Off-Carrier Strikes.” During this exercise fixed-wing aircraft engage in air-to-air warfare, encounter electronic combat threats, strike targets, and refuel.

The Carrier Strike Group COMPTUEX is an Integrated Phase, at-sea, major range event that integrates the aircraft carrier and carrier air wing with surface and submarine units in a challenging environment. It is nominally 26 days long with two scenario-driven “mini” multi-threat battle problems, one about 24 hours long and the other about 18 hours long.

Operations included in the Carrier Strike Group COMPTUEX scenario at the FRTC are specifically tailored for the operational training needed by the Strike Group prior to deployment and are held at various

times of the year, depending on the rotational nature of the Strike Group's deployment. Typically, high-explosive fire operations that take place during COMPTUEX include long-range air strikes, simulated Naval Surface Fire Support, and other surface gunnery and MISSILEXs.

2.4.1.6 Expeditionary Warfare - Land Demolitions and Explosive Ordnance Disposal

At the FRTC, explosive ordnance disposal (EOD) personnel train to gain and maintain qualification and proficiency in locating, neutralizing, or destroying unexploded ordnance and conducting other hazardous range clearance activities. Detachments from other facilities complement the existing EOD personnel. Removal of unexploded ordnance is important for personnel safety and the environmental sustainability of ranges. Operations are conducted on B-17, B-19, and B-20 (no live ordnance is dropped at B-16) and involves approximately 22 personnel per activity. Explosive ordnance disposal activities last approximately 4.5 hours. These EOD activities are similar in nature to Land Demolition activities, the difference being that EOD range clearance actions are not undertaken in a tactical training environment, but are administrative in nature.

Land Demolitions at the FRTC are limited. Approximately once per year the FRTC provides access to the Federal Bureau of Investigation (FBI) for training on demolition reconstruction. During this training the FBI destroys a vehicle using explosives and provides training to law enforcement personnel on how to investigate and evaluate the type of explosive, detonation method, and other aspects of the explosion.

2.4.1.7 Other Training - Mission Area Training – Marksmanship

Mission Area Training is conducted at the Nevada Army National Guard small arms range located on B-19. Nevada Army National Guard personnel conduct small arms marksmanship training from fixed firing lines. Navy personnel (NSAWC, security, and EOD) use the range for similar training. Most training is conducted on weekends to avoid conflicts with aviation training. The range is used approximately 60 days per year with Nevada Army National Guard groups as large as 70 receiving training over a weekend.

2.4.1.8 Supersonic Events

Two supersonic operating areas have been established at FRTC (Figure 2-1) to conduct military training that requires high-performance flight profiles, including aircraft flying at supersonic speeds (i.e., greater than the speed of sound or Mach 1). Most supersonic flights occur during adversarial training simulating air-to-air combat situations during AAW and Large Force Exercises. An estimated 458 supersonic events would occur during the busiest month under the No Action Alternative (Appendix E, Noise Study).

2.5 Alternative 1 – Increase Training Activities and Use Additional Platforms and Systems

2.5.1 Changes in Training Activities

Under Alternative 1, the number of annual activities would increase for Combat Search and Rescue, Gunnery Exercise (A-G), HARMEX, and MISSILEX (A-G) (See Table 2-4 in Section 2.7, Range Activity Summary Tables). Two new activities, Ground LASER Targeting and Dismounted Fire and Maneuver, would also be conducted. Although Ground LASER Targeting and Dismounted Fire and Maneuver have been conducted at FRTC in the past, they were not conducted during the baseline period of 2010–2012. Therefore, these training activities are not included in the No Action Alternative and are analyzed as new activities under Alternatives 1 and 2. The changes under Alternative 1 represent an overall 6 percent increase in the total number of annual training activities at FRTC, but several of the current training activities would not change (Table 2-4). Alternative 1 does not include an increase in AAW or Large Force

Exercises; therefore, supersonic events are not expected to increase. The proposed changes for Alternative 1 are required to meet the training objectives for STW and Other Training, as identified by subject matter experts from NSAWC, NSW, Naval Expeditionary Combat Command, and the Nevada Army National Guard. Table 2-2 provides a high-level summary of the training activities that would be conducted under the No Action Alternative and Alternative 1. Detailed data for current (No Action Alternative) and proposed (Alternatives 1 and 2) training activities at the FRTC, including annual number of estimated training activities, location, representative platforms, ordnance use, and aircraft overflights are provided separately in Section 2.7 (Range Activity Summary Tables) for readability.

Table 2-2: Summary of the Annual Number of Training Activities for the No Action Alternative and Alternative 1

Warfare Area	No Action Alternative	Alternative 1
Anti-Air Warfare	2,582	2,582
Naval Special Warfare	79	79
Strike Warfare	1,882	2,050
Large Force Exercise	456	456
Electronic Warfare	4,025	4,025
Expeditionary Warfare	78	78
Other	185	592
Total	**9,287**	**9,862**

2.5.2 Description of New Training Activities

2.5.2.1 Dismounted Fire and Maneuver Training

Dismounted Fire and Maneuver Training is proposed by Marines from the Marine Mountain Warfare Training Center in Bridgeport, California. The training would occur on B-17. The training consists of limited vehicle travel on existing roads to position personnel for dismounted maneuvers. Dismounted activity would consist of three to five groups of 6–10 personnel conducting operations. Safety Danger Zones have been developed for the area for up to .50 cal live-fire exercises (the .50 cal safety danger zone encompasses the use of all other ammunition that could be part of an exercise). Activity duration would be 2–3 days. To date, the USMC has not pursued this proposed training, but the area remains available to all units on a case-by-case basis, as long as it does not interfere with the NSAWC training mission.

2.5.2.2 Ground LASER Targeting Training

Ground LASER Targeting Training is conducted using LASERs as aiming devices for small arms, as target scoring systems in lieu of live rounds, for range finding, to illuminate targets at night, and to mark targets for identification by aircraft. Historically, this type of training was conducted in the settlement area of Dixie Valley but is currently only approved on B-16, B-17, and B-19 at the FRTC. Ground LASER Targeting Training would be linked to Ground Maneuver Tactics Training classes.

2.5.3 Proposed Additional Platforms and Systems

New platforms and systems that would transition into the fleet under Alternative 1 to replace older platforms and systems are described below. The Navy Fact File provides additional information regarding Navy platforms and systems (U.S. Department of the Navy 2014d).

2.5.3.1 Aircraft

2.5.3.1.1 F-35 Joint Strike Fighter

The F-35 Joint Strike Fighter Lightning II aircraft will complement and replace the Navy's FA-18E/F. The F-35 is projected to make up about one-third of the Navy's strike fighter inventory by 2020. The Marine Corps will have a variant of the F-35 (F-35B) with a short takeoff, vertical landing capability that is planned to replace the AV-8B and FA-18C/D aircraft. The Air Force F-35A is a conventional take-off and landing variant planned to be introduced between 2015 and 2020. The Navy (F-35C) variant for aircraft carrier use is scheduled for delivery in 2015; the USMC variant reached initial operating capability in 2012. The F-35 will operate similarly to the aircraft it replaces or complements. It will operate in the same areas and will be used in the same training exercises, such as air-to-surface and air-to-air MISSILEXs, BOMBEXs, and any other exercises where fixed-wing aircraft are used in training.

2.5.3.1.2 EA-18G Airborne Electronic Attack Aircraft

The Navy and USMC are transitioning from the EA-6B Prowler to the EA-18G Growler for their airborne electronic attack aircraft. The EA-18G is a variant of the F/A-18F Super Hornet. The EA-18G is used to conduct the same types training at FRTC as the EA-6B, but it provides greater speed, altitude, and other capabilities. The Navy will complete the transition from the EA-6B to EA-18G in 2015, and the USMC will do so in 2019. However, the transition is complete for squadrons that typically train at FRTC. The No Action Alternative includes a mix of EA-6B and EA-18G sorties (Table 2-6) based on data from the baseline period (2010–2012). EA-6B sorties decrease to zero and EA-18G sorties increase for Alternatives 1 and 2.

2.5.3.1.3 E-2D Airborne Early Warning Aircraft

The E-2D Advanced Hawkeye is the carrier-based Airborne Early Warning aircraft follow-on variant of the E-2C Hawkeye. The E-2D will operate similarly to the E-2C, in the same training areas and will include in-flight refueling capability. Fleet integration is expected in 2015.

2.5.3.1.4 P-8A Multi-Mission Maritime Aircraft

The P-8A is a modified Boeing 737-800ERX that brings together a highly reliable airframe and turbo fan jet engine with fully connected, state-of-the-art sensors, and command and control systems. This combination of airframe and systems dramatically improves the capabilities of the current P-3 aircraft it is designed to replace. Transition from the P-3 to the P-8A started in 2013 and is projected to be complete in 2018.

2.5.3.1.5 AH-1Z Attack Helicopter

The AH-1Z attack helicopter provides rotary-wing CAS, anti-armor, armed escort, armed/visual reconnaissance and fire support coordination capabilities under day/night and adverse weather conditions for the USMC. The AH-1Z replaces the two-bladed AH-1W and features a new four-bladed composite rotor system, performance-matched transmission, four-bladed tail rotor, upgraded landing gear, and a fully integrated glass cockpit. Transition from the AH-1W to the AH-1Z started in 2011 and is projected to be complete around 2021.

2.5.3.1.6 UH-1Y Utility Helicopter

The UH-1Y provides command and control and assault support under day/night and adverse weather conditions. The UH-1Y is the most significant upgrade ever made to the H-1 helicopter. Upgraded features include a new four-bladed, all-composite and ballistically tolerant (holes up to 23 mm in

diameter from small arms projectiles) rotor system; upgraded engines and transmissions; integrated digital cockpit featuring multifunction flat panels; increased payload capabilities; crash-worthy seating for all crew and passengers; 84 percent identical parts with the AH-1Z Super Cobra (also part of the H-1 Upgrade Program); increased load carrying ability; greater range and survivability; smaller logistical footprint; and easier maintenance for the USMC.

2.5.3.1.7 MV-22 Tilt Rotor Aircraft

The MV-22 Osprey is a tilt rotor aircraft designed as the medium-lift replacement for the CH-46E Sea Knight assault support helicopter. The Osprey can operate as a helicopter or a turboprop aircraft and offers twice the speed, six times the range, and three times the payload of the CH-46E. The MV-22 was deployed in 2007 with a primary function of medium-lift assault support. Its mission for the Marine Corps is the transportation of troops, equipment, and supplies from ships and land bases for combat assault and assault support. Transition from the CH-46E to MV-22 is projected to be complete in 2018.

2.5.3.2 Unmanned Autonomous Systems

Military UASs include aerial vehicles that operate as intelligence, search, and reconnaissance sensors or as armed combat air systems. The military UASs described in this section include, but are not limited to, those that may be operated at the FRTC.

2.5.3.2.1 MQ-88 Fire Scout

The Fire Scout Vertical Take-Off and Landing Tactical Aerial Vehicle system is designed to operate from air-capable ships with initial deployment on a Guided Missile Frigate, followed by final integration and test on board the Littoral Combat Ship. This unmanned vehicle is capable of providing radio voice communications relay and is equipped with electro-optical/infrared sensors and a LASER designator that enables the system to find tactical targets, track and designate targets, accurately provide targeting data to strike platforms, and perform battle damage assessment. Testing is currently going on to place a weapons system on the Fire Scout.

2.5.3.2.2 MQ-4C Triton

The MQ-4C Triton is a Broad Area Maritime Surveillance UAS in testing and development as a complementary system to the P-8A aircraft, providing maritime reconnaissance support to the Navy. It will be equipped with electro-optical/infrared sensors, can remain airborne for 30 hours, and fly at approximately 60,000 ft. (18,288 m) AGL.

2.5.3.3 Missiles/Rockets/Bombs

The Navy will develop, test, and train with improved weapons, including missiles, rockets, and bombs. Most developments involve changes in the sensors and guidance systems associated with these weapons, while the warheads generally remain unchanged. For missiles and rockets, improvements in propulsion, combined with improvements in sensor capability, may extend the maximum range of some weapons.

2.5.3.3.1 Joint Air-to-Ground Missile

The joint A-G missile is a possible replacement or upgrade to existing A-G weapons currently in use at the FRTC, such as the AGM-114 HELLFIRE Missile. In addition to having a longer operating range than existing weapons, the joint A-G missile could include a multi-mode seeker, with a combination of semi-active LASER, passive infrared, and radar.

2.5.3.3.2 Guided Rocket Systems

Guided rocket systems include the Low Cost Guided Imaging Rocket (LOGIR) and the Advanced Precision Kill Weapon System (APKWS). LOGIR is a guided infrared 2.75-inch (in.) (7-centimeter [cm]) rocket system, and APKWS is a LASER-guided 2.75 in. (7 cm) rocket. The MH-60 helicopter is one platform expected to be equipped with these rockets. Rockets currently in use at the FRTC similar to the new rocket systems are the 2.75 in. and 5 in. Zuni rockets.

2.6 ALTERNATIVE 2 – ALTERNATIVE 1 PLUS A 10 PERCENT INCREASE IN TRAINING ACTIVITIES (PREFERRED ALTERNATIVE)

Alternative 2 includes all elements of Alternative 1 and, with a few exceptions, a 10 percent increase in training activities compared to Alternative 1. The Navy has identified Alternative 2 as its preferred alternative. The number of Long Range Strike for JTFEX and COMPTUEX, Dismounted Fire and Maneuver, and Ground Maneuver Tactics activities conducted for Alternative 2 would be the same as Alternative 1. The 10 percent increase from Alternative 1 to Alternative 2 would provide flexibility to accommodate additional training required in response to changes in training doctrine, deployment schedules, and world events. Alternative 2 includes increases in AAW and Large Force Exercises; therefore, the annual number of supersonic events would increase.

As discussed in Section 3.4 (Noise) and Appendix E (Noise Study), modeling to predict supersonic events is based on “busiest month” conditions and these conditions would not change under Alternative 1 or 2. During the “busiest month,” approximately 458 supersonic events could occur. The number of supersonic activities in any other month is less than what is expected during the busiest month. Therefore, even if there are changes in the number of supersonic activities in other “non-busiest” months, the absolute maximum that is used for modeling would be the numbers anticipated for the busiest month . Consequently, the number of supersonic events occurring during the busiest month for Alternative 2 would be the same as the No Action Alternative (458 supersonic events).

Although supersonic event estimates for the busiest month cannot be used to extrapolate total annual supersonic events, the relative increase of events would be proportional to the increase in annual AAW and Large Force Exercises (as those are the warfare areas that include supersonic operations). The total number of supersonic events would be expected to increase 10 percent under Alternative 2 relative to the No Action Alternative and Alternative 1. The increase in supersonic events is anticipated to be distributed throughout the non-busiest months, as the busiest month scenario is not expected to change under any alternative.

Table 2-3 provides a high-level summary of the training activities that would be conducted under the No Action Alternative, Alternative 1, and Alternative 2. Detailed data for current (No Action Alternative) and proposed (Alternatives 1 and 2) training activities at the FRTC, including annual number of estimated training activities, location, representative platforms, ordnance use, and aircraft overflights are provided separately in Section 2.7 (Range Activity Summary Tables) for readability.

Table 2-3: Summary of the Annual Number of Training Activities for All Alternatives

Warfare Area	No Action Alternative	Alternative 1	Alternative 2
Anti-Air Warfare	2,582	2,582	2,841
Naval Special Warfare	79	79	86
Strike Warfare	1,882	2,050	2,255
Large Force Exercise	456	456	501
Electronic Warfare	4,025	4,025	4,428
Expeditionary Warfare	78	78	86
Other	185	592	651
Total	**9,287**	**9,862**	**10,848**

Section 2.7 (Range Activity Summary Tables) contains summary data for current (No Action Alternative) and proposed (Alternatives 1 and 2) training activities at the FRTC, including platforms used, annual number of training activities, and location. Section 2.7 also provides additional information, including an estimated total of annual ordnance by range area and aircraft overflights in the FRTC airspace.

2.7 Range Activity Summary Tables

Table 2-4 summarizes the training activities under each alternative at the FRTC. Table 2-5 lists the estimated annual expenditure of ordnance by range. Table 2-6 presents the annual summary of aircraft operations. Information presented in this section was developed by Navy subject matter experts based on historical use (No Action Alternative) and anticipated future use (Alternatives 1 and 2) of the FRTC and its associated airspace. Specific values presented in the tables are representative annual maximum values used in the impact analysis for this EIS. These values were derived from data on past use, current requirements, and anticipated emerging requirements. Specific values for past use varied based on several factors such as changes in training doctrine, deployment schedules, weapons systems, and world events. Likewise, actual values for future use are expected to vary for the same reasons. Specific platforms, weapons systems, and types of ordnance presented in the tables and mentioned throughout the EIS are also representative for analytical purposes. While this information is comprehensive, similar platforms, weapons systems, and types of ordnance with similar characteristics not specifically mentioned could be used.

Table 2-4: Current and Proposed Annual Level of Training Activities at the Fallon Range Training Complex

Range Activity	Representative Platform	Annual Number of Training Activities			Location
		No Action Alternative	Alternative 1	Alternative 2	
Anti-Air Warfare					
Air Combat Maneuvers	FA-18, EA-18G, F-16, F-22, F-35, AV-8, EA-6B, F-15, F-16, F-5, F-21	1,957	1,957	2,153	NSAWC 1, NSAWC 2
Air Combat Maneuvers	FA-18	625	625	688	Reno MOA
Strike Warfare					
Bombing Exercise (Air-to-Ground)	AV-8, EA-18G, FA-18, F-15, F-16	1,293	1,293	1,422	B-16, B-17, B-19, B-20
Close Air Support	EA-18G, EA-6B, FA-18, F-15, F-16, H-60, T-34, UAS, F-35, A-10, AV-8, AH-1	378	378	416	B-17, B-19
Urban Close Air Support	FA-18	92	92	101	Over the city of Fallon, Nevada
Combat Search and Rescue	E-2, EA-6B, EA-18G, FA-18, F-5, F-16, F-35, H-60S	45	115	127	NSAWC 1, NSAWC 2
Gunnery Exercise (Air-to-Ground)	FA-18, CH-46, H-60, H-47, H-53, F-35, F-15, F-16, V-22, A-10, AH-1, AH-64	36	40	44	B-16, B-17, B-19, B-20
HARMEX (Suppression of Enemy Air Defense [simulation only])	FA-18, EA-18G, F-35 Integrated activities may add F-22, F-15, F-16, E-2, E-3, EP-3, RC-135	8	20	22	EW Range

Table 2-4: Current and Proposed Annual Level of Training Activities at the Fallon Range Training Complex (continued)

Range Activity	Representative Platform	Annual Number of Training Activities			Location
		No Action Alternative	Alternative 1	Alternative 2	
Strike Warfare					
Missile Exercise (Air-to-Ground)	F-18, AV-8, F-15E, H-60S, F-35	30	112	123	B-17, B-19, B-20
Naval Special Warfare					
Convoy Operations	Aircraft: FA-18, CH-47, H-60, CH-46 Vehicles: HMMWV	32	32	35	Dixie Valley Training Area
Insertion/Extraction	CH-47, H-60, C-130, MV-22, CH-46	31	31	34	NSAWC 1, NSAWC 2
Tactical Ground Mobility	HMMWV, SUV, RG-31/33, MATV, ATV, LTATV Joint light tactical vehicle, UAS CAT1	12	12	13	B-16, Dixie Valley Training Area
Ground Maneuver Tactics	Ground Personnel	4	4	4	Dixie Valley Training Area
Large Force Exercises					
Carrier Air Wing Large Force Exercise	E-2, E-3, E-8, EA-6B, EA-18G, F-15, F-16, F-21, F-22, F-5, FA-18, H-60, SH-60, C-130, KC-10, KC-130, KC-135, P-3C, P-8, F-35, RC-135, UAS	382	382	420	NSAWC 1, NSAWC 2
Desert Rescue Large Force Exercise	AH-1, AH-1Z, A-10, C-130, E-2C, EA-6B, EA-18G, FA-18, F-16, F-5, F--35, MV-22, H-60, MI--17, MI-24, UAS	70	70	77	NSAWC 1, NSAWC 2

Table 2-4: Current and Proposed Annual Level of Training Activities at the Fallon Range Training Complex (continued)

Range Activity	Representative Platform	Annual Number of Training Activities			Location
		No Action Alternative	Alternative 1	Alternative 2	
Large Force Exercises					
Long Range Strike for JTFEX and COMPTUEX	E-2C, E-3, EA-6B, EA-18G, F-5, F-15, F-16, FA-18, F-22, F-35, KC-10, KC-135, B-52	4	4	4	NSAWC 1, NSAWC 2
Electronic Warfare					
Electronic Warfare Operations	EA-6B, EA-18G, EP-3, E-2, E-3, C-130, FA-18, F-16, F-35, P-3, P-8, H-60, RC-135, UAS, MC-12, V-22, H-47, AH-1, CH-53 Opposition Forces aircraft: F-15, F-16, F-21, FA-18, F-5	4,025	4,025	4,428	NSAWC 1, NSAWC 2
Expeditionary Warfare					
Land Demolitions, EOD	EOD Personnel, FBI	78	78	86	B-16, B-17, B-19, B-20
Other					
Dismounted Fire and Maneuver	Ground Personnel (0.5, 5.56 mm, 7.62 mm caliber weapons)	0	4	4	B-17
Ground LASER Targeting	HMMWV, MRAP, MATV, and future (JLTV, Stryker, and LAV)	0	378	416	Dixie Valley Training Area, Shoal Site, B-16, B-17, B-19

Table 2-4: Current and Proposed Annual Level of Training Activities at the Fallon Range Training Complex (continued)

Range Activity	Representative Platform	Annual Number of Training Activities			Location
		No Action Alternative	Alternative 1	Alternative 2	
Mission Area Training – Marksmanship	National Guardsmen, Sailors and Reservists, Law Enforcement (5.56 mm, 7.62 mm, 9 mm, 40 mm, 50 mm, 12-gauge caliber weapons, 105 mm howitzer)	185	210	231	B-19
Overall Total Annual Number of Activities		**9,287**	**9,862**	**10,848**	

Notes: (1) COMPTUEX = Composite Training Unit Exercise, EOD = Explosive Ordnance Disposal, EW = Electronic Warfare, FBI = Federal Bureau of Investigation, HARMEX = High-speed Anti-radiation Missile Exercises, HMMWV = High Mobility Multipurpose Wheeled Vehicle, JLTV = Joint Light Tactical Vehicle, JTFEX = Joint Task Force Exercise, LASER = light amplification by stimulated emission of radiation, LAV = Light Assault Vehicle, MATV = Military All Terrain Vehicle, MOA = Military Operations Area, MRAP = Mine Resistant Ambush-protected, NSAWC = Naval Air Strike and Warfare Center

(2) Platforms presented are representative platforms; other similar platforms could be used.

Table 2-5: Summary of Estimated Annual Ordnance Use by Training Range Area[1]

General Type	Ordnance/Munitions Type	No Action Alternative (NAA)	ALT 1	ALT 2
Bravo-16				
Bomb	BDU-12 (Inert)	15	15	17
	BDU-45 (Inert)	40	40	44
	BDU-48 (Inert)	116	116	128
	GBU-12 (Inert)	0	0	0
	GBU-16 (Inert)	7	7	8
	GBU-31 (Inert)	1	1	1
	GBU-32 (Inert)	6	6	6
	GBU-38 (Inert)	12	12	13
	LGTR (Inert)	225	225	248
	MK-77 (Inert)	0	0	0
	MK-82 (Inert)	1	1	1
	MK-83 (Inert)	18	18	19
	MK-84 (Inert)	2	2	2
	SHAPE BDU (Inert)	0	0	0
	Bomb (Inert) Summary	**443**	**443**	**487**
Explosives	Bulk HE (lb.)	9	9	10
	M023 (C4 Block)	26	26	29
	M130 (Blasting Cap, Electric)	6	6	6
	M131 (Blasting Cap, Non-Electric)	15	15	17
	M456 (Detonation Cord [ft])	242	242	266
	M670 (Time Blasting Fuse)	103	103	114
	M766 (Igniter, Time Blasting Fuse)	15	15	17
	Explosives Summary	**416**	**416**	**458**
Grenade	40 mm Practice Grenades (Inert)	41,832	83,664	92,030
	Smoke Grenades (Inert)	199	697	767
	Grenade (Inert) Summary	**42,031**	**84,361**	**92,797**
Ammunition	.50 cal (Live)	179,280	358,560	394,416
	5.56 mm (Live)	1,210	1,210	1,331
	7.62 mm (Live)	478,080	956,160	1,051,776
	9 mm (Live)	10,000	20,000	22,000
	Ammunition (Live) Summary	**668,570**	**1,335,930**	**1,469,523**
GRAND TOTAL FOR ALL ORDNANCE/MUNITIONS PER ACTION ALTERNATIVE AT B-16		***711,461***	***1,421,151***	***1,563,266***

Table 2-5: Summary of Estimated Annual Ordnance Use by Training Range Area[1] (continued)

General Type	Ordnance/Munitions Type	NAA	ALT 1	ALT 2
Bravo-17				
Bomb	BDU-12 (Inert)	105	105	115
	BDU-45 (Inert)	398	398	438
	BDU-48 (Inert)	322	322	354
	GBU-12 (Inert)	11	11	12
	GBU-16 (Inert)	81	81	90
	GBU-31 (Inert)	11	11	12
	GBU-32 (Inert)	53	53	59
	GBU-38 (Inert)	90	90	99
	LGTR (Inert)	1,352	1,352	1,488
	MK-77 (Inert)	2	2	3
	MK-82 (Inert)	8	8	8
	MK-83 (Inert)	108	108	118
	MK-84 (Inert)	412	412	453
	SHAPE BDU (Inert)	1	1	1
	Bomb (Inert) Summary	**2,953**	**2,953**	**3,249**
Bomb	BDU-110 (Live)	2	2	2
	BDU-111 (Live)	592	592	651
	BDU-48 (Live)	94	94	103
	BLU-110 (Live)	55	55	60
	BLU-111 (Live)	122	122	134
	GBU-12 (Live)	68	68	74
	GBU-16 (Live)	77	77	85
	GBU-31 (Live)	2	2	3
	LGTR (Live)	746	713	784
	MK-76 (Live)	11,260	11,020	12,122
	MK-81 (Live)	46	46	50
	MK-82 (Live)	449	449	493
	MK-83 (Live)	834	834	917
	MK-84 (Live)	57	57	63
	Small Diameter Bomb (Live)	0	2	2
	Bomb (Live) Summary	**14,402**	**14,131**	**15,544**
Explosives	Bulk HE (lb.)	9	9	10
	M023 (C4 Block)	26	26	29
	M130 (Blasting Cap, Electric)	6	6	6
	M131 (Blasting Cap, Non-Electric)	15	15	17

Table 2-5: Summary of Estimated Annual Ordnance Use by Training Range Area[1] (continued)

General Type	Ordnance/Munitions Type	NAA	ALT 1	ALT 2
	M456 (Detonation Cord [ft])	242	242	266
	M670 (Time Blasting Fuse)	103	103	114
	M766 (Igniter, Time Blasting Fuse)	15	15	17
	Explosives Summary	**416**	**416**	**458**
Missile	2.75" (Inert)	32	32	35
	5" Zuni (Inert)	2	2	2
	Missile (Inert) Summary	**34**	**34**	**37**
Missile	2.75" (Live)	173	666	733
	5" Zuni (Live)	42	42	46
	AGM-114 Hellfire	25	44	48
	Missile (Live) Summary	**240**	**752**	**827**
Ammunition	.50 cal (Live)	27,677	41,886	46,074
	20 mm (Live)	70,877	64,458	70,904
	25 mm (Live)	0	1,250	1,375
	5.56 mm (Live)	1,210	15,210	16,731
	7.62 mm (Live)	14,311	28,571	31,428
	Ammunition (Live) Summary	**114,075**	**151,375**	**166,512**
GRAND TOTAL FOR ALL ORDNANCE/MUNITIONS PER ACTION ALTERNATIVE AT B-17		***132,120***	***169,661***	***186,627***

Table 2-5: Summary of Estimated Annual Ordnance Use by Training Range Area[1] (continued)

General Type	Ordnance/Munitions Type	NAA	ALT 1	ALT 2
Bravo-19				
Bomb	BDU-12 (Inert)	29	29	32
	BDU-45 (Inert)	166	166	183
	BDU-48 (Inert)	37	37	41
	GBU-16 (Inert)	27	27	30
	GBU-31 (Inert)	5	5	6
	GBU-32 (Inert)	18	18	20
	GBU-38 (Inert)	23	23	25
	LGTR (Inert)	225	225	248
	MK-82 (Inert)	3	3	3
	MK-83 (Inert)	20	20	22
	MK-84 (Inert)	11	11	12
	Bomb (Inert) Summary	**564**	**564**	**620**
Bomb	BDU-110 (Live)	2	2	2
	BDU-111 (Live)	196	196	215
	BDU-48 (Live)	94	94	103
	BLU-110 (Live)	8	8	9
	GBU-12 (Live)	24	24	26
	GBU-16 (Live)	20	20	22
	LGTR (Live)	492	492	541
	MK-76 (Live)	2,759	2,648	2,912
	MK-81 (Live)	24	24	26
	MK-82 (Live)	160	160	176
	MK-83 (Live)	252	252	277
	MK-84 (Live)	10	10	11
	Bomb (Live) Summary	**4,039**	**3,928**	**4,320**
Explosives	Bulk HE (lb.)	14	14	15
	M023 (C4 Block)	40	40	44
	M130 (Blasting Cap, Electric)	9	9	9
	M131 (Blasting Cap, Non-Electric)	24	24	26
	M456 (Detonation Cord [ft])	374	374	411
	M670 (Time Blasting Fuse)	160	160	176
	M766 (Igniter, Time Blasting Fuse)	24	24	26
	Explosives Summary	**644**	**644**	**708**
Grenade	40 mm Grenade (Live)	1	1	1
	Grenade (Live) Summary	**1**	**1**	**1**

Table 2-5: Summary of Estimated Annual Ordnance Use by Training Range Area[1] (continued)

General Type	Ordnance/Munitions Type	NAA	ALT 1	ALT 2
Missile	2.75" (Inert)	32	32	35
	5" Zuni (Inert)	2	2	2
	Missile (Inert) Summary	**34**	**34**	**37**
Missile	2.75" (Live)	84	251	277
	5" Zuni (Live)	44	44	48
	AGM-114 Hellfire	17	23	26
	Missile (Live) Summary	**145**	**318**	**351**
Mortar	81 mm ILL	3	3	3
	Mortar (Inert) Summary	**3**	**3**	**3**
Mortar	105 mm (Live)	311	311	342
	60 mm (live)	2	2	2
	Mortar (Live) Summary	**313**	**313**	**344**
Ammunition	.50 cal (Live)	49,673	53,456	58,801
	12 gauge (Live)	3,419	3,940	4,334
	20 mm (Live)	43,511	39,458	43,404
	25 mm (Live)	0	1,250	1,375
	40 mm (Live)	6,337	6,606	7,267
	5.56 mm (Live)	248,982	271,057	298,163
	7.62 mm (Live)	46,171	51,331	56,464
	9 mm (Live)	95,960	106,312	116,943
	Ammunition (Live) Summary	**494,053**	**533,410**	**586,751**
GRAND TOTAL FOR ALL ORDNANCE/MUNITIONS PER ACTION ALTERNATIVE AT B-19		***499,795***	***539,214***	***593,134***

Table 2-5: Summary of Estimated Annual Ordnance Use by Training Range Area[1] (continued)

General Type	Ordnance/Munitions	NAA	ALT 1	ALT 2
Bravo-20				
Bomb	BDU-12 (Inert)	30	30	33
	BDU-45 (Inert)	111	111	123
	BDU-48 (Inert)	173	173	191
	GBU-12 (Inert)	11	11	12
	GBU-16 (Inert)	34	34	37
	GBU-31 (Inert)	2	2	2
	GBU-32 (Inert)	18	18	20
	GBU-38 (Inert)	32	32	35
	LGTR (Inert)	451	451	496
	MK-77 (Inert)	1	1	1
	MK-82 (Inert)	3	3	4
	MK-83 (Inert)	35	35	39
	MK-84 (Inert)	13	13	15
	SHAPE BDU (Inert)	0	0	0
	Bomb (Inert) Summary	**915**	**915**	**1,006**
	BDU-111 (Live)	158	158	174
	BLU-110 (Live)	16	16	17
	BLU-111 (Live)	122	122	134
	GBU-12 (Live)	21	21	23
	GBU-16 (Live)	28	28	31
	GBU-31 (Live)	1	1	1
	LGTR (Live)	255	222	244
	MK-76 (Live)	3,170	3,041	3,345
	MK-81 (Live)	9	9	9
	MK-82 (Live)	121	121	133
	MK-83 (Live)	321	321	353
	MK-84 (Live)	16	16	17
	Small Diameter Bomb (Live)	0	2	2
	Bomb (Live) Summary	**4,236**	**4,076**	**4,484**
Explosives	Bulk HE (lb.)	9	9	10
	M023 (C4 Block)	26	26	29
	M130 (Blasting Cap, Electric)	6	6	6
	M131 (Blasting Cap, Non-Electric)	15	15	17
	M456 (Detonation Cord [ft])	242	242	266
	M670 (Time Blasting Fuse)	103	103	114
	M766 (Igniter, Time Blasting Fuse)	15	15	17
	Explosives Summary	**416**	**416**	**458**

Table 2-5: Summary of Estimated Annual Ordnance Use by Training Range Area[1] (continued)

General Type	Ordnance/Munitions	NAA	ALT 1	ALT 2
Missile	2.75" (Live)	49	225	247
	AGM-114 Hellfire	5	12	13
	Missile (Live) Summary	**54**	**237**	**260**
Ammunition	.50 cal (Live)	6,930	6,930	7,623
	20 mm (Live)	27,366	25,000	27,500
	5.56 mm (Live)	1,210	1,210	1,331
	7.62 mm (Live)	8,196	8,196	9,015
	Ammunition (Live) Summary	**43,702**	**41,336**	**45,469**
GRAND TOTAL FOR ALL ORDNANCE/MUNITIONS PER ACTION ALTERNATIVE AT B-20		***49,323***	***46,980***	***51,677***
Dixie Valley Training Area				
Grenade	40 mm Practice Grenades (Inert)	8,568	17,136	18,850
	Smoke Grenades (Inert)	41	143	157
	Grenade (Inert) Summary	**8,609**	**17,279**	**19,007**
Ammunition	.50 cal (Blanks)	36,720	73,440	80,784
	5.56 mm (Blanks)	500	500	550
	7.62 mm (Blanks)	81,774	163,047	179,352
	Ammunition (Blanks) Summary	**118,994**	**236,987**	**260,686**
GRAND TOTAL FOR ALL ORDNANCE/MUNITIONS PER ACTION ALTERNATIVE AT DVTA		***127,603***	***254,266***	***279,693***

[1] Values are based on historical use, existing requirements, and anticipated future requirements. These values are representative of baseline (No Action Alternative) and anticipate future (Alternatives 1 and 2) range use, and are presented for analysis purposes. Actual values will vary based on specific training requirements, which are influenced by factors such as deployments and world events.

Notes: BDU = Bomb Dummy Unit, BLU = Bomb Live Unit, GBU = Guided Bomb Unit, cal = caliber, HE = high explosive, LASER = light amplification by stimulated emission of radiation, lb. = pound(s), mm = millimeters, NSAWC = Naval Strike and Air Warfare Center

Table 2-6: Annual Estimates of Aircraft Sortie Overflights in the Fallon Range Training Complex Special Use Airspace

Aircraft	No Action Alternative				Alternative 1				Alternative 2			
	Sorties[1]	Flight Time (Hours)[2]	% Above 3,000 ft. AGL	% Nighttime[3]	Sorties	Flight Time (Hours)	% Above 3,000 ft. AGL	% Nighttime	Sorties	Flight Time (Hours)	% Above 3,000 ft. AGL	% Nighttime
Fixed-Wing												
A-10	200	1.2	95	20	213	1.2	95	20	234	1.2	95	20
AV-8	8	1.2	95	30	9	1.2	95	30	9	1.2	95	30
B-52	4	0.5	100	0	4	0.5	100	0	5	0.5	100	0
C-130	74	1.5	70	45	79	1.5	70	30	87	1.5	70	30
EA-6B	1,384	1.7	100	30	0	0	0	0	0	0	0	0
EA-18G	750	1.2	100	60	2,273	1.5	100	30	2,500	1.5	100	30
E-2	1,156	1.8	100	40	1,231	1.8	100	40	1,354	1.8	100	40
EP-3	10	1.8	100	20	11	1.8	100	20	12	1.8	100	20
F-5	3,920	1.5	90	30	4,175	1.5	85	30	4,592	1.5	85	30
F-15	30	1.6	85	15	32	1.6	100	15	35	1.6	100	15
F-16	1,524	1.3	100	30	1,623	1.3	85	30	1,785	1.3	85	30
FA-18/F-35	31,981	1.3	85	35	34,060	1.3	85	35	37,466	1.3	85	35
F-21	181	1.2	85	0	193	1.2	85	0	212	1.2	85	0
F-22	9	1.5	95	10	10	1.5	95	10	11	1.5	95	10
KC-10	3	3.0	100	25	3	3.0	100	25	4	3.0	100	25
KC-130	2	2.5	100	20	2	2.5	100	20	2	2.5	100	20
KC-135	6	3.0	100	25	6	3.0	100	25	7	3.0	100	25
OV-10	32	2.5	100	30	34	2.5	100	30	37	2.5	100	30
P-3C/P-8 MMA	70	3.0	100	20	75	3.0	100	20	82	3.0	100	20
RC-135	4	1.8	100	20	4	1.8	100	20	5	1.8	100	20
T-34	267	1.8	70	10	284	1.8	50	10	313	1.8	50	10

Table 2-6: Annual Estimates of Aircraft Sortie Overflights in the Fallon Range Training Complex Special Use Airspace (continued)

Aircraft	No Action Alternative				Alternative 1				Alternative 2			
	Sorties	Flight Time (Hours)	% Above 3,000 ft. AGL	% Nighttime	Sorties	Flight Time (Hours)	% Above 3,000 ft. AGL	% Nighttime	Sorties	Flight Time (Hours)	% Above 3,000 ft. AGL	% Nighttime
Rotary												
AH-1	16	1.2	0	20	17	1.2	0	20	19	1.2	0	20
AH-64	12	1.2	0	20	13	1.2	0	20	14	1.2	0	20
CH-46	66	1.5	0	25	70	1.5	0	15	77	1.5	0	15
CH-47	6	1.5	0	25	6	1.5	0	15	7	1.5	0	15
CH-53	14	1.5	0	15	15	1.5	0	15	16	1.5	0	15
H-60	1,286	1.5	5	50	1,370	1.5	5	50	1,507	1.5	5	50
MV-22	2	1.5	40	30	2	1.5	40	30	2	1.5	40	30
Unmanned Autonomous Systems												
UAS (All Classes)	169	0.8	0	20	180	0.8	0	20	196	0.8	0	20
	No Action Alternative				**Alternative 1**				**Alternative 2**			
Total of all Annual Sorties per Alternative	**43,186**				**45,993**				**50,592**			

[1] A single aircraft sortie is one complete flight (i.e., one takeoff and one final landing for one aircraft). If two aircraft are flown together, then that would be counted as two sorties. No matter how many sorties are flown, one activity is documented.
[2] Flight Time (Hours) = Flight Time in hours is the time on range per *each* sortie.
[3] % nighttime = percentage of total flight time that occurs between 10 p.m. and 7 a.m.
Notes: AGL = above ground level, ft. = feet, UAS = Unmanned Autonomous System

2.8 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

The Navy eliminated from further analysis the alternatives described in the following sections because they did not meet the purpose of and need for the Proposed Action or were not practical or feasible from a technical or economic standpoint.

2.8.1 CONDUCTING TRAINING AT LOCATIONS OTHER THAN THE FALLON RANGE TRAINING COMPLEX

The unique nature of the FRTC provides the combination of training airspace, ranges, and infrastructure needed to support the complex military activities currently occurring at the FRTC. There is no other Navy range in the U.S. that provides the level of operational support and established infrastructure for training activities; other service ranges with similar capability are already at maximum utilization. Factors that make the FRTC uniquely suited to its mission are discussed in Section 1.3.2 (The Strategic Importance of the Fallon Range Training Complex) and include:

- The FRTC has the highest utilization rates of all Navy range complexes for aviation training. The climate offers ideal air training opportunities year-round with an average 355 days a year in which the airspace ceiling is 3,000 ft. AGL or higher and visibility is 3 nm or greater for at least 50 percent of each day.
- The FRTC, with NAS Fallon, is the only naval training complex that can support, house, and train an entire carrier air wing for advanced integrated STW, EW, and AAW training.
- The FRTC's unique attributes include collocation with NSAWC, overland supersonic capability, a sophisticated threat Integrated Air Defense System, a Tactical Combat Training System range, multiple target types, high-altitude weapons training, and on-site adversary air training.

Additionally, the proximity of the FRTC to the support infrastructure (e.g., fuel, billeting, and runways) of NAS Fallon provides the most economical option for training. Travel times and additional fuel expenses for training activities to be conducted at the Naval Air Weapons Station China Lake, Chocolate Mountains Aerial Gunnery Range, or Nellis Air Force Base would increase the cost of training in the Navy's current fiscally constrained environment. Also, Naval Air Weapons Station China Lake is primarily a research, development, testing, and evaluation range and does not have the capacity to accommodate the training schedules of squadrons that currently train at FRTC.

This alternative—conduct training at locations other than the FRTC—fails to meet the purpose of and need for the Proposed Action, and was therefore eliminated from detailed study.

2.8.2 SIMULATED TRAINING

Military training includes extensive use of computer-simulated virtual training environments and involves command and control exercises without operational forces (constructive training). These training methods have substantial value in achieving limited training objectives. Computer technologies provide excellent tools for implementing a successful, integrated training program while reducing the risk and expense typically associated with live military training. However, virtual and constructive training are adjuncts to, not a substitute for, live training, including live-fire training. Unlike live-fire training, simulated training does not provide the requisite level of realism necessary to attain combat readiness and cannot replicate the high-stress environment encountered during combat operations.

Current simulation technology does not permit training with the degree of fidelity required to maintain proficiency. Basic training can take place using simulators but, beyond basic levels, simulation is of limited utility as the simulator cannot match the dynamic nature of the environment. Specifically, coordinated unit level activities require multiple crews to interact in a variety of environments that cannot be simulated. Moreover, it is a training imperative that crews actually use the weapons and equipment they will be called upon to operate.

Aviation simulation training provides valuable training for aircrews in specific limited training situations. However, the numerous variables that affect the outcome of any given training flight cannot be simulated with a high degree of realism. The military continues to research new ways to provide realistic training simulation; however, there are limits to the realism that simulation can provide, most notably dynamic multi-threat environments involving numerous forces where the training media is too complex to accurately model.

This alternative—substitution of simulation for live training—fails to meet the purpose of and need for the Proposed Action, and was therefore eliminated from detailed study.

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3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.0 INTRODUCTION

This chapter describes existing environmental conditions (affected environment) for resources potentially affected by the alternatives described in Chapter 2 (Description of Proposed Action and Alternatives). Potential biological, physical, cultural, and social resource impacts (environmental consequences) are identified, described, and evaluated for the alternatives. As discussed in Chapter 2 (Description of Proposed Action and Alternatives), the type and tempo of existing training activities would continue at current levels under the No Action Alternative. The potential impacts of the No Action Alternative are compared to the potential impacts of activities proposed under Alternative 1 and Alternative 2.

The affected environment and environmental consequences are described and analyzed for 10 resource categories. The resource categories and their sections in this Environmental Impact Statement (EIS) are as follows:

- Soils (3.1)
- Air Quality (3.2)
- Water Quality (3.3)
- Noise (3.4)
- Biological Resources (3.5)
- Land Use and Recreation (3.6)
- Socioeconomics, Environmental Justice, and Protection of Children (3.7)
- Transportation (3.8)
- Cultural Resources (3.9)
- Public Health and Safety (3.10)

During the environmental impact analysis process, the resources analyzed are identified and the expected geographic scope of potential impacts for each resource is defined. Known as the resource's region of influence, this area is defined as the geographic area in which impacts to the subject resource have the potential to occur. For most resource categories, the region of influence coincides with the air and land training areas of the Fallon Range Training Complex (FRTC). For some resources, the region of influence encompasses broader regions.

Describing the environment and analyzing impacts requires a comprehensive and systematic review of relevant literature and data to ensure that only the best available information is used for analysis. Section 3.0.1 (Data Sources) describes the data used and the characteristics of the best available data.

The general approach to analysis is provided in Section 3.0.2 (General Approach to Analysis). This section describes how the Proposed Action is broken down into stressors that are analyzed for each resource. It provides a general analysis framework, preliminary impact screening, resource-specific individual stressor analysis, synthesis of ecosystem effects of the Proposed Action, and introduction to cumulative impacts analysis.

Chapter 3 concludes by assessing impacts on physical resources (soils, air quality, and water quality), biological resources (wildlife and vegetation), and human resources (land use and recreation, socioeconomics and environmental justice, transportation, cultural resources, and public health and

safety) (Sections 3.1 through 3.10). Each resource section has a more focused description of the regulatory framework applicable to that resource, a more focused approach to analysis, a discussion of the affected environment of that resource, the environmental consequences of the Proposed Action and alternatives, a summary of the impacts to that resource, and the regulatory determination of impacts on that resource.

In determining environmental consequences, this chapter incorporates current resource protection measures such as standard operating procedures, best management practices, and conservation measures that are integral to the activities covered by the Proposed Action and its alternatives. If the analysis in a resource section identifies potential impact on the resource from the Proposed Action, methods are proposed that would minimize or mitigate the potential impacts identified. These mitigation measures are discussed at the end of each resource section and summarized in Chapter 5 (Best Management Practices, Monitoring, and Mitigation Measures).

3.0.1 DATA SOURCES

The Navy conducted a systematic review of relevant literature, regulatory requirements, mitigation provisions, and data for each resource category to ensure that best available science was used in the evaluation of potential environmental impacts in this EIS. Published and unpublished documents were used, including journals, books, periodicals, bulletins, Department of Defense operations reports, theses, dissertations, species management plans, and other technical reports published by government agencies, private businesses, or consulting firms. Internet searches were conducted, and websites were evaluated for credibility of the source, quality of the information, and relevance of the content to ensure the use of high-quality information in this document.

3.0.2 GENERAL APPROACH TO ANALYSIS

The EIS interdisciplinary team composed of United States (U.S.) Department of the Navy (Navy) and subject matter experts used a screening process to analyze training activities to identify those component activities in the alternatives that could act as stressors to the human environment. Other information evaluated to identify and analyze stressors included public and agency scoping comments; previous environmental analyses; agency consultations; resource-specific information; and applicable laws, regulations, and executive orders. This process was used to focus the information presented and analyzed in the affected environment and environmental consequences sections of this EIS. Table 3.0-1 compares range activities, the number of yearly training activities that would be associated with each alternative, and the category of stressors that potentially would occur related to those activities. Matrices were prepared to identify associations between stressors, resources, training activities, and alternatives (Table 3.0-1 and Table 3.0-2). The relevant stressors are as follows:

- Potential release of soil or water contaminants (military munitions, incidental spills)
- Air pollutant emissions (criteria air pollutant emissions, hazardous air pollutant emissions, fugitive dust)
- Noise (aircraft noise; military munitions or munitions noise; weapons firing, launch, and impact noise)
- Energy (electromagnetic radiation, Light Amplification by Stimulated Emission of Radiation [LASERs])
- Physical disturbance (aircraft and aerial targets strike, military expended material strikes, other ground-disturbing activities [training activities])
- Economics and usability (air training activities, land training activities, access/usability)
- Secondary stressors (soil quality, water quality, air quality)

Table 3.0-1: Range Activities and Potential Stressors

Range Activity	Location	Annual Number of Training Activities			Stressor Category						
		No Action Alternative	Alternative 1	Alternative 2	Potential Release of Soil or Water Contaminants	Air Pollutant Emissions	Noise	Energy	Physical Disturbance	Economics and Usability	Secondary Stressors
Anti-Air Warfare											
Air Combat Maneuvers	NSAWC 1, NSAWC 2, RENO MOA	2,582	2,582	2,841		✓	✓			✓	✓
Strike Warfare											
Bombing Exercise (Air-to-Ground)	B-16, B-17, B-19, B-20	1,293	1,293	1,422	✓	✓	✓	✓	✓	✓	✓
Close Air Support	B-17, B-19	378	378	416	✓	✓	✓	✓	✓	✓	✓
Urban Close Air Support	FA-18	92	92	101	✓	✓	✓	✓	✓	✓	✓
Combat Search and Rescue	NSAWC 1, NSAWC 2	45	115	127		✓	✓		✓	✓	✓
Gunnery Exercise (Air-to-Ground)	B-16, B-17, B-19, B-20	36	40	44	✓	✓	✓		✓	✓	✓
HARMEX (Suppression of Enemy Air Defense [simulation only])	EW Range	8	20	22		✓	✓	✓	✓	✓	✓
Missile Exercise (Air-to-Ground)	B-17, B-19, B-20	30	112	123	✓	✓	✓	✓	✓	✓	✓
Naval Special Warfare											
Convoy Operations	Dixie Valley Training Area	32	32	35	✓	✓	✓		✓	✓	✓

Table 3.0-1: Range Activities and Potential Stressors (continued)

Range Activity	Location	Annual Number of Training Activities			Stressor Category						
		No Action Alternative	Alternative 1	Alternative 2	Potential Release of Soil or Water Contaminants	Air Pollutant Emissions	Noise	Energy	Physical Disturbance	Economics and Usability	Secondary Stressors
Naval Special Warfare											
Insertion/Extraction	NSAWC 1, NSAWC 2	31	31	34		✓	✓		✓	✓	✓
Tactical Ground Mobility	B-16, Dixie Valley Training Area	12	12	13	✓	✓	✓	✓	✓	✓	✓
Ground Maneuver Tactics	Dixie Valley Training Area	4	4	4	✓	✓	✓		✓	✓	✓
Large Force Exercises											
Carrier Air Wing Large Force Exercise	NSAWC 1, NSAWC 2	382	382	420	✓	✓	✓	✓	✓	✓	✓
Desert Rescue Large Force Exercise	NSAWC 1, NSAWC 2	70	70	77	✓	✓	✓	✓	✓	✓	✓
Long-Range Strike for JTFEX and COMPTUEX	NSAWC 1, NSAWC 2	4	4	4	✓	✓	✓	✓	✓	✓	✓
Electronic Warfare											
Electronic Warfare Operations	NSAWC 1, NSAWC 2	4,025	4,025	4,428		✓	✓	✓	✓	✓	✓
Expeditionary Warfare											
Land Demolitions, Explosive Ordnance Disposal (EOD)	B-16, B-17, B-19, B-20	78	78	86	✓	✓	✓		✓	✓	✓

Table 3.0-1: Range Activities and Potential Stressors (continued)

Range Activity	Location	Annual Number of Training Activities			Stressor Category						
		No Action Alternative	Alternative 1	Alternative 2	Potential Release of Soil or Water Contaminants	Air Pollutant Emissions	Noise	Energy	Physical Disturbance	Economics and Usability	Secondary Stressors
Other Activities											
Dismounted Fire and Maneuver	Bell Canyon (B-17)	0	4	4	✓	✓	✓		✓	✓	✓
Ground LASER Targeting	Dixie Valley Training Area, Shoal Site, B-16, B-17, B-19	0	378	416	✓	✓		✓	✓	✓	✓
Mission Area Training – Marksmanship	Nevada National Guard Small Arms Range	185	210	231	✓		✓		✓	✓	✓

[1] Annual number of events unless noted otherwise
Notes: COMPTUEX = Composite Training Unit Exercise, EW = Electronic Warfare, HARMEX = High-Speed Anti-Radiation Missile Exercise, JTFEX = Joint Task Force Exercise, MOA = Military Operations Area, NSAWC = Naval Strike and Air Warfare Center

3.0.2.1 Resources and Issues Evaluated

Physical resources and issues evaluated include soils, water quality, and air quality. Biological resources evaluated include, but are not limited to, mammals, birds (including migratory birds), aquatic life, and vegetation. Other impact topics evaluated in this EIS include land use, cultural resources, socioeconomics, transportation, and public health and safety.

Table 3.0-2: Stressors Analyzed for Each Resource Category or Impact Topic

Stressor	Resource Category or Impact Topic									
	Soils	Air Quality	Water Quality	Noise	Biological Resources	Land Use and Recreation	Socioeconomics and Env. Justice	Transportation	Cultural Resources	Public Health and Safety
Potential Release of Contaminants										
Military Munitions	✓		✓		✓					
Incidental Spills	✓		✓		✓					
Air Pollutant Emissions										
Criteria Air Pollutant Emissions		✓								
Hazardous Air Pollutant Emissions		✓								
Fugitive Dust		✓								
Noise										
Aircraft Noise				✓	✓	✓	✓		✓	
Ordnance Noise				✓	✓	✓	✓		✓	
Weapons Firing, Launch, and Impact Noise				✓	✓	✓	✓		✓	
Energy										
Electromagnetic Radiation					✓					
Lasers					✓					
Physical Disturbance										
Aircraft and Aerial Target Strike					✓		✓		✓	✓
Military Munitions Strike	✓		✓		✓		✓		✓	✓
Other Ground-Disturbing Activities (Training Activities)	✓		✓		✓		✓		✓	
Economics and Usability										
Air Training Activities							✓			
Land Training Activities							✓			
Access/Usability						✓	✓	✓		
Secondary Stressors										
Soil quality					✓					✓
Water quality					✓		✓			✓
Air quality					✓		✓			

3.0.2.2 Identification of Stressors for Analysis

The proposed training activities were evaluated to identify specific components that could act as stressors (see Table 3.0-1 and Table 3.0-2) by having direct or indirect impacts on the environment. This evaluation included identification of the spatial variation of the identified stressors. The warfare areas, along with their associated stressors, are identified in Table 3.0-1. A preliminary analysis based on scoping, previous National Environmental Policy Act (NEPA) analyses, and opinions of subject matter experts identified the stressor/resource interactions that warrant further analysis in this EIS.

3.0.2.3 Resource-Specific Effects Analysis

The direct and indirect effects of each stressor carried forward for further analysis were analyzed for each resource. Quantitative and semi-quantitative methods were used to the extent possible, but inherent scientific limitations required the use of qualitative methods for most stressor/resource interactions. Resource-specific methods are described in respective sections of Chapter 3, where applicable. While specific methods used to analyze the effects of individual stressors varied by resource, the following generalized approach was used for all stressor/resource interactions:

- The frequency, duration, and spatial extent of exposure to stressors were analyzed for each resource. The frequency of exposure to stressors or frequency of a proposed activity was characterized as intermittent or continuous and was quantified in terms of number per unit of time when possible. Duration of exposure was expressed as short- or longer-term and was quantified in units of time (e.g., seconds, minutes, hours) when possible. The spatial extent of exposure was generally characterized as widespread or localized, and the stressor footprint or area (e.g., square feet, square kilometers) was quantified when possible.
- An analysis was conducted to determine whether and how resources are likely to respond to stressor exposure or be altered by stressor exposure based on available scientific knowledge. This step included reviewing available scientific literature and empirical data. For many stressor/resource interactions, a range of likely responses or endpoints was identified. For example, exposure of an organism to sound produced by an explosion could result in no response, a physiological response such as increased heart rate, a behavioral response such as being startled, or injury or mortality.
- The information obtained from the steps described in the first two bullet points was used to analyze the likely effects of individual stressors on a resource and to characterize the type, duration, and intensity (severity) of effects. The type of effect was generally defined as beneficial or adverse, and was further defined as a specific endpoint (e.g., change in behavior, mortality, change in concentration, or loss of habitat). When possible, the endpoint was quantified. The duration of an effect was generally characterized as short-term (e.g., minutes, days, weeks, or months, depending on the resource), long-term (e.g., months, years, or decades, depending on the resource), or permanent. For biological resources, the analysis started with individual organisms and their habitats, and then addressed populations, species, and communities, as appropriate. All of the above were analyzed to make a significance determination for each resource individually.

3.0.2.4 Cumulative Impacts

A cumulative impact is the impact on the environment that results when the incremental impact of the action is added to other past, present, and reasonably foreseeable future actions. The cumulative impacts analysis (Chapter 4) considers other actions regardless of what agency (federal or nonfederal) or person undertakes the actions. “Cumulative impacts can result from individually minor but collectively

significant actions taking place over a period" (40 Code of Federal Regulations [C.F.R.] §1508.7). The goal of the analysis is to provide the decision makers with a "big picture" view of the effects on the future sustainability of important resources, not only of the proposed action and alternatives but of all other actions occurring within the same geographic region.

Similar to the resource-specific combined effects analysis described above, the cumulative impact analysis considers additive, synergistic, and antagonistic effects in relation to past, present, and reasonably foreseeable actions. The following process was used to identify the cumulative impacts of the Proposed Action and alternatives.

- Other past, present, and reasonably foreseeable future actions that have affected, or will affect, the same resources as the proposed action were identified through the scoping process, communications with other agencies, a review of other military activities, literature review, and previous NEPA analyses. Individual actions were grouped to the extent possible so that the cumulative impacts analysis could focus on aggregate effects of the actions.
- The effects of past, present, and reasonably foreseeable future actions on each resource were identified and summarized. Available information concerning the effects of other actions was derived from existing NEPA documents, the literature, and best professional judgment.
- The incremental effects of each alternative were analyzed to determine if a significant cumulative effect would occur when added to the effects of past, present, and reasonably foreseeable actions.

3.1 SOILS

3.1.1 INTRODUCTION

3.1.1.1 Overview

Soil is the unconsolidated mineral or organic material on the top layer of the Earth that serves as a natural medium for the growth of plants. Together with climate, soils largely determine the type of plants that can grow in an area. Proposed activities that could directly affect soils are limited to the land areas of the Fallon Range Training Complex (FRTC). Training activities that take place in the training ranges (Bravo [B]-16, B-17, B-19, and B-20) and the training areas (the Dixie Valley and the Shoal Site) have the potential to impact soils. In addition to addressing soils, this section includes brief descriptions of geology and topography. Potential impacts on geology and topography would be negligible and do not warrant detailed analysis. Nonetheless, general descriptive information is provided to support the overall description of the affected environment and the impact analysis for other resources.

3.1.1.2 Regulatory Framework and Management Practices

3.1.1.2.1 Regulatory Framework

3.1.1.2.1.1 Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) (42 United States Code [U.S.C.] §6901 et seq.) gives the United States (U.S.) Environmental Protection Agency (EPA) the authority to control hazardous waste from “cradle-to-grave.” This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also sets forth a framework for the management of nonhazardous solid wastes. The 1986 amendments to RCRA enabled the U.S. EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. In accordance with the Department of Defense (DoD) policy to implement the Military Munitions Rule, RCRA is not applicable for military munitions used for their intended purpose on a range.

3.1.1.2.1.2 Farmland Protection Policy Act

The Farmland Protection Policy Act (FPPA) (7 U.S.C. §4201 et seq.) is intended to minimize the impact federal programs have when those programs unnecessarily and irreversibly convert farmland to nonagricultural uses. It ensures that, to the extent possible, federal programs are administered to be compatible with state and local units of government, and private programs and policies to protect farmland. Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a federal agency or with assistance from a federal agency (Natural Resources Conservation Service 2013).

For the purpose of the FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance, which are defined based on soils. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land, but not water or urban built-up land (Natural Resources Conservation Service 2013).

U.S. Department of the Navy (Navy) safety policies preclude the use of the Navy-owned properties within the FRTC for agricultural use. The soils in the FRTC typically have high salinity and sodicity (the amount of sodium relative to other salts on the soil exchange complex), which restrict plant growth and are not conducive to agriculture. None of the soils found within B-16, B-17, B-19, B-20, Dixie Valley Training Area (DVTA), or the Shoal Site are associated with prime farmland (Natural Resources Conservation Service 2013). The south-central portion of the Dixie Valley was an irrigated agriculture settlement area prior to Navy ownership of the land. During the 1980s, the Navy purchased these

irrigators' lands and acquired the associated water rights. The Navy maintains the water rights on 29 wells in this area. The water is used by wildlife and to maintain the wildlife habitat. Livestock on the Bureau of Land Management (BLM) grazing allotments also use the water from some of the wells. The soils are not considered to be prime and unique farmland.

The soil association Bunejug-erber clay loams, found within Naval Air Station (NAS) Fallon Main Station, is considered to be prime farmland if irrigated and reclaimed of excess salts and sodium (U.S. Department of the Navy 2013). The proposed action does not involve any activities within NAS Fallon Main Station and, therefore, prime farmland soils would not be adversely affected by implementation of the Proposed Action, and will not be further evaluated.

3.1.1.2.2 Management Practices

3.1.1.2.2.1 Range Sustainability Environmental Program Assessment

A critical aspect in ensuring the long-term sustainability of military ranges is to understand the environmental conditions at each range and to conscientiously manage these resources in an environmentally sound manner. The Range Sustainability Environmental Program Assessment process is the Navy's approach for assessing and addressing the environmental condition of land-based operational ranges where munitions are used or were used, excluding small arms ranges, within the United States and its territories. Range Sustainability Environmental Program Assessment complies with the environmental requirements of the U.S. DoD Directive 4715.11, *Environmental and Explosives Safety Management on Operational Ranges within the United States*, and DoD Instruction 4715.14, *Operational Range Assessments*, which serves the following purposes:

- Determining whether there has been a release or substantial threat of a release of munitions constituents of potential concern from an operational range to an off-range area
- Determining whether the release or substantial threat of a release of munitions constituents of potential concern from an operational range to an off-range area poses an unacceptable risk to human health or the environment
- Enhancing the Navy's ability to prevent or respond to a release or substantial threat of a release of munitions constituents of potential concern from operational ranges or range complexes to off-range areas that could pose unacceptable risks to human health or the environment
- Using data quality objectives and conceptual site models to develop sampling strategies, where necessary, to fill data gaps and provide necessary information to confirm whether source-receptor interactions exist and whether unacceptable risks to human health or the environment exist

Requirements, procedures, and protective measures necessary for implementing range assessments under the Range Sustainability Environmental Program Assessment are provided in the Navy's Range Sustainability Environmental Program Assessment policy implementation manual (U.S. Department of the Navy 2006). The process includes:

- **Range Condition Assessments.** The goal of the range condition assessment is to determine if further steps are necessary to maintain compliance and whether further analysis is required to assess risks of off-range releases of munitions constituents of potential concern beyond the range boundary. Range condition assessments are required every 5 years at each range regardless of whether a comprehensive range evaluation is conducted. This re-evaluation also is required whenever significant changes (e.g., changes in range operations, site conditions,

applicable statutes, regulations, DoD issuances, or other policies) occur that affect determinations made during the previous assessment.

- **Comprehensive Range Evaluations.** A comprehensive range evaluation will be conducted if necessary to assess the potential for the off-range release of munitions constituents of potential concern. The comprehensive range evaluation includes two phases and two decision points. Protective measures may be implemented during either phase, if appropriate. If a comprehensive range evaluation is performed, sampling and testing of appropriate environmental media will be conducted.
- **Sustainable Range Oversight.** The purpose of the sustainable range oversight is to ensure range sustainability while addressing off-range releases of munitions constituents of potential concern through the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process. If munitions constituentss migrate off-range and present an unacceptable risk to human health and the environment, sustainable range oversight would be implemented by the Navy to control the on-range portion of the off-range migration through appropriate range management techniques. The Navy would use its authority under CERCLA to execute the appropriate CERCLA action for the off-range portion. This includes coordinating with the appropriate regulators and stakeholders.

3.1.1.2.2.2 Operational Range Clearance

Chief of Naval Operations Instruction 3571.4, *Operational Range Clearance Policy for Navy Ranges*, establishes the policy and requirements for performing operational range clearance on Navy ranges in accordance with DoD Directive 4715.11. The purpose of the operational range clearance plan is to sustain readiness and ensure the safety of aircrews, range operations, maintenance personnel, range clearance personnel, and the public. Operational range clearance also provides secondary benefits to the Navy by reducing the amount of expended military munitions that accumulate in the environment. The *Fallon Operational Range Clearance Plan* was completed in 2013 for NAS Fallon and the FRTC; it is designated NAS Fallon Instruction 4790.XX (U.S. Department of the Navy 2013). The plan is updated every 5 years, or sooner if training operations, operational frequency, or range characteristics change significantly. Clearance activities are accomplished to meet range-specific needs based on the following range clearance categories specified in the Commander U.S. Fleet Forces Command and Commander Pacific Fleet *Operational Range Clearance Guidance Document for Implementing Chief of Naval Operations Instruction 3571.4*:

- **Laser Training Events.** All reflective surfaces (specular hazards) not specifically approved for use in the exercise, such as mirrors, bottles, windows, shiny metal, or other surfaces that have a high coefficient of specular reflection or the potential to adversely affect training, must be removed from laser ranges/targets to an appropriate distance at an appropriate frequency to ensure that laser training events are not adversely affected.
- **Target Fidelity.** To ensure that all targets resemble the objective of the mission and are distinguishable from their surroundings, all material potentially presenting an explosive hazard on the surface or partially buried that are greater than 4 inches (in.) (10.2 centimeters [cm]) in any dimension must be removed to an appropriate distance from the target and at an appropriate frequency. In addition, any significant unevenness of the ground surface (e.g., craters, holes, ruts) around each target must be removed.
- **Maintenance Personnel Safety.** To ensure the safety of maintenance personnel, operational range clearance requirements must address ingress/egress routes, run-in lines, and maintenance roads, and ensure there is sufficient area around each target to afford safe

movement and operation of personnel and equipment. From these areas, all material potentially presenting an explosive hazard on the surface or partially buried that is greater than 4 in. (10.2 cm) in any dimension must be removed to an appropriate distance at appropriate frequencies. Target areas affected by intrusive activity may be cleared to 1 foot (ft.) (0.3 meter [m]) below the anticipated intrusive depth.

- **Long-Term Range Sustainment.** Effective, efficient, and environmentally compliant management of ranges is key to ensuring that range capabilities are available to meet current and future requirements. Therefore, operational range clearance requirements must address areas that may not be routinely accessed. Areas that support various range management activities, as well as areas that pose a potential concern to human health or the environment, shall undergo clearance activities. For these areas, all material potentially presenting an explosive hazard greater than 4 in. (10.2 cm) in any dimension on the surface or partially buried must be removed at appropriate frequencies. Prescribed areas should be cleared until a density of less than or equal to five intact items per acre is encountered.

3.1.1.3 Approach to Analysis

The impact analysis for soils considered possible changes in the physical and chemical characteristics of soils that could result from the Proposed Action. Such changes could arise from the physical disturbance of soils (e.g., vehicle use and personnel movements) or soil contamination from military munitions. Specific impacts might include soil erosion from wind or water, soil compaction, and soil contamination. Factors used in determining whether impacts on soils would be significant relate to the extent to which their physical or chemical characteristics are changed, other than in local areas, such that (1) soils could no longer support important ecological functions (e.g., supporting native plant communities, providing burrowing habitat for wildlife), or (2) soils were contaminated to the extent that they would be considered a source of contamination that represents a substantial threat of a release to an off-range area that poses unacceptable risk to human health or the environment.

3.1.2 AFFECTED ENVIRONMENT

3.1.2.1 Geology

The FRTC is within the Great Basin physiographic province, which is characterized by fault block-controlled basin and range structure. The province is characterized by a distinctive alternating pattern of linear northerly to northwesterly trending, narrow, rugged mountain ranges separated by broad basins. The mountain ranges make up approximately 35 percent of the landscape, while intervening valleys, which are internally draining closed basins, make up roughly 65 percent. Erosional desert stream valleys, dissected plateaus, and isolated small mountains are also present in this physiographic province (Peterson 1981).

The rocks exposed in the mountain ranges within the FRTC are predominantly Tertiary sedimentary and volcaniclastic rocks. Primarily Mesozoic and Paleozoic marine sedimentary, volcanic, and intrusive rocks underlie these rocks, in turn. The valleys between the mountain ranges are underlain by unconsolidated alluvial and playa (lake) deposits.

The training ranges B-16, B-17, B-19, and B-20 are primarily underlain by Quaternary alluvial, playa, marsh, and alluvial flat deposits. Portions of the ranges are underlain with Tertiary volcanic rocks such as andesite, dacite, basalt, welded and nonwelded silicic ash-flow tuffs, rhyolite flows, and intrusive rocks.

The DVTA is in a long, northeast-southwest-trending valley system, which also includes the adjacent Fairview Valley on the south. Dixie Valley formed as a result of uplift and tilting of the Stillwater Range to the west and the Clan Alpine Mountains to the east, and along faults at the bases of the ranges. Fault scarps are present along the base of the Stillwater Range as a result of fault movement associated with the 1954 earthquakes. Similar to the training ranges, the valley is underlain primarily by alluvial, playa, marsh, and alluvial flat deposits, which are locally eroded.

The Shoal Site lies on the Sand Springs Mountain Range separating the Fairview Valley Subbasin from the Carson Desert Subbasin. It is primarily underlain with Quaternary alluvial, playa, marsh, and alluvial flat deposits.

3.1.2.2 Soils

The soil types within the FRTC training ranges and areas are depicted in Figure 3.1-1. This area includes the lake-bed sediments of Pleistocene Lake Lahontan. As an internally drained basin, the Lahontan Basin receives the dissolved solids that are the result of leaching in the watershed. As surface water from spring floods evaporates on the broad, nearly level, alluvium-filled valley floors, salts are left behind to accumulate in the soil profile. Since streams do not drain from the valleys and evaporation exceeds precipitation, the salts are not leached by natural drainage. The pH of these soils is high due to accumulation of calcium, magnesium, potassium, and especially sodium in the soil profile due to insufficient leaching.

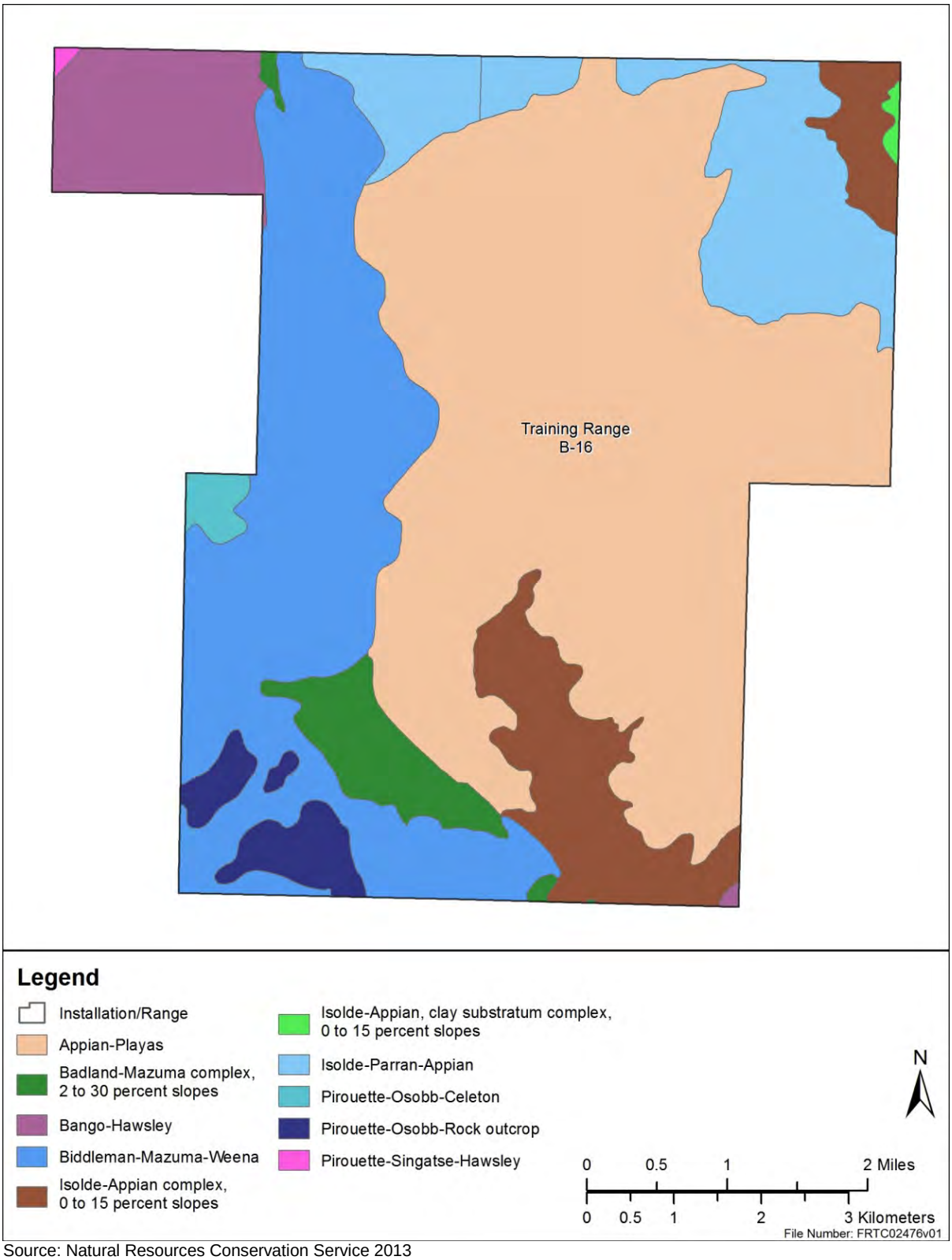
3.1.2.2.1 Soil Types

Bravo-16

Soils at B-16 follow a characteristic progression from the steep slopes on the west to the playa deposits at the center of the basin, located in the eastern portion of the range (Figure 3.1-1). The soils on the summits of hills and plateaus, and the adjoining slopes, are typically thin rocky soils derived from volcanic rocks. These soils consist primarily of extremely stony to very cobbly, very fine to fine sandy loams (Pirouette-Osobb-Celeton-Rock Outcrop Association), which have a silica-cemented hardpan overlying basalt, at a depth of 1.0–1.5 ft. The permeability of these soils is very low, the shrink-swell potential is low, and the alkalinity is moderate. Local areas are devoid of soil accumulations due to areas of badland topography and exposures of hard basalt bedrock. Farther downslope, the soils near the base of the slopes consist of reworked alluvium, lakebed, and dune sand deposits. Soils in this area consist primarily of gravelly loam, loamy sand, fine sand, and silty clay (Biddleman Association, Isolde-Parran-Appian Association, Bango-Hawsley Association) (Natural Resources Conservation Service 2013).

The sandy soils are generally characterized by high permeability, moderately low available water capacity, strong alkalinity, and low to high salinity. The clay deposits of the sodic flat areas typically are strongly alkaline, have low to high sodicity and salinity, and have a high shrink-swell potential and a very low hazard of erosion (water). Soils are considered to be sodic if the sodium adsorption ratio (SAR) is greater than 10 and the pH is generally greater than 9.0 or 9.5.

Toward the center of the basin, the soils have formed on low lake terraces and are characterized by a thin, impermeable subsurface layer consisting of clay and clay loam that occurs at a depth of approximately 6 in. (15.2 cm) and called the Appian-Playas Association. These deposits are moderate to very strongly alkaline but are low in sodicity. Playa deposits underlie the deepest portions of the basin. These soils are silty clay, poorly drained, saline deposits that do not support vegetation (Natural Resources Conservation Service 2013).



Source: Natural Resources Conservation Service 2013

Figure 3.1-1: Soil Types within Bravo-16

Bravo-17

Soils in the vicinity of B-17 are similar to those in the vicinity of B-16, including local variations that depend upon whether the areas are on steeply sloping upland, alluvial fans and fan piedmonts, or valley floors (Figure 3.1-2).

The southeastern and northwestern sloping portions of the range consist primarily of gravelly to very gravelly, sandy loam derived from volcanic rocks (Hooplite-Old Camp-Singatse, Hooplite-Old Camp-Jung, Downeyville-Blacktop, Downeyville-Gabbvally Associations, and Trocken Series). These soils are mildly to moderately alkaline, have low sodicity and salinity, have moderately slow permeability, and have a slight to moderate erosion potential. They grade downhill into very gravelly sandy loam and loamy sand derived from alluvial fan deposits (Genegraf-Rednik-Trocken Associations). These soils have low salinity and low to moderate sodicity, are moderately to strongly alkaline, have a low to moderate shrink-swell potential, and have a slight erosion hazard (Natural Resources Conservation Service 2013).

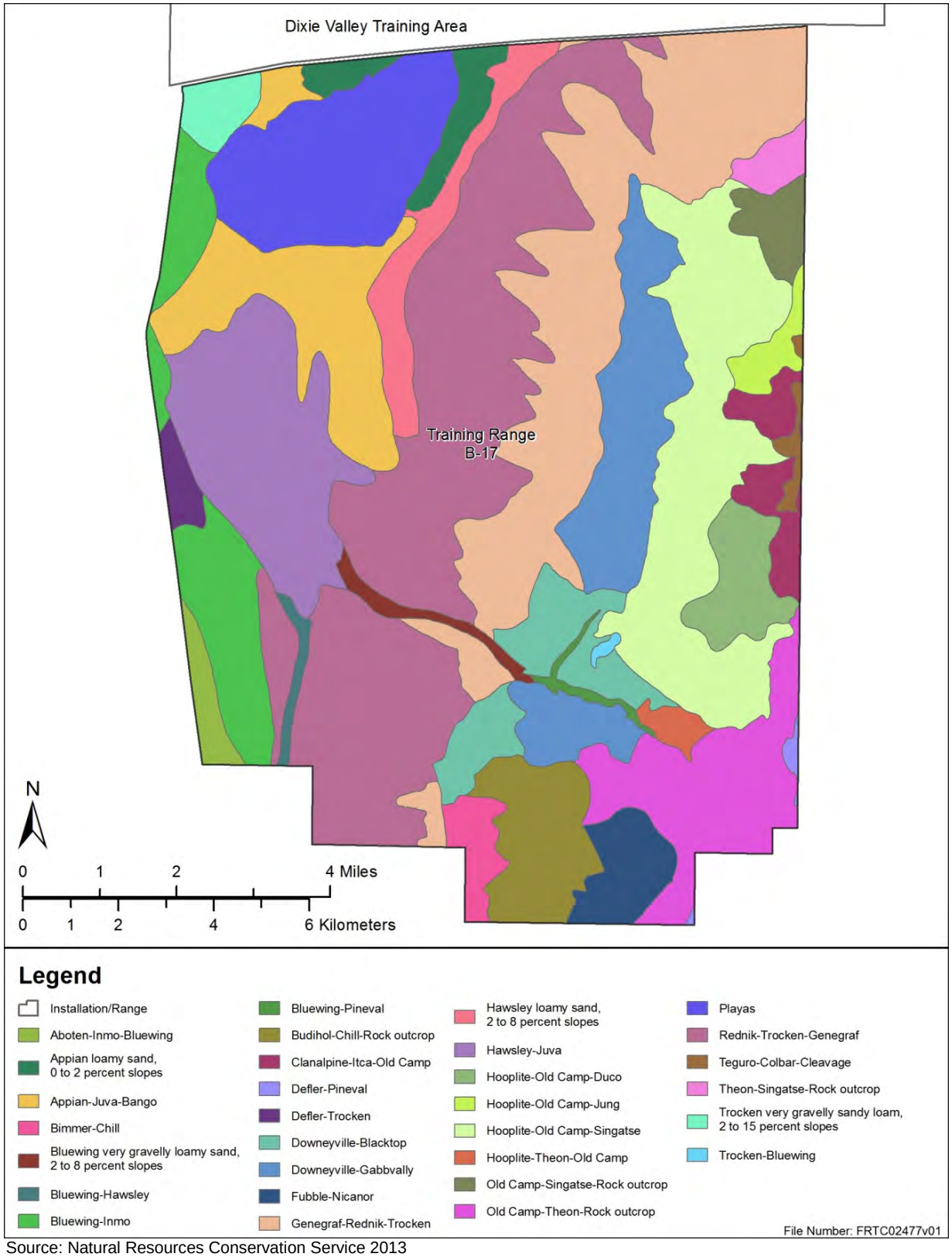
On the western portion of the range, the soils consist of sand, fine sand, stony loamy sand, and gravelly sandy loam, typically present on gentle slopes (Hawsley-Juva, Bluewing-Inmo Associations) (Figure 3.1-2). These soils are generally low in salinity and sodicity, moderately to strongly alkaline, very deep, and well-drained deposits that formed in sandy alluvium derived from mixed rock. Permeability is moderately rapid to very rapid, runoff is slow, and the hazard of erosion is slight to moderate.

These alluvial soils grade into basin floor, lake plain terrace soils derived from alluvial, stratified lacustrine, and Lake Terrace deposits (Appian and Appian-Juva-Bango Association). These soils consist of loamy fine sand; sandy loam (clay substratum); loamy sand; and silt loam, which are slightly saline and sodic, moderately to very strongly alkaline, very deep, and well-drained. Permeability is moderately slow in the surface layer and in the subsoil. Runoff is slow, and the hazard of erosion is slight to moderate. Playa deposits are present in the northwest corner of the range. The soils are fine-grained, poorly drained, saline deposits that do not support vegetation (Natural Resources Conservation Service 2013).

Bravo-19

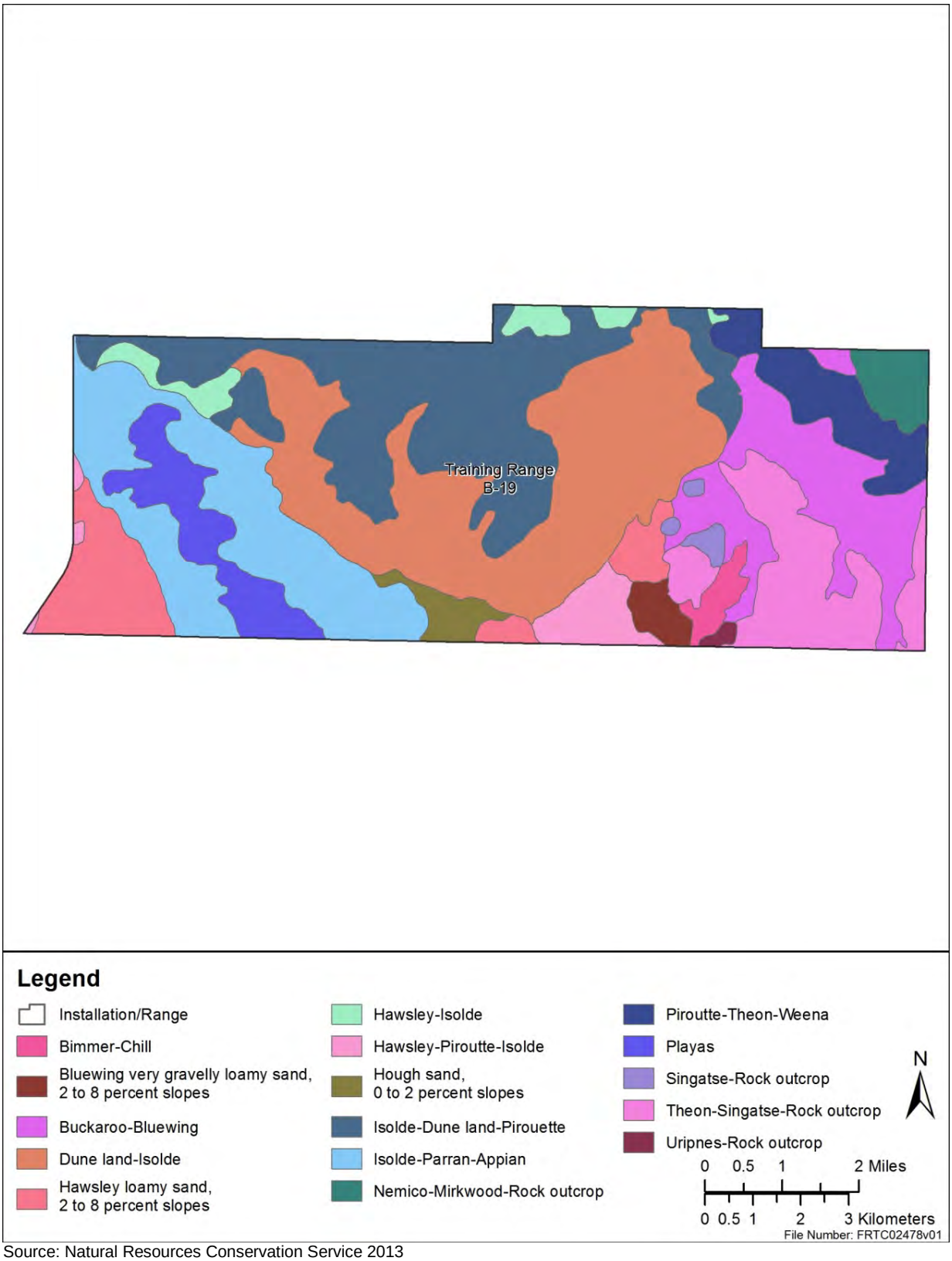
A large portion of B-19 consists of sand dunes and playas (Figure 3.1-3). The soils on the southeast and southwest portion of B-19 consist primarily of sand, fine sand, stony loamy sand, and gravelly sandy loam typically present on gentle slopes, and locally in badland areas (Hawsley-Pirouette-Isolde Association, Theon-Singatse-Rock outcrop association, and Hawsley loamy sand). These soils generally have low to moderate salinity and sodicity, are moderately to strongly alkaline, and are very deep, well-drained deposits that formed in sandy alluvium derived from mixed rock. Permeability is moderately rapid to very rapid; runoff is slow; and the hazard of erosion is slight to moderate (Natural Resources Conservation Service 2013).

Most of the range has soils that consist of loamy fine sand, sandy loam, stony fine sandy loam, very gravelly sandy loam, very gravelly loamy sand, and clay substratum, typically found on low lake terraces (Isolde-Parran-Appian Association) and stabilized dunes (Dune land-Isolde and Isolde-Dune land-Pirouette Association) (Figure 3.1-3). Soils in these areas consist of very deep, mildly to moderately alkaline, well-drained soils that formed in loamy alluvium. Salinity and sodicity of these soils varies from low to high. Permeability is moderately slow in the clay-rich soils and is very rapid in the sandy materials. Runoff varies from slow to rapid, and the hazard of erosion is moderate. These sediments grade into the playa deposits.



Source: Natural Resources Conservation Service 2013

Figure 3.1-2: Soil Types within Bravo-17

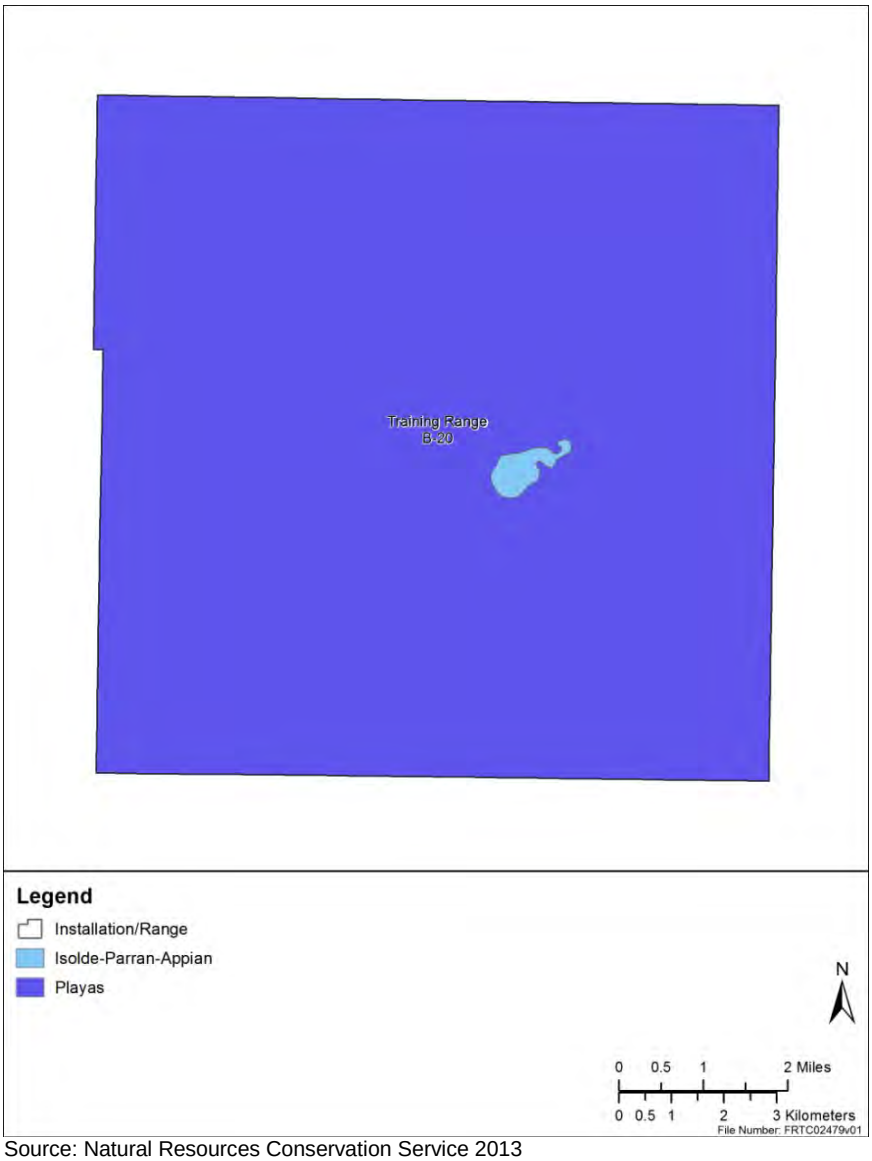


Source: Natural Resources Conservation Service 2013

Figure 3.1-3: Soil Types within Bravo-19

Bravo-20

The B-20 target range is in the northeastern section of the Carson Sink. Lone Rock, an igneous rock formation approximately 140 ft. tall, is the center of this target area (U.S. Department of the Navy 2008). With the exception of Lone Rock, playa deposits underlie the entire training range (Figure 3.1-4). The playa deposits consist of fine-textured sediments that have not developed characteristics of soil. Soils in the vicinity of Lone Rock consist primarily of soils derived from alluvial and dune deposits. Alluvial-derived soils consist primarily of fine sand and silty clay (Isolde-Parran-Appian Association). These soils are deep and well drained. Available water capacity is moderate. These soils have low to high salinity and sodicity, are strongly to very strongly alkaline, have moderately slow to moderately rapid permeability, and have very slow surface runoff. Potential for sheet and rill erosion is slight (Natural Resources Conservation Service 2013).



Source: Natural Resources Conservation Service 2013

Figure 3.1-4: Soil Types within Bravo-20

Dixie Valley Training Area

Soils at the lower elevations of Dixie Valley exhibit the typical characteristics found in the internally drained valleys of the Basin and Range Province (Figure 3.1-5). The soils have a high pH and are high in soluble salts because runoff is slow on the broad, nearly level valley floor. The soils at the base of a mountain are also alluvial in origin. These soils, which are generally gravelly, occupy the fan remnant and inset fan landforms. The predominant soil associations include Hawsley loamy sand, Rednik-Trocken-Bluewing Association, and the Genegraf-Rednik-Trocken Association (Natural Resources Conservation Service 2013).

Soils in the Horse Creek area consist of loamy slopes, including gravelly sandy loam, gravelly loamy sand, gravelly very fine sand, and very stony loam (Cleaver-Bundorf Association, Genegraf-Buckaroo-Bluewing Association, Rednick-Trocken-Genegraf Association); and local areas of slopes with volcanic rock outcrops (Theon-Mirkwood-Rock Outcrop Association) (Natural Resources Conservation Service 2013).

Soils in the northern portion of this training area consist primarily of sodic sands, deep sodic fans, and playa deposits. Soils in this area of the Dixie Valley are composed of sandy loams and fine sands (Bango-Playas-Chuckle Association) and silty loam, loamy sand, sandy loam, and silty clay loam (Slaw-Juva-Wholan Association) (Figure 3.1-5). The northwestern-most soils in the area consist of silt loam, gravelly loam, gravelly loamy sand, stony loamy sand, and silt loam (Slaw-Trocken-Chuckles Association). Playa deposits are locally present in the northern portion of the valley, in addition to silty clay loam, silt loam, and sand (Chuckles-Playas-Slaw Association) (Natural Resources Conservation Service 2013).

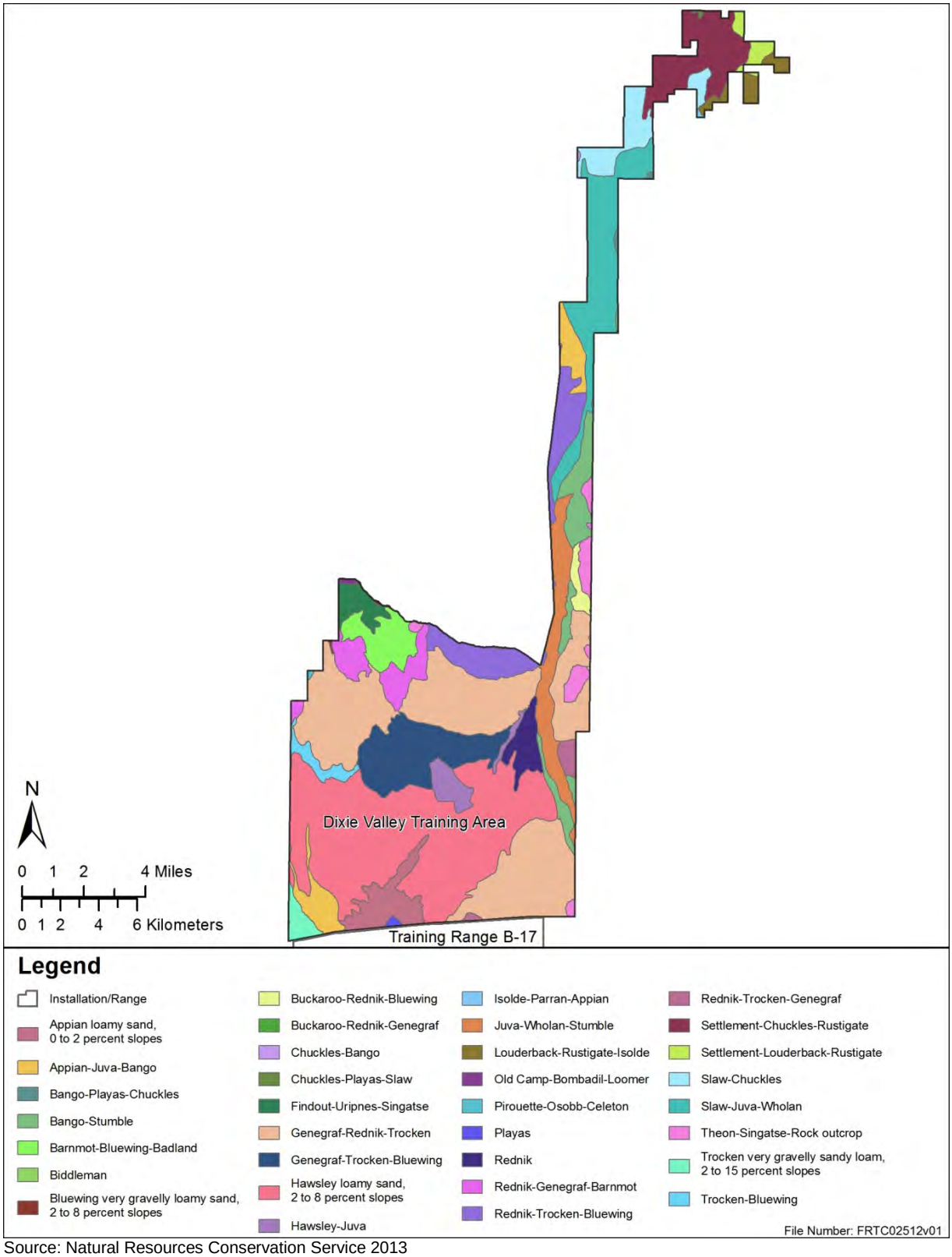
Shoal Site

Soils in this area consist predominantly of stony and gravelly sandy loam (Budihol-Chill-Rock Outcrop Association, Urpines-Budihol-Chill Association, Bimmer-Chill Association) (see Figure 3.1-5). Below this at greater than 7 in. (17.8 cm), bedrock is persistent. The available water capacity of the soils in this area is very low (Natural Resources Conservation Service 2013).

3.1.2.2.2 Existing Soil Contamination

The potential for contamination of soils from use of the FRTC for military training exists at B-17, B-19, and B-20, which are available for high-explosives training. A range condition assessment has been conducted for NAS Fallon as part of the Navy's Range Sustainability Environmental Program Assessment (U.S. Department of the Navy 2006). Soil sampling for B-17, B-19, and B-20 was conducted as part of the assessment because high-explosive munitions are dropped on targets within these ranges. B-16 was not included in the sampling phase because only practice (inert) ordnance are allowed within the range, and it was concluded that use of practice ordnance would not release measurable quantities of munitions constituents to the environment. The DVTA and the Shoal Site were also not included because high-explosive munitions are not used in these training areas.

The purpose of the sampling was to assess the accumulation of munition constituents in the soils in the target areas and to determine if munition constituents are migrating from the target areas to offsite areas due to soil erosion by wind or rain water. Soil samples were evaluated for explosives and perchlorate. Of the 40 samples collected from the three ranges, munition constituents were detected in only three samples (one from B-17 and two from B-19); results for all other samples were below detection limits. The explosives hexahydro-1,3,5-trinitro-1,3,5-triazine (royal demolition explosive [RDX])



Source: Natural Resources Conservation Service 2013

Figure 3.1-5: Soil Types within Dixie Valley Training Area

and 2,4,6-trinitrotoluene (TNT) were detected in two samples collected in B-19. The explosives 4-amino-2, 6-dinitortoluene (a TNT degradation product), RDX, and high-melting explosive (octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine [HMX]) were detected in one sample collected in B-17. The 40 soil samples were collected in areas that represented the highest potential for encountering elevated concentrations of munition constituents. Based on the soil sampling results, the range condition assessment report concludes that explosive material that is not consumed in the detonation undergoes rapid biodegradation. A qualitative analysis of perchlorate and aluminum also indicated no potential impacts from these compounds (U.S. Department of the Navy 2008).

As part of the range condition assessment, an operational range site model was used to evaluate the potential risk of range activities. The potential impacts of range use were evaluated by using the munition constituent concentrations developed from a mass loading model, soil sampling, and applying offsite transport models to determine what potential receptors outside the ranges may be exposed. Based on this modeling, it was concluded that there would be no vertical migration of munition constituent to groundwater and that there is not significant transport of munition constituents in soils via surface water or due to wind erosion (U.S. Department of the Navy 2008). Based on the predictive modeling and sampling studies conducted during the range condition assessment, munition constituents do not appear to be migrating off range (U.S. Department of the Navy 2008).

3.1.3 Environmental Consequences

This section evaluates how and to what degree the activities described in Chapter 2 (Description of Proposed Action and Alternatives) could impact soils within the Study Area. The analysis focuses on potential impacts to the chemical and physical properties of soils associated with implementation of all current and proposed military readiness activities at the FRTC. Table 2-4 presents the baseline and proposed training activities for each alternative. Table 3.0-2 shows the warfare areas and associated stressors that were considered for analysis. The stressors vary in intensity, frequency, duration, and location within the Study Area. The primary stressors applicable to soils in the Study Area and that are analyzed include the following:

- Potential Release of Contaminants (Military Munitions)
- Physical Disturbance (Military Munitions Strike, Other Ground Disturbing Activities)

3.1.3.1 No Action Alternative

3.1.3.1.1 Potential Release of Contaminants

Potential sources of soil contamination would not change under the No Action Alternative and include military munitions and explosives and explosive byproducts.

Military Munitions

Military munitions, including nonexplosive practice munitions and fragments of explosive munitions would continue to accumulate in soils within B-16, B-17, B-19, and B-20. Nonexplosive practice bombs and range scrap would be removed at regular intervals based on the *Fallon Operational Range Clearance Plan* (U.S. Department of the Navy 2013). Small- and medium-caliber rounds primarily consist of steel or a lead core with a copper jacket. A potential concern is the fate and transport of metals from bullets and bullet fragments accumulating in soil, with lead being the primary constituent of concern because of its toxicity and its ability to persist in the environment (U.S. Army Environmental Center 1998). Source level accumulation would only occur at concentrated use areas such as the small arms range, where rounds are fired into a berm; it is not expected in fire and maneuver areas.

Several factors influence the fate and transport of lead on a training range, including soil type, soil pH, annual precipitation rate, and topographic slope (U.S. Environmental Protection Agency 2005). Lead oxidizes when exposed to air and dissolves when exposed to acidic water or soil, but it is generally insoluble and immobile under neutral pH conditions (U.S. Environmental Protection Agency 2005). The corrosion products of lead bullets in soil environments consist primarily of hydrocerussite, which is relatively insoluble (Chen and Daroub 2002). However, Dermatas et al. (2004) demonstrated that in the case of a lead bullet with a copper jacket, the presence of copper increased the solubility of lead significantly due to a galvanic corrosion reaction. Lead and copper concentrations were highly elevated in surface soils at two small arms ranges on Fort Irwin, California, but quickly decreased as a function of increasing depth from the ground surface. Despite the galvanic corrosion reaction, the mobility of both metals was significantly reduced within the first 10–20 in. (25.4–50.8 cm) below the surface. The limited mobility was attributed to the alkaline characteristics of the soils (pH 7.48–7.65 on one range and 8.03–8.30 on the other) and the formation of secondary minerals such as hydrocerussite (Dermatas et al. 2004).

Ideal soil pH for firing ranges is 6.5–8.5 because the lead precipitates out of solution and binds to the soil within this pH range (U.S. Environmental Protection Agency 2005). This binding effect prevents the lead from migrating to the subsurface. The soils within the FRTC are alkaline. Lead would be expected to have limited mobility in these slightly alkaline to highly alkaline soils (pH 7.0–9.4).

Lead mobility would also be limited by the low precipitation rate of approximately 5 in. (13 cm) in the valleys of the FRTC per year. Lead would weather slowly under these arid conditions because it would have limited contact with water. Low precipitation coupled with the flat terrain in the training ranges and training areas also makes it unlikely that lead would be transported outside the immediate target area by storm water runoff (U.S. Environmental Protection Agency 2005).

In summary, spent small- and medium-caliber rounds would not be removed at regular intervals, but would slowly accumulate in soils over long periods of time in areas of concentrated use, such as small arms ranges and target berms. However, lead would be expected to be relatively immobile in soils at the FRTC based on soil pH, limited annual precipitation, and the flat terrain. Elevated concentrations would likely be limited to surface soils in the immediate area of projectile impact and in areas of concentrated use such as the small arms range berm.

Effects of lead on soils under the No Action Alternative would be long term, but the effects would be localized. Elevated concentrations of lead in soils would not represent a substantial threat of a release to an off-range area that poses unacceptable risk to human health or the environment.

Explosives and Explosive Byproducts

Explosives are complex chemical mixtures that may affect soils through the byproducts of their detonation and the dispersal of unconsumed explosives in the soil.

The Proposed Action categories of high explosives include:

- Nitroaromatics, such as TNT and tetryl (methyl-2,4,6-trinitrophenyl-nitramine)
- Nitramines, such as RDX and HMX

The explosives TNT, RDX, and HMX are components of bombs, medium- and large-caliber munitions, and charges used in a variety of training activities. When used, explosives may undergo a high-order

detonation or a low-order detonation, or they may fail to detonate. High-order (complete) detonations consume 98–99 percent of the explosive material; the remainder is released into the environment as discrete particles. Low-order (incomplete) detonations consume a lower percentage of the explosive and release larger amounts of explosives into the environment. If ordnance fails to detonate, the energetic materials it contains may be released into the environment over time as its casing corrodes. In this discussion, the term "residual explosives" means unconsumed explosives remaining after low-order detonations and detonation failures. The term "explosion byproducts" refers to the liquids and gases that remain after detonation of explosives. Table 3.1-1 shows rates of failure and low-order detonations for high explosives and other munitions.

Table 3.1-1: Failure and Low-Order Detonation Rates of Military Ordnance

Ordnance	Failure Rate (Percent)	Low-Order Detonation Rate (Percent)
Guns/artillery	4.68	0.16
Hand grenades	1.78	n/a
High-explosive ordnance	3.37	0.09
Rockets	3.84	n/a
Submunitions	8.23	n/a

Note: n/a = not applicable
Source: Rand Corporation 2005, U.S. Army Corps of Engineers 2007

Based on the soil sampling conducted for the 2008 range condition assessment, soil contamination within B-17, B-19, and B-20 is low, as described in Section 3.1.2.2.2 (Existing Soil Contamination). It appears that explosive constituents are largely consumed during detonation, and those that are not consumed degrade rapidly in the environment (U.S. Department of the Navy 2008). In addition, based on operational site modeling, munition constituents are not migrating off the ranges through wind or surface water transport (U.S. Department of the Navy 2008). Inert munitions used at B-16 and within the DVTA would not release measurable quantities of munitions constituents to the environment (U.S. Department of the Navy 2008).

Similar to what has been described for lead, the effects of contaminants on soils from the use of high-explosive munitions under the No Action Alternative would be long term, but the effects would be localized. Concentrations of explosives in soils would not represent a substantial threat of a release to an off-range area that poses unacceptable risk to human health or the environment. There would be no significant impacts on soils from possible contamination under the No Action Alternative.

3.1.3.1.2 Physical Disturbance

Military Munitions Strike

Most nonexplosive practice and explosive munitions would impact the ground in maintained areas of B-16, B-17, B-19, and B-20 where surface soils have been previously disturbed. The target areas have been subjected to maintenance and disturbance from impact of nonexplosive and explosive munitions since the 1950s. Therefore, physical disturbance of soils from military munitions under the No Action Alternative would not result in additional impacts on soils given the long-term and repeatedly disturbed nature of the soils in these areas. The long-term effects on soils under the No Action Alternative from military munitions strikes would be from the increased potential for soil erosion, compaction, and displacement. Physical disturbance from military munitions would not result in significant impacts on soils under the No Action Alternative.

Other Ground Disturbing Activities

Training Activities

Ground-based training involving vehicle operation and personnel movements would continue to take place at the FRTC under the No Action Alternative. Training involves vehicle use on the existing road network, which primarily consists of primitive dirt roads and gravel roads. During the tactical ground mobility training, offroad use of vehicles occurs within B-16. Continued vehicle use on dirt roads and in the offroad areas of B-16 would result in soil disturbance and compaction in previously disturbed areas. Similarly, the presence of personnel for training activities, including insertion/extraction, tactical ground mobility, and ground maneuver tactics, would compact soils and expose them to erosion. If areas are used frequently, damage to plants could become permanent as plants are repeatedly trampled and soils become compacted, preventing recovery of plants.

The fine-grained soils within the training ranges, the DVTA, and the Shoal Site are very susceptible to wind erosion, especially when disturbed. Water erosion is less of a concern because of the flat terrain, and precipitation is only about 5 in. (13 cm) per year.

The effects on soils under the No Action Alternative from other ground-disturbing activities would be long term and in the form of increased potential for soil erosion and compaction. The direct effects would occur in previously disturbed areas along dirt roads and within the training ranges. Ground-disturbing activities would not result in significant impacts on soils under the No Action Alternative.

3.1.3.2 Alternative 1

3.1.3.2.1 Potential Release of Contaminants

Military Munitions

Military munitions, including nonexplosive practice munitions and fragments from explosive munitions would continue to accumulate in soils within the training ranges. Nonexplosive practice bombs and range scrap would be removed at regular intervals based on the *Fallon Operational Range Clearance Plan* (U.S. Department of the Navy 2013). There would be a notable increase at B-16, where the annual use of small- and medium-caliber live rounds would double, and in the Dixie Valley, where the use of blank rounds would double (see Table 2-5). Small increases in the annual number of live rounds would occur at B-17 and B-19, and there would be a slight decrease in use at B-20. The fate and transport of lead on firing ranges as a result of the use of live rounds is a potential concern. However, as discussed for the No Action Alternative, source level accumulation would only occur at concentrated use areas such as the small arms range, where rounds are fired into a berm; it is not expected in fire and maneuver areas. Furthermore, lead would be expected to have limited mobility based on neutral to alkaline soil pH, limited precipitation, and flat terrain at the FRTC. The flat terrain of the training ranges and training areas, coupled with low precipitation, also makes it unlikely that lead would be transported outside the immediate target area by stormwater runoff.

In summary, spent small- and medium-caliber rounds would not be removed at regular intervals, but would slowly accumulate in soils over long periods of time in areas of concentrated use, such as small arms ranges and target berms. However, lead would be expected to be relatively immobile in soils at the FRTC based on soil pH, limited annual precipitation, and the flat terrain. Elevated concentrations would likely be limited to surface soils in the immediate area of projectile impact and in areas of concentrated use such as the small arms range berm. Effects of contaminants on soils under Alternative 1 would be long term and localized in the range areas. Elevated concentrations of lead in soils would not represent

a substantial threat of a release to an off-range area that poses unacceptable risk to human health or the environment.

Explosives and Explosive Byproducts

Under Alternative 1, the annual use of explosives on B-16 would be the same as under the No Action Alternative. On B-17, B-19, and B-20, the annual use of high-explosive bombs would decrease slightly and the use of explosives would stay the same as the No Action Alternative. As described for the No Action Alternative, soil contamination within B-17, B-19, and B-20 is low. Explosive constituents are largely consumed during detonation, and those that are not consumed degrade rapidly in the environment (U.S. Department of the Navy 2008). In addition, operational site modeling done for the FRTC indicates that constituents are not migrating off the ranges due to wind or surface water transport (U.S. Department of the Navy 2008). Inert munitions used at B-16 and within the DVTA would not release measurable quantities of munitions constituents to the environment (U.S. Department of the Navy 2008).

The effects of explosive contaminants on soils from the use of high-explosive munitions under Alternative 1 would be long term, and the effects would be localized. Concentrations of explosives in soils would not represent a substantial threat of a release to an off-range area that poses unacceptable risk to human health or the environment.

There would be no significant impacts on soils from the potential release of contaminants under Alternative 1.

3.1.3.2.2 Physical Disturbance

Military Munitions Strike

Under Alternative 1, nonexplosive practice and explosive munitions would impact the ground in maintained areas of B-17, B-19, and B-20 where surface soils have been previously disturbed. At B-16, the annual number of inert bombs would be the same as under the No Action Alternative, and at B-17, B-19, and B-20, there would be a slight decrease in annual use. Therefore, there would be a slight decrease in the frequency at which soils are impacted under Alternative 1.

The long-term effects on soils under Alternative 1 would be the same as those described for the No Action Alternative, with the continued potential for soil erosion, compaction, and displacement. The direct effects would occur to soils that have been repeatedly disturbed by training activities within the ranges. Physical disturbance from military munitions would not result in significant impacts on soils under Alternative 1.

Other Ground Disturbing Activities

Training Activities

Training activities that result in ground disturbance would increase under Alternative 1 compared to the No Action Alternative. There would be a slight increase in vehicle use and personnel movements under Alternative 1 during ground-based training events, as combat search and rescue activities increase to 115 training events per year from 45 under the No Action Alternative and mission area training increases by five events per year. However, vehicles would continue to use existing road network and training ranges that have been previously disturbed.

The effects of other ground-disturbing activities on soils under Alternative 1 would be long term and in the form of increased potential for soil erosion, compaction, and displacement. The direct effects would occur in previously disturbed areas along dirt roads and within the training ranges. Ground-disturbing activities would not result in significant impacts on soils under Alternative 1.

3.1.3.3 Alternative 2

3.1.3.3.1 Potential Release of Contaminants

Military Munitions

Military munitions, including nonexplosive practice munitions and fragments from explosive munitions would continue to accumulate in soils within the training ranges. Nonexplosive practice bombs and range scrap would be removed at regular intervals based on the *Operational Range Clearance Plan* (U.S. Department of the Navy 2013). There would be a notable increase at B-16, where the annual use of small- and medium-caliber live rounds would more than double, and in the Dixie Valley, where the use of blank rounds would more than double (see Table 2-5). The annual number of live rounds would increase by approximately 52,000 at B-17, 92,600 at B-19, and 1,700 at B-20. The fate and transport of lead on firing ranges as a result of the use of live rounds is a potential concern. However, as discussed for the No Action Alternative, source level accumulation would only occur at concentrated use areas such as the small arms range, where rounds are fired into a berm; it is not expected in fire and maneuver areas. Furthermore, lead would be expected to have limited mobility based on neutral to alkaline soil pH, limited precipitation, and flat terrain at the FRTC. The flat terrain of the training ranges and training areas coupled with low precipitation also makes it unlikely that lead would be transported outside the immediate target area by stormwater runoff.

In summary, spent small- and medium-caliber rounds would not be removed at regular intervals, but would slowly accumulate in soils over long periods of time in areas of concentrated use, such as small arms ranges and target berms. However, lead would be expected to be relatively immobile in soils at the FRTC based on soil pH, limited annual precipitation, and the flat terrain. Elevated concentrations would likely be limited to surface soils in the immediate area of projectile impact and in areas of concentrated use such as the small arms range berm. Effects of contaminants on soils under Alternative 2 would be long term and localized in the range areas. Elevated concentrations of lead in soils would not represent a substantial threat of a release to an off-range area that poses unacceptable risk to human health or the environment.

Explosives and Explosive Byproducts

Under Alternative 2, the annual use of high-explosive bombs and explosives would increase on the training ranges. The number of high-explosive bombs would increase compared to the No Action Alternative on B-17 by 1,141, on B-19 by 281, and on B-20 by 248. B-16, B-17, and B-20 would increase the number of explosives annually by 42 each, and B-19 would increase by 64 annually.

Although there would be an increase in the number of high-explosive munitions used annually on the ranges, the impacts on soils would not differ appreciably from the No Action Alternative. Sampling has indicated that soil contamination within B-17, B-19, and B-20 is low. Explosive constituents are largely consumed during detonation, and those that are not consumed degrade rapidly in the environment (U.S. Department of the Navy 2008). In addition, operational site modeling done for the FRTC indicates that constituents are not migrating off the ranges due to wind or surface water transport (U.S. Department of the Navy 2008). Inert munitions used at B-16 and within the DVTA would not release

measurable quantities of munitions constituents to the environment (U.S. Department of the Navy 2008).

Therefore, the effects of explosive contaminants on soils from the use of high-explosive munitions would be long term and localized. Concentrations of explosives in soils would not represent a substantial threat of a release to an off-range area that poses unacceptable risk to human health or the environment.

There would be no significant impacts on soils from potential release of contaminants under Alternative 2.

3.1.3.3.2 Physical Disturbance

Military Munitions Strike

Under Alternative 2, nonexplosive practice and explosive munitions would impact the ground in maintained areas of B-16, B-17, B-19, and B-20 where surface soils have been previously disturbed. The largest increase in munition use would occur at B-17, where the annual number of inert and live bombs would increase by approximately 1,400. At B-16, B-19, and B-20, there would be increases of 46, 337, and 339 in the annual number of inert or live bombs used, respectively. Because these target areas have been subjected to maintenance and disturbance regimes for years, the increased munition use at the training ranges would amount to a minor increase in ground disturbance through displacement of soils.

Other Ground Disturbing Activities

Training Activities

Training activities that result in ground disturbance would increase under Alternative 2 compared to the No Action Alternative. There would be a slight increase in vehicle use and personnel movements under Alternative 2 during ground-based training events. The annual number of combat search and rescue activities would increase to 127 training events per year from 45 under the No Action Alternative, mission area training would increase by 17 events per year, and naval special warfare activities would increase slightly by one to three events a year. However, vehicles would continue to use existing road network and training ranges that have been previously disturbed.

The effects of other ground-disturbing activities on soils under Alternative 2 would be long term and minor in the form of increased potential for soil erosion, compaction, and displacement. The direct effects would occur in previously disturbed areas along dirt roads and within the training ranges. Ground-disturbing activities would not result in significant impacts on soils under Alternative 2.

3.1.3.4 Proposed Management Practices, Monitoring, and Mitigation Measures

3.1.3.4.1 Proposed Best Management Practices

The current management practices listed in Section 3.1.1.2.2 (Management Practices) would continue to be implemented under Alternatives 1 and 2, and existing programs and plans would be updated to reflect new conditions. The following best management practices would be implemented to avoid and minimize potential impacts on soils under Alternatives 1 and 2:

- Incidental fuel spills would be avoided during training by conducting all refueling activities in a secondary containment area.
- Drip pads would be placed under equipment when parked to avoid soil contamination from leaking fluids.

- Range condition assessment 5-year reviews would continue to be conducted, and appropriate steps would be taken, if necessary, to prevent or respond to a release or substantial threat of a release of munitions constituents of potential concern to off-range areas that could pose unacceptable risks to human health or the environment.
- Wind and water erosion would be minimized by adhering to standard operating procedures for vehicles on existing roads and two-track trails (unless otherwise noted in standard operating procedures or in the event of emergency).

3.1.3.4.2 Proposed Monitoring

No specific monitoring needs were identified for soils. However, the need for soil sampling, analysis, or monitoring would continue to be considered during range condition assessment 5-year reviews conducted under the Navy's Range Sustainability Environmental Program Assessment.

3.1.3.4.3 Proposed Mitigation Measures

No mitigation measures are warranted for soils based on the analysis presented in Section 3.1.3 (Environmental Consequences), implementation of current management practices, and implementation of proposed best management practices.

3.1.3.5 Summary of Effects and Conclusions

Table 3.1-2 lists each stressor analyzed for potential impacts on soils at the FRTC. None of the alternatives would result in significant impacts on soils.

Table 3.1-2: Summary of Impacts on Soils

Stressors		Summary of Effects and National Environmental Policy Act Impact Determination
Major Stressor Category	**Stressor Type**	
No Action Alternative		
Potential Release of Contaminants		Military Munitions: Long-term effects in the form of accumulation of military munitions, metals, and explosives in surface soils. Effects would be localized.
Physical Disturbance		Training Activities: Long-term, minor effects in the form of soil erosion, compaction, and displacement. Effects would be localized.
Impact Conclusion		The No Action Alternative would not result in significant impacts on soils.
Alternative 1		
Potential Release of Soil Contaminants		Military Munitions: Long-term effects in the form of accumulation of military munitions, metals, and explosives in surface soils. Effects would be localized.
Physical Disturbance		Training Activities: Long-term, minor effects in the form of soil erosion, compaction, and displacement. Effects would be localized.
Impact Conclusion		Alternative 1 would not result in significant impacts on soils.
Alternative 2		
Potential Release of Soil Contaminants		Military Munitions: Long-term effects in the form of accumulation of military munitions and metals in surface soils. Effects would be localized.
Physical Disturbance		Training Activities: Long-term, minor effects in the form of soil erosion, compaction, and displacement. Effects would be localized.
Impact Conclusion		Alternative 2 would not result in significant impacts on soils.

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3.2 AIR QUALITY

3.2.1 INTRODUCTION

3.2.1.1 Overview

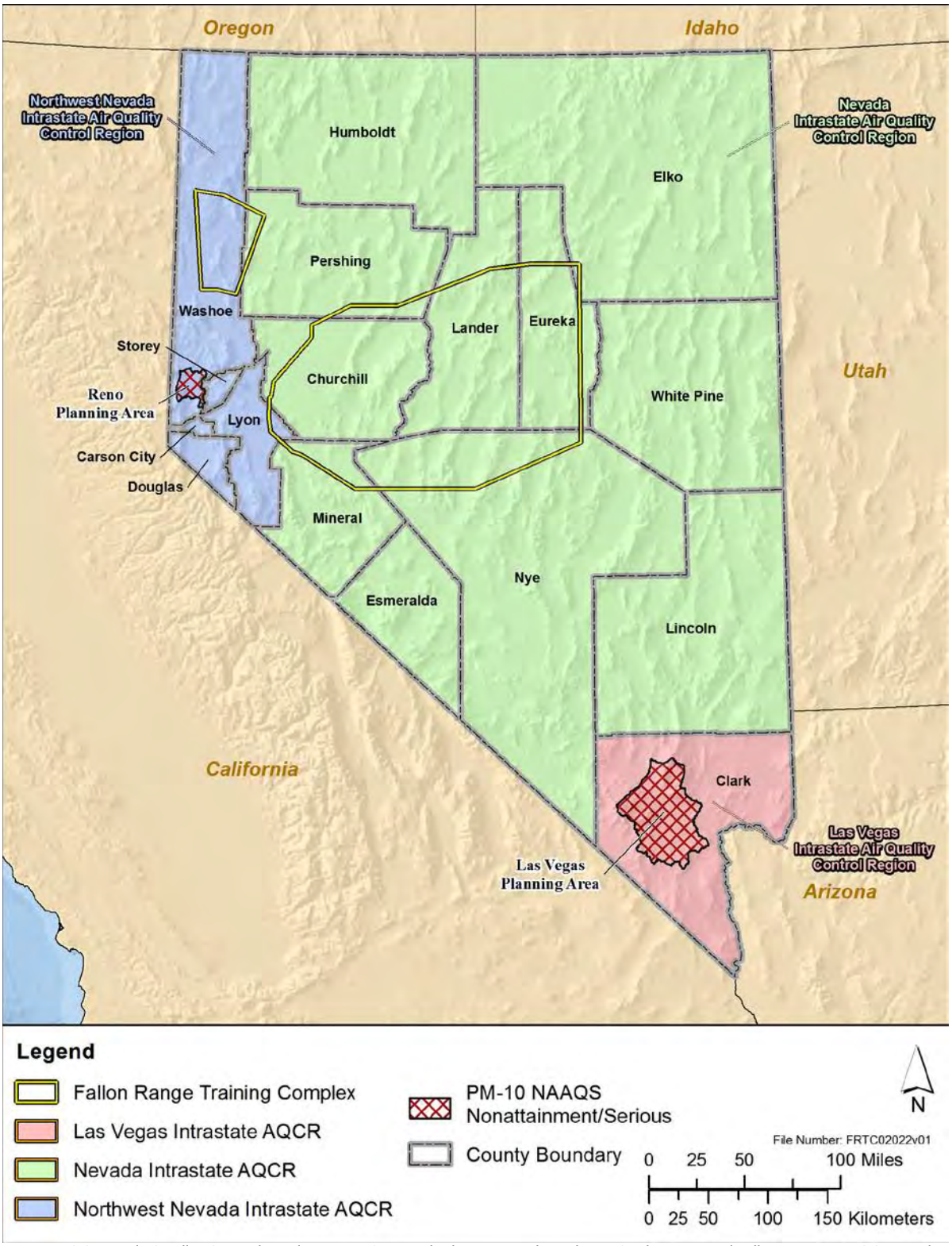
Nevada consists of three air quality control regions: (1) the Nevada Intrastate Air Quality Control Region, (2) the Northwest Nevada Intrastate Air Quality Control Region, and (3) the Las Vegas Intrastate Air Quality Control Region (Figure 3.2-1). These regions are further subdivided into particular air basins for monitoring and management purposes. As shown in Figure 3.2-1, most of the Fallon Range Training Complex (FRTC) Study Area lies within the Nevada Intrastate Air Quality Control Region. A relatively small part of the FRTC Study Area, including most of the Reno Military Operations Area (MOA), is within the Northwest Nevada Intrastate Air Quality Control Region.

Two areas in Nevada are classified as "nonattainment areas" for suspended particulate matter (PM) less than or equal to 10 micrometers (µm) in diameter (PM_{10}) because ambient concentrations of PM_{10} exceed the national ambient air quality standard for this pollutant. These nonattainment areas, which are referred to as the Reno Planning Area and Las Vegas Planning Area, are located outside the FRTC Study Area (Figure 3.2-1). The remainder of Nevada and the entire FRTC Study Area are classified as being in attainment with all national ambient air quality standards (see Section 3.2.1.2, Regulatory Framework and Management Practices, for additional information about national ambient air quality standards).

The study area or region of influence for the air quality analysis includes north central parts of the Nevada Intrastate Air Quality Control Region and the northern segment of the Northwest Nevada Intrastate Air Quality Control Region. The following section provides the regulatory framework for air quality and contains general information and definitions of terms commonly used in this section.

3.2.1.2 Regulatory Framework and Management Practices

The United States (U.S.) Environmental Protection Agency (EPA) is responsible for enforcing the Clean Air Act of 1970 and its 1977 and 1990 amendments (42 United States Code §7401, et seq.). The Clean Air Act's purposes are to classify air basins as to their attainment status under the national ambient air quality standards (40 Code of Federal Regulations [C.F.R.] §50) (Table 3.2-1), develop schedules and strategies to meet the national ambient air quality standards, and regulate emissions of criteria pollutants and air toxics to protect the public health and welfare. Short-term standards (1-, 3-, 8- and 24-hour periods) are established for pollutants contributing to acute health effects, while long-term standards (quarterly and annual averages) are established for pollutants contributing to chronic health effects.



Notes: AQCR = Air Quality Control Region, PM-10 = Particulate Matter less than 10 micrometers in diameter, NAAQS = National Ambient Air Quality Standards

Figure 3.2-1: Nevada Air Quality Control Regions and Nonattainment Areas

Table 3.2-1: Ambient Air Quality Standards

Pollutant	Averaging Time	NAAQS Primary	NAAQS Secondary	Nevada Standards
O_3	8 hours (2008 standard)	0.075 ppm	Same as primary	Same as NAAQS
O_3 – Lake Tahoe Basin, #90	1 hour	-	-	0.10 ppm
PM_{10}	24 hours	150 µg/m^3	Same as primary	Same as NAAQS
	Annual arithmetic mean	-	-	50 µg/m^3
$PM_{2.5}$	24 hours	35 µg/m^3	Same as primary	-
	Annual arithmetic average	12 µg/m^3	15 µg/m^3	-
CO less than 5,000 ft. below mean sea level	8 hours	9 ppm	-	Same as NAAQS
CO above 5,000 ft. above mean sea level	8 hours	9 ppm	-	6 ppm
CO at any elevation	1 hour	35 ppm	-	Same as NAAQS
NO_2	Annual arithmetic average	53 ppb	Same as primary	Same as NAAQS
	1 hour	100 ppb	-	-
SO_2	3 hours	-	0.5 ppm	Same as NAAQS
	1 hour	75 ppb	-	-
Lead	Rolling 3-month average	0.15 µg/m^3	Same as primary	Same as NAAQS
Hydrogen sulfide	1 hour	-	-	0.08 ppm

Notes: CO = carbon monoxide, ft. = feet, NAAQS = national ambient air quality standards, NO_2 = nitrogen dioxide, O_3 = ozone, $PM_{2.5}$ = fine particulate matter less than or equal to 2.5 micrometers in diameter, PM_{10} = suspended particulate matter less than or equal to 10 micrometers in diameter, ppb = parts per billion, ppm = parts per million, µg/m^3 = micrograms per cubic meter
Sources: Nevada Administrative Code 445B.22097, U.S. Environmental Protection Agency 2012

States may also establish their own ambient air quality standards that are more stringent than those set by federal law. The Nevada Administrative Code (NAC) (Chapter 445B, Section 22097) establishes ambient air quality standards for Nevada. These standards include the national ambient air quality standards as well as Nevada standards, which are used to consider whether to issue a permit for a stationary source by ensuring that the stationary source will not cause the Nevada standards to be exceeded in areas where the general public has access (Nevada Administrative Code 445B.22097). Table 3.2-1 lists the ambient air quality standards enforced by the Nevada Division of Environmental Protection.

Criteria pollutants are carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), PM_{10}, fine particulate matter less than or equal to 2.5 µm in diameter ($PM_{2.5}$), and lead (Pb). In Nevada, for new stationary sources or a renewal of an operating permit for an existing stationary source, hydrogen sulfide is also a regulated air pollutant. Air basins that exceed a national ambient air quality standard are designated as “nonattainment” for that pollutant, while air basins that are in compliance with national ambient air quality standards are in “attainment” for that pollutant. The U.S. EPA requires states to develop and execute a state implementation plan for nonattainment areas, which describes actions that will lead the state into compliance with all federal air quality standards. Areas that have achieved attainment may be designated as “maintenance areas,” which are subject to maintenance plans showing how the area will continue to meet federal air quality standards. The federally enforceable applicable state implementation plan for Nevada is compiled in 40 C.F.R. Part 52 Subpart DD.

Noncriteria air pollutants that can affect human health are categorized as hazardous air pollutants under Section 112 of the Clean Air Act. The U.S. EPA has identified 188 hazardous air pollutants, such as benzene, perchloroethylene, and methylene chloride. Hazardous air pollutants are examined individually where there is a source of these pollutants.

Hazardous air pollutants emitted from mobile sources are called mobile source air toxics. Mobile source air toxics are compounds emitted from highway vehicles and non-road equipment that are known or suspected to cause cancer or other serious health and environmental effects. On March 29, 2001, the U.S. EPA published the first mobile source air toxics rule, which identified 21 compounds as hazardous air pollutants that required regulation (U.S. Environmental Protection Agency 2001). A subset of six of these mobile source air toxics compounds were identified as having the greatest influence on health: benzene, 1,3-butadiene, formaldehyde, acrolein, acetaldehyde, and diesel particulate matter. The U.S. EPA published a second mobile source air toxics rule on February 26, 2007, which generally supported the findings in the first rule and provided additional recommendations of compounds having the greatest impact on health. The rule also identified several engine emission certification standards that must be implemented (U.S. Environmental Protection Agency 2007).

Unlike the criteria pollutants, there are no national ambient air quality standards for benzene and other hazardous air pollutants. The primary control methods for these pollutants for mobile sources involves reducing their content in fuel and altering the engine operating characteristics to reduce the volume of pollutant generated during combustion. Mobile source air toxics would be the primary hazardous air pollutants emitted by mobile sources during proposed training activities. Aircraft operations would result in low levels of emissions of these pollutants in the ambient air below the mixing height (3,000 feet [ft.] [914.4 meters {m}] above ground level [AGL]) and would occur over a widely dispersed area. For these reasons, hazardous air pollutants are evaluated qualitatively in this Environmental Impact Statement (EIS).

The Western Regional Air Partnership Dust Emissions Joint Forum adopted a definition of fugitive dust on October 21, 2004 (Western Governors' Association 2006). Fugitive dust was defined as dust that could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening. A similar definition is contained in NAC section 445B.075 for this solid airborne particulate matter. Fugitive dust can be generated from agricultural tilling, construction, materials handling, paved travel surfaces, unpaved travel surfaces, minerals products industry, abrasive blasting, livestock husbandry, and wind erosion of exposed areas. Fugitive dust can become a contributor to nonattainment of the National Ambient Air Quality Standards (NAAQS) for PM_{10} or $PM_{2.5}$. The ratios of $PM_{2.5}$ to PM_{10} for fugitive dust sources published in Section 13 of AP-42 typically range from 0.10 to 0.20.

Section 176 (c)(1) of the Clean Air Act, commonly known as the General Conformity Rule, requires federal agencies to ensure that their actions conform to applicable implementation plans for achieving and maintaining national ambient air quality standards for criteria pollutants. To ensure conformity, a federal action must not contribute to new violations of ambient air quality standards, increase the frequency or severity of existing violations, or delay timely state or regional attainment of standards. A conformity review must be completed for every federal action that generates air emissions in nonattainment or maintenance (former nonattainment) areas. The General Conformity Rule does not apply to the Proposed Action because the FRTC Study Area is not within a nonattainment or maintenance area.

Air pollutants are classified as either primary or secondary pollutants. Primary air pollutants are those emitted directly into the atmosphere, such as CO, SO_2, Pb, and PM. Secondary air pollutants, such as O_3, are those formed through atmospheric chemical reactions. Such reactions usually involve primary air pollutants and normal constituents of the atmosphere. Sunlight and meteorological conditions, such as temperature and humidity, can also affect atmospheric chemistry. Air pollutants such as organic gases and particulate matter are a combination of primary and secondary pollutants. PM_{10} and $PM_{2.5}$ are

generated as primary pollutants by various mechanical processes (e.g., abrasion, erosion, mixing, or atomization) or combustion processes. However, PM_{10} and $PM_{2.5}$ also can be formed as secondary pollutants, through chemical reactions or by the condensation of gaseous pollutants into fine aerosols.

Compounds that react to form secondary air pollutants, such as O_3, are called pollutant precursors. Precursors for O_3 fall into two broad groups of chemicals: nitrogen oxides (NO_X) and organic compounds. NO_X consists of nitric oxide and NO_2. Organic compound precursors of O_3 are routinely described by various terms, including volatile organic compounds, reactive organic compounds, and reactive organic gases. In this document, the term "reactive organic gases" refers to organic compound precursors of O_3.

Air pollutant emissions refer to the amount (weight or volume) of one or more specific compounds emitted into the atmosphere by a source. Most air pollutant emissions are expressed as a rate (e.g., 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 is determined by the atmospheric concentrations of specific air pollutants at a particular time and location. The ambient air pollutant concentrations measured at a particular location are determined by the pollutant emissions rate, local meteorology, and atmospheric chemistry. Wind speed and direction and precipitation patterns affect the dispersal, dilution, and removal of air pollutant emissions. Ambient air quality data are generally reported as a mass per unit volume (e.g., micrograms per cubic meter [$\mu g/m^3$] of air) or as a volume fraction (e.g., parts per million by volume).

The U.S. EPA has developed guidance to evaluate aircraft operational emissions, which is provided in *The Procedures of Emission Inventory Preparation, Volume IV: Mobile Sources* (U.S. Environmental Protection Agency 1992). Aircraft engines emit pollutants during all phases of operation: climb, approach, and cruise. The altitude of the aircraft is an important factor in determining the potential effects aircraft emissions have on air quality at the ground level. Table 2-6 in this EIS, Annual Estimates of Aircraft Sortie Overflights in the Fallon Range Training Complex Special Use Airspace (SUA), provides the percentage of flight time spent above 3,000 ft. AGL (914 m). This particular altitude is considered the top of the mixing layer. Air within the mixing layer is completely mixed, and pollutants emitted anywhere within the layer will be carried down to ground level (U.S. Environmental Protection Agency 1992). When an aircraft is above the mixing layer, whether on descent or when climbing to cruising altitude, the emissions tend to disperse, rather than being trapped by the inversion, and have no ground level effect. The U.S. EPA recommends a default mixing layer of 3,000 ft. (914 m) be used in aircraft emission calculations.

The Navy incorporates clean air initiatives into tactical vehicle and equipment procurement programs, fuel standards compliance, and vehicle inspection and maintenance procedures.

3.2.1.3 Approach to Analysis

The impact analysis for air quality considers possible changes in ambient air quality that could result from the Proposed Action. Such changes could arise from air pollutant emissions associated with increases in military readiness activities (e.g., combustion emissions from aircraft, vehicles, and equipment). Factors used in determining if impacts to air quality would be significant include whether emissions from the alternatives would be expected to change the national ambient air quality standards attainment status in the Northwest Nevada Intrastate Air Quality Control Region or Nevada Intrastate Air Quality Control Region.

Section 3.2.3 (Environmental Consequences) presents the analysis of potential impacts on air quality within the FRTC Study Area in relation to three air quality stressors:

- Criteria pollutants
- Hazardous air pollutants
- Fugitive dust

3.2.2 AFFECTED ENVIRONMENT

3.2.2.1 Regional and Local Air Quality

As mentioned in Section 3.2.1.1 (Overview), Nevada consists of three air quality control regions: (1) the Nevada Intrastate Air Quality Control Region, (2) the Northwest Nevada Intrastate Air Quality Control Region, and (3) the Las Vegas Intrastate Air Quality Control Region. These regions are further subdivided into particular air basins for monitoring and management purposes. Figure 3.2-1 illustrates the three air quality control regions. As shown in Figure 3.2-1, the FRTC Study Area lies almost exclusively within the Nevada Intrastate Air Quality Control Region. However, the noncontiguous Reno MOA portion of the FRTC Study Area lies partially within the Northwest Nevada Intrastate Air Quality Control Region. As shown in Figure 3.2-1, no nonattainment areas are within the FRTC Study Area.

Nevada has four jurisdictions that independently manage their own air programs as designated by statute: Department of Conservation and Natural Resources, Division of Environmental Protection, Bureau of Air Quality Planning; Washoe County District Health Department, Air Quality Management Division; Clark County Department of Air Quality and Environmental Management; and various tribal agencies (Nevada Division of Environmental Protection 2014). The Ambient Air Quality Monitoring Program of the Bureau of Air Quality Planning operates an ambient air quality monitoring network of gaseous and particulate pollutant monitors throughout rural Nevada, except those areas in Washoe and Clark County (Nevada Division of Environmental Protection 2014). Washoe and Clark County operate and maintain monitoring networks separate from the state and publish their findings independently.

The Nevada Intrastate Air Quality Control Region generally has good air quality, as indicated by the absence of nonattainment areas in the region. Historically, the region had just one nonattainment area (U.S. Environmental Protection Agency 2013), in White Pine County. This area will not be further discussed, as the Steptoe Valley Central area in White Pine County has been in attainment of the national ambient air quality standards for SO_2 for over a decade and is located outside of the FRTC Study Area. The Northwest Nevada Intrastate Air Quality Control Region has one air basin that is currently designated nonattainment for PM_{10}. However, this air basin is located outside the FRTC Study Area.

Nevada Air Pollution Control Program operates a network of monitoring stations across Nevada's 15 rural counties (Nevada Division of Environmental Protection 2011). The monitors conform to all U.S. Environmental Protection Agency siting criteria and are situated to measure air quality in both rural and urbanized portions of Nevada's 15 rural counties: Carson City, Churchill, Douglas, Elko, Esmeralda, Eureka, Humboldt, Lander, Lincoln, Lyon, Mineral, Nye, Pershing, Storey, and White Pine. With the exception of the Reno MOA, the FRTC Study Area lies within the rural counties area. Clark (to the south) and Washoe (to the west) Counties operate and maintain monitoring networks separate from Nevada Air Pollution Control Program and publish their findings independently. The following trends were observed for the 15 rural counties area as set forth in the *Air Quality Trend Report 2000–2010* (Nevada Division of Environmental Protection 2011):

- Carbon monoxide: Ambient concentrations of CO have decreased and remained well below the current national ambient air quality standards.
- Ground-level ozone: Ambient concentrations of O_3 have remained steady and below the current 2008 national ambient air quality standards.
- Particulate matter ≤ 2.5 µm in diameter: Ambient concentrations of $PM_{2.5}$ have trended upward in Gardnerville and are close to the national ambient air quality standards in Carson City and Gardnerville. Nevada Air Pollution Control Program is in the process of analyzing samples to determine the cause(s) of the elevated levels. Ambient concentrations of $PM_{2.5}$ have decreased in Fernley.
- Particulate matter ≤ 10 µm in diameter: PM_{10} monitoring conducted in Elko has shown no significant change in ambient concentrations. Monitoring conducted in Pahrump shows that annual concentrations of PM_{10} have decreased in most of the monitored locations and remain well below the annual standard. The 24-hour PM_{10} concentrations in Pahrump remain steady at or near the standard. However, the number of exceedances of the 24-hour standard, most of which occurred during uncontrollable high wind events, have been reduced. As a result, the design values for PM_{10} show no exceedances of the national ambient air quality standards in the past 5 years.

The most recent air emissions inventory data that are available for Nevada (2008) are set forth in Table 3.2-2.

Table 3.2-2: Annual Baseline (2008) Criteria and Precursor Air Pollutant Emissions for Nevada

Geographic Area	Criteria and Precursor Air Pollutant Emissions in Tons/Year[1]					
	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$
Nevada	501,162	83,932	92,293	16,813	179,409	25,208

Notes: CO = carbon monoxide, NO_x = nitrogen oxides, SO_x = sulfur oxides, PM_{10} = suspended particulate matter less than or equal to 10 micrometers in diameter, $PM_{2.5}$ = fine particulate matter less than or equal to 2.5 micrometers in diameter, VOC = volatile organic compounds.
Source: U.S. Environmental Protection Agency 2008

As noted, Nevada's rural counties are in attainment of the NAAQS. Included within this status is attainment of the NAAQS for particulate matter, of which fugitive dust can be a contributor. On April 5, 2005, the U.S. Environmental Protection Agency designated all areas within Nevada's 15 Rural Counties as attainment/unclassifiable[1] for the 1997 24-hour and annual $PM_{2.5}$ NAAQS (Nevada Division of Environmental Protection 2011). On 13 December 2009, the U.S. Environmental Protection Agency designated all areas within Nevada's 15 Rural Counties as attainment/unclassifiable for the revised 2006 24-hour $PM_{2.5}$ NAAQS. On November 15, 1990, the U.S. Environmental Protection Agency designated all areas within Nevada's 15 Rural Counties as unclassifiable for PM_{10}.

3.2.2.2 Existing Air Pollutant Emissions

U.S. Department of the Navy (Navy) training-related air pollutant emissions within the FRTC Study Area primarily originate from mobile sources, with the main source being fixed-wing aircraft overflights in the SUA. Other minor sources include helicopters; unmanned aerial systems; military ground vehicles; ordnance; emergency generators; heating, ventilation, and air conditioning units; and burning. Naval Air

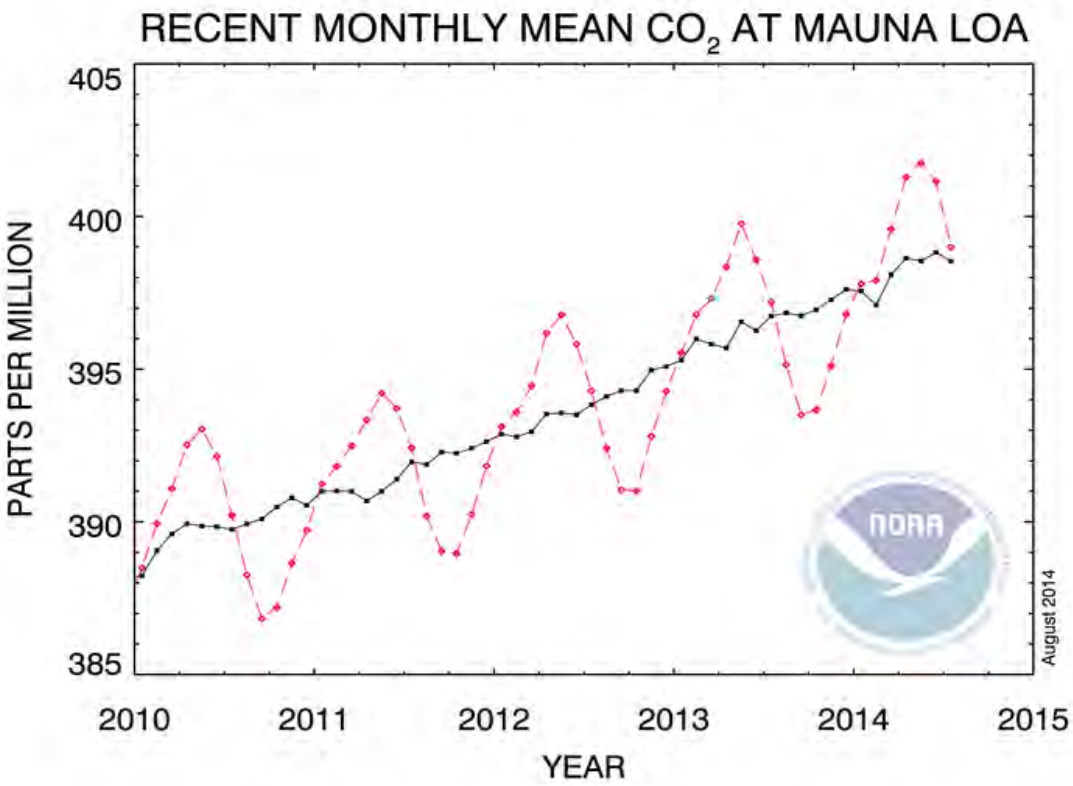
[1] Unclassifiable means any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

Station (NAS) Fallon has 11 different burn variances from Nevada Bureau of Air Pollution Control, four of which are applicable to FRTC. These allow burning for activities such as weed management, fire training, training exercises, and disposal of materials such as wood and cardboard (associated with training). The state must be notified of any burning 24 hours in advance. On lands designated as Navy-owned, NAS Fallon ensures sound fire management practices and incorporates such practices in a Fire Management Plan specific to these lands. Additionally, there is a Cooperative Fire Protection Agreement between NAS Fallon and Bureau of Land Management (BLM) in Carson City. Existing air pollutant emissions are addressed in more detail in Section 3.2.3 (Environmental Consequences) under the No Action Alternative.

3.2.2.3 Climate Change

Climate change refers to any significant change in the measures of climate lasting for an extended period of time. In other words, climate change includes major changes in temperature, precipitation, or wind patterns, among other effects, that occur over several decades or longer. Global warming refers to the recent and ongoing rise in global average temperature near Earth's surface. Global warming causes climate patterns to change. However, global warming itself represents only one aspect of climate change (U.S. Environmental Protection Agency 2014). Global surface temperatures have increased by an average of about 1.3 degrees Fahrenheit during the last century (Solomon et al. 2007). Global warming and climate change have been attributed to many factors, including increasing atmospheric concentrations of carbon dioxide (CO_2), NO_2, methane, and other greenhouse gases. Figure 3.2-2 illustrates the global increase in CO_2 concentration from 2009 to 2014 (Department of Commerce 2014). Most of the observed temperature increase since the mid-20th century is correlated with increasing amounts of greenhouse gases emitted by human activities such as combustion of fossil fuels and deforestation (Solomon et al. 2007).

The greenhouse gas effect is the process by which certain gases in the atmosphere allow shortwave radiation from the sun in but also keep longwave radiation from the earth from escaping, which then warms the planet’s lower atmosphere and surface. The existence of the greenhouse effect is not disputed. The issues and interrelationship between these issues that are not clearly defined include how the strength of the greenhouse effect changes with different concentrations of greenhouse gases, the relationships among natural sources and sinks of greenhouse gases, human sources of greenhouse gases, and atmospheric concentrations of greenhouse gases. Climate processes are understood at a general level, and more research is needed before impacts may be clearly defined.



Notes: The dashed red line with diamond symbols represents the monthly mean values, centered on the middle of each month. The black line with the square symbols represents the same, after correction for the average seasonal cycle.
Source: Department of Commerce 2014

Figure 3.2-2: Recent Carbon Dioxide Global Trend

CO_2 is the major greenhouse gas emitted by human activities, primarily from the combustion of fossil fuels such as coal, oil, and natural gas. Atmospheric concentrations of CO_2 have increased by 41 percent since the mid-1700s (U.S. Environmental Protection Agency 2013). This level is much higher than at any time during the last 650,000 years (Canadell et al. 2007). Less direct geological evidence indicates that CO_2 values this high were last seen about 20 million years ago (Pearson and Palmer 2000). The burning of fossil fuel has produced about 75 percent of the increase in CO_2 from human activity over the past 20 years. The potential effects of proposed greenhouse gas emissions are by nature global and may result in cumulative impacts, as individual sources of greenhouse gas emissions are not large enough to have any noticeable effect on climate change. Therefore, the impact of proposed greenhouse gas emissions to climate change is discussed in the context of cumulative impacts in Chapter 4 (Cumulative Impacts).

3.2.3 Environmental Consequences

This section evaluates how and to what degree the activities described in Chapter 2 (Description of Proposed Action and Alternatives) could impact air quality within the Study Area. The analysis focuses on potential impacts and overall changes as they relate to air quality associated with implementation of all current and proposed military readiness activities. Table 2-4 presents the baseline and proposed training activities for each alternative. Each stressor is introduced and analyzed by alternative.

Table 3.0-1 shows the warfare areas and associated stressors that were considered for analysis. The stressors vary in intensity, frequency, duration, and location within the Study Area. The following primary stressors are applicable to air quality in the Study Area and are analyzed:

- Air Pollutant Emissions (criteria air pollutants, hazardous air pollutants, and fugitive dust).

The Navy maintains its equipment in top working order so they can train safely and effectively. Well-maintained equipment tends to have lower emissions than poorly maintained equipment. Equipment would be operated intermittently over a large area and would produce regionally insignificant amounts of criteria pollutants and hazardous air pollutants. Additionally, military ground vehicles (e.g., pickup trucks, all-terrain vehicles, Humvees, and mine-resistant ambush-protected vehicles) and ordnance used during training would result in low levels of emissions of criteria pollutants, hazardous air pollutants, and fugitive dust, and would occur over a widely dispersed area.

The main sources of emissions are aircraft; these emissions are quantitatively analyzed in Appendix D (Air Quality Summaries). Given their minor emissions contribution in the attainment area, vehicular mobile emission sources and ordnance emissions are evaluated qualitatively in this EIS. Air station personnel work commutes and transits to and from the air station and ranges are not included in this training EIS. Commutes and transits, along with airfield operations (including flight operations, maintenance runups, construction and equipment emissions, and vehicular emissions) were separately evaluated in the Final Environmental Assessment for Airfield Operations at Naval Air Station Fallon, Nevada (U.S. Department of the Navy 2013). NAS Fallon currently holds a Class II Air Quality Operating Permit. A Class II Permit is for "minor" sources that emit less than 100 tons per year of any regulated pollutant, less than 25 tons per year total hazardous air pollutants, and less than 10 tons per year of any one hazardous air pollutant. NAS Fallon emissions are not part of the Proposed Action, but are considered in Chapter 4 (Cumulative Impacts).

Electronic warfare countermeasures generate emissions of chaff, a form of particulate not regulated under the federal Clean Air Act as a criteria air pollutant. Virtually all radio frequency chaff is 10 to 100 times larger than particulate matter under PM_{10} and $PM_{2.5}$ (Spargo et al. 1999). The types of training that produce chaff emissions (e.g., combat search and rescue activities) may take place throughout the Study Area SUA. The air quality impacts of chaff were evaluated by the Air Force in *Environmental Effects of Self-Protection Chaff and Flares* (U.S. Air Force 1997). The study concluded that most chaff fibers maintain their integrity after ejection. Although some fibers are likely to fracture during ejection, it appears this fracturing does not release particulate matter. Tests indicate that the explosive charge in the impulse cartridge results in minimal releases of particulate matter. A later study at Naval Air Station Fallon found that the release of 50,000 cartridges of chaff per year over 10,000 square miles would result in an annual average PM_{10} or $PM_{2.5}$ concentration of 0.018 $\mu g/m^3$. This was far below the then-national ambient air quality standard of 50 $\mu g/m^3$ for PM_{10} and 15 $\mu g/m^3$ for $PM_{2.5}$ (Agency for Toxic Substances and Disease Registry 2003).[2] Therefore, chaff is not further evaluated as an air quality stressor in this EIS. Potential impacts of chaff expenditure on the FRTC Study Area environment are further assessed in Section 3.1 (Soils) and Section 3.3 (Water Quality).

[2] The current standard for PM_{10} is 150 $\mu g/m^3$ over a 24-hour average time (see Table 3.2-1).

3.2.3.1 No Action Alternative

3.2.3.1.1 Air Pollutant Emissions

Criteria Pollutants

Table 3.2-3 lists criteria air pollutant and precursor emissions in the FRTC Study Area from the No Action Alternative. Emissions are totaled for each major source component (i.e., fixed-wing aircraft, rotary aircraft, and unmanned aircraft systems). Aircraft emissions were calculated for all flight activities below the default mixing height (3,000 ft. AGL [914 m]). The data for percentage of flight time spent above 3,000 ft. AGL [914 m] is contained in Table 2-6. The air pollutants emitted in the greatest quantity are NO_x, PM_{10}, $PM_{2.5}$, and CO, with fixed-wing aircraft contributing the largest amounts. All emissions calculations are provided in Appendix D (Air Quality Summaries).

Table 3.2-3: Annual Criteria and Precursor Air Pollutant Emissions for Training under the No Action Alternative

Emissions Source	Criteria and Precursor Air Pollutant Emissions in Tons/Year					
	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$
Fixed-Wing Aircraft	60	483	7	69	220	220
Rotary Aircraft	8	8	1	3	5	5
Unmanned Aircraft Systems	< 1	< 1	< 1	< 1	< 1	< 1
Total All Sources =	**68**	**492**	**8**	**72**	**225**	**225**
No Action Alternative emissions as a percentage of Nevada emissions baseline (2008)	0.01%	0.59%	0.01%	0.43%	0.13%	0.89%

Notes: (1) CO = carbon monoxide, NO_x = nitrogen oxides, PM_{10} = suspended particulate matter less than or equal to 10 micrometers in diameter, $PM_{2.5}$ = fine particulate matter less than or equal to 2.5 micrometers in diameter, SO_x = sulfur oxides, VOC = volatile organic compounds
(2) Includes estimated criteria and precursor air pollutant emissions for all flight activities below the default mixing height (3,000 ft AGL [914 m]).

Other sources of criteria pollutant emissions under the No Action Alternative include those emanating from ground vehicles and munitions detonation. Vehicle use during range activities is very limited in comparison to aircraft use, and therefore aircraft emissions are considered representative of overall training-related emissions. Based on the nature of the detonation process and the very low emission rates that have been published (AP 42, Chapter 15) in studies of munitions firing and open detonations, emission quantities from munitions use are very small. Criteria pollutant emissions associated with munitions use pose very little risk of creating adverse air quality impacts.

Under the No Action Alternative, training activities and associated criteria air pollutant emissions would not change. Air quality in air quality control regions would not change as a result of the No Action Alternative and would still be generally characterized as good. Most aircraft flight training activities across the FRTC Study Area SUA would continue to occur above the mixing layer (average of 3,000 ft. AGL [914 m]). All fixed-wing aircraft training activities (i.e., air combat maneuvers) occurring in the Reno MOA would be conducted above the mixing layer and therefore would have no impact on ground level air quality in the Northwest Nevada Intrastate Air Quality Control Region.

Criteria air pollutant emissions associated with training activities would have a negligible effect on air quality under the No Action Alternative because changes to air quality would not be detectable and would be below or within historical or desired air quality conditions. Criteria air pollutant emissions associated with the No Action Alternative would have no significant impact on air quality.

Hazardous Air Pollutants

The U.S. Environmental Protection Agency has listed 188 hazardous air pollutants regulated under Title III (Hazardous Air Pollutants), Section 112(g) of the Clean Air Act. Hazardous air pollutants are emitted by processes associated with the No Action Alternative, including fuel combustion. Trace amounts of hazardous air pollutants are emitted by combustion sources participating in training activities, including aircraft, ordnance, and military vehicles and equipment. The amounts of hazardous air pollutants emitted are small compared to the emissions of criteria pollutants; emission factors for most hazardous air pollutants from combustion sources are roughly three or more orders of magnitude lower than emission factors for criteria pollutants (California Air Resources Board 2007). Emissions of hazardous air pollutants from munitions use are smaller still, with emission factors ranging from roughly 10^{-5} to 10^{-15} pounds of individual hazardous air pollutants per item for cartridges, to 10^{-4} to 10^{-13} pounds of individual hazardous air pollutants per item for mines and smoke canisters (U.S. Environmental Protection Agency 2009). As examples, 10^{-5} is equivalent to 0.0001, and 10^{-15} is equivalent to 0.00000000000001. Hazardous air pollutant emissions estimates were not calculated because of the small amounts that would be emitted.

Under the No Action Alternative, training activities and associated hazardous air pollutant emissions would not change. Hazardous air pollutants emissions would be intermittent and distributed over the entire FRTC Study Area. Their concentrations would be further reduced by atmospheric mixing and other dispersion processes. After initial mixing, it is unlikely that the No Action Alternative would result in detectable concentrations of hazardous air pollutants. The effects of hazardous air pollutant emissions under the No Action Alternative would be negligible and there would be no significant impacts on air quality.

Fugitive Dust

Ground-based training activities (e.g., convoy operations, tactical ground mobility operations, and ground maneuver tactics training) would be limited under the No Action Alternative, and generation of fugitive dust would be negligible. Past Navy actions (addition of gravel on certain training land trails) has minimized the generation of fugitive dust. Existing conditions have not led to any known violations of state or federal ambient air quality standards. Fugitive dust from training activities would have no significant impact on air quality under the No Action Alternative.

3.2.3.2 Alternative 1

3.2.3.2.1 Air Pollutant Emissions

Criteria Pollutants

Table 3.2-4 lists criteria air pollutant and precursor emissions in the FRTC Study Area from Alternative 1. Emissions are totaled for each major source component (i.e., fixed-wing aircraft, rotary aircraft, and unmanned aircraft systems). Aircraft emissions were calculated for all flight activities below the default mixing height (3,000 ft. AGL [914 m]). The data for percentage of flight time spent above 3,000 ft. AGL [914 m] is contained in Table 2-6. The air pollutants emitted in the greatest quantity are NO_x, PM_{10}, $PM_{2.5}$, and CO, with fixed-wing aircraft contributing the largest amounts. All emissions calculations are provided in Appendix D (Air Quality Summaries).

Table 3.2-4: Annual Criteria and Precursor Air Pollutant Emissions for Training under Alternative 1 Compared to the No Action Alternative

Emissions Source	Criteria and Precursor Air Pollutant Emissions in Tons/Year					
	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$
Alternative 1						
Fixed-Wing Aircraft	87	539	7	74	167	167
Rotary Aircraft	8	9	1	3	6	6
Unmanned Aircraft Systems	< 1	< 1	< 1	< 1	< 1	< 1
Alternative 1 Total =	**95**	**548**	**8**	**77**	**172**	**172**
No Action Alternative						
Fixed-Wing Aircraft	60	483	7	69	220	220
Rotary Aircraft	8	8	1	3	5	5
Unmanned Aircraft Systems	< 1	< 1	< 1	< 1	< 1	< 1
No Action Alternative Total =	**68**	**492**	**8**	**72**	**225**	**225**
Summary and Comparison						
Change in emissions from No Action Alternative	28	56	1	5	-53	-53
Alternative 1 emissions as a percentage of Nevada emissions baseline (2008)	0.02%	0.65%	0.01%	0.46%	0.10%	0.68%

Notes: CO = carbon monoxide, NO_x = nitrogen oxides, PM_{10} = suspended particulate matter less than or equal to 10 micrometers in diameter, $PM_{2.5}$ = fine particulate matter less than or equal to 2.5 micrometers in diameter, SO_x = sulfur oxides, VOC = volatile organic compounds
Includes estimated criteria and precursor air pollutant emissions for all flight activities below the default mixing height (3,000 ft AGL [914 m]).
Values may not sum exactly to total because of rounding.

Some criteria and precursor pollutant emissions would increase under Alternative 1 compared to the No Action Alternative. Increases would be attributable to the increased fixed-wing aircraft use (from 41,615 sorties to 44,321 sorties per year). However, due to the anticipated changing mix of aircraft under the Proposed Action, particulate matter emissions would decrease under Alternative 1 compared to the No Action Alternative. The largest increase in criteria pollutant emissions is predicted for NO_x, which is an O_3 precursor that would increase by 56 tons per year. Carbon monoxide emissions are estimated to increase by 28 tons per year under Alternative 1. Other criteria and precursor air pollutant emissions are estimated to either remain nearly constant with existing conditions, or decrease under Alternative 1. Under Alternative 1, FRTC training-related criteria and precursor air pollutant emissions would represent a minor percentage of overall state emissions (less than 0.7 percent for each pollutant), similar in scale to those of the No Action Alternative.

Other sources of criteria pollutant emissions, including those emanating from ground vehicles and munitions detonation, would also increase under the Alternative 1. Vehicle use during range activities is very limited in comparison to aircraft use, and therefore aircraft emissions are considered representative of overall training-related emissions. Based on the very low emission rates, emission quantities from munitions use are very small. Criteria pollutant emissions associated with munitions use pose very little risk of creating adverse air quality impacts under Alternative 1.

As with the No Action Alternative, most aircraft operations under Alternative 1 would be conducted above the average mixing layer of 3,000 ft. (914.4 m) AGL, thus minimizing impacts to local air quality. All fixed-wing aircraft training activities (i.e., air combat maneuvers) occurring in the Reno MOA would be conducted above the mixing layer and therefore would have no impact on ground level air quality in

the Northwest Nevada Intrastate Air Quality Control Region. Criteria air pollutant emissions associated with Alternative 1 would have no significant impact on air quality.

Hazardous Air Pollutants

As discussed for the No Action Alternative, hazardous air pollutants are emitted by processes associated with Alternative 1, including fuel combustion. Trace amounts of hazardous air pollutants are emitted by combustion sources participating in training activities, including aircraft, ordnance, and military vehicles and equipment. Hazardous pollutant emissions would increase under Alternative 1, and the increases would be roughly proportional to the increases observed for the criteria air pollutants emitted (see Table 3.2-4).

Hazardous air pollutants emissions would continue to be intermittent and distributed over the entire FRTC Study Area. Their concentrations would be further reduced by atmospheric mixing and other dispersion processes. After initial mixing, it is possible that hazardous pollutants would be measurable, but they would be in very low concentrations and would not affect the air quality in the air quality control regions. The effects of hazardous air pollutant emissions from training activities under Alternative 1 would be long term and localized. There would be no significant impact on air quality.

Fugitive Dust

The potential for fugitive dust to be generated would rise slightly under Alternative 1 in comparison to the No Action Alternative. Under Alternative 1, most range activities would involve no additional ground-based activities (i.e., convoy operations, tactical ground mobility operations, and ground maneuver tactics training) (see Table 2-4). However, ground Light Amplification by Stimulated Emission of Radiation (LASER) targeting would increase under Alternative 1 in comparison to the No Action Alternative. During ground LASER targeting training, fugitive dust is likely to be generated by ground-based military equipment in the Dixie Valley Training Area, Shoal Site, B-16, B-17, and B-19. Fugitive dust emissions ($PM_{2.5}$ and PM_{10}) during ground LASER targeting are expected to be localized and temporary (short-term). No sensitive receptors are located in proximity to areas of localized impacts. Ground-based training activities would be limited under Alternative 1, and generation of fugitive dust would be negligible. Fugitive dust from training activities would have no significant impact on air quality under Alternative 1.

3.2.3.3 Alternative 2 (Preferred Alternative)

3.2.3.3.1 Air Pollutant Emissions

Criteria Pollutants

Table 3.2-5 lists criteria air pollutant and precursor emissions in the FRTC Study Area from Alternative 2. Emissions are totaled for each major source component (i.e., fixed-wing aircraft, rotary aircraft, and unmanned aircraft systems). Aircraft emissions were calculated for all flight activities below the default mixing height (3,000 ft. AGL [914 m]). The data for percentage of flight time spent above 3,000 ft. AGL [914 m] is contained in Table 2-6. The air pollutants emitted in the greatest quantity are NO_x, PM_{10}, $PM_{2.5}$, and CO, with fixed-wing aircraft contributing the largest amounts. All emissions calculations are provided in Appendix D (Air Quality Summaries).

Some criteria and precursor pollutant emissions would increase under Alternative 2 compared to the No Action Alternative. The increases would be attributable to the increased fixed-wing aircraft use (from 41,615 sorties to 48,752 sorties per year). However, due to the anticipated changing mix of aircraft under the Proposed Action, particulate matter emissions would decrease under Alternative 2 compared

to the No Action Alternative. The largest increase in criteria pollutant emissions is predicted for NO_x, which is an O_3 precursor that would increase by 111 tons per year. Carbon monoxide emissions are estimated to increase by 37 tons per year under Alternative 2. Other criteria and precursor air pollutant emissions are estimated to either remain nearly constant with existing conditions, or decrease under Alternative 1. Under Alternative 2, FRTC training-related criteria and precursor air pollutant emissions would represent a minor percentage of overall state emissions (less than 0.8 percent for each pollutant), similar in scale to those of the No Action Alternative.

Other sources of criteria pollutant emissions, including those emanating from ground vehicles and munitions detonation, would also increase under the Alternative 2. Vehicle use during range activities is very limited in comparison to aircraft use, and therefore aircraft emissions are considered representative of overall training-related emissions. Based on the very low emission rates, emission quantities from munitions use are very small. Criteria pollutant emissions associated with munitions use pose very little risk of creating adverse air quality impacts under Alternative 2.

As with the No Action Alternative, most aircraft operations under Alternative 2 would be conducted above the average mixing layer of 3,000 ft. (914.4 m) AGL, thus minimizing impacts to local air quality. All fixed-wing aircraft training activities (i.e., air combat maneuvers) occurring in the Reno MOA would be conducted above the mixing layer and therefore would have no impact on ground level air quality in the Northwest Nevada Intrastate Air Quality Control Region. Criteria air pollutant emissions associated with Alternative 2 would have no significant impact on air quality.

Table 3.2-5: Annual Criteria and Precursor Air Pollutant Emissions for Training under Alternative 2 Compared to the No Action Alternative

Emissions Source	Criteria and Precursor Air Pollutant Emissions in Tons/Year					
	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$
Alternative 2						
Fixed-Wing Aircraft	95	593	8	82	184	184
Rotary Aircraft	9	10	1	3	6	6
Unmanned Aircraft Systems	< 1	< 1	< 1	< 1	< 1	< 1
Alternative 2 Total =	**105**	**603**	**9**	**85**	**190**	**190**
No Action Alternative						
Fixed-Wing Aircraft	60	483	7	69	220	220
Rotary Aircraft	8	8	1	3	5	5
Unmanned Aircraft Systems	< 1	< 1	< 1	< 1	< 1	< 1
No Action Alternative Total =	**68**	**492**	**8**	**72**	**225**	**225**
Summary and Comparison						
Change in emissions from No Action Alternative	37	111	1	13	-35	-35
Alternative 2 emissions as a percentage of Nevada emissions baseline (2008)	0.02%	0.72%	0.01%	0.50%	0.11%	0.75%

Notes: (1) CO = carbon monoxide, NO_x = nitrogen oxides, PM_{10} = suspended particulate matter less than or equal to 10 micrometers in diameter, $PM_{2.5}$ = fine particulate matter less than or equal to 2.5 micrometers in diameter, SO_x = sulfur oxides, VOC = volatile organic compounds
(2) Includes estimated criteria and precursor air pollutant emissions for all flight activities below the default mixing height (3,000 ft AGL [914 m]).
Values may not sum exactly to total because of rounding.

Hazardous Air Pollutants

As discussed for criteria pollutants, the emissions of hazardous air pollutants under Alternative 2 would increase compared to the No Action Alternative. Hazardous air pollutant emissions would continue to be intermittent and distributed over the entire FRTC Study Area. Their concentrations would be further reduced by atmospheric mixing and other dispersion processes. After initial mixing, it is possible that hazardous pollutants would be measurable, but they would be in very low concentrations and would not affect the air quality in the Nevada air quality control regions. The effects of hazardous air pollutant emissions from training activities under Alternative 2 would be long term and localized. There would be no significant impact on air quality.

Fugitive Dust

The potential for fugitive dust to be generated under Alternative 2 would increase in comparison to the No Action Alternative. Under Alternative 2, additional ground-based activities (e.g., convoy operations [increase of three activities], tactical ground mobility operations [increase of one activity], and ground LASER targeting [increase of 416 activities]) would take place (see Table 2-4). During ground LASER targeting training, fugitive dust is likely to be generated by ground-based military equipment in the Dixie Valley Training Area, Shoal Site, B-16, B-17 and B-19. Fugitive dust emissions ($PM_{2.5}$ and PM_{10}) during ground LASER targeting are expected to be localized and temporary (short-term). No sensitive receptors are located in proximity to areas of localized impacts. Ground-based activities may use all-terrain vehicles, pickup trucks, high-mobility multipurpose wheeled vehicles, and mine-resistant ambush-protected vehicles. Operation of military vehicles on range would generate dust during dry conditions, which would be minimized by adhering to standard operating procedures such as operating on existing roads and two-track trails. Conditions could be evaluated before starting a training event, and water or another dust palliative product could be used to minimize dust, if warranted. Following standard operating procedures and, where warranted, implementing best management practices would ensure that fugitive dust does not result in significant impacts on air quality. Fugitive dust from training activities would have no significant impact on air quality under Alternative 2.

3.2.3.4 Proposed Management Practices, Monitoring, and Mitigation Measures

3.2.3.4.1 Proposed Best Management Practices

The Navy proposes the following best management practices to avoid and minimize impacts to air quality under Alternative 2:

- When warranted, water or another dust palliative product would be used as necessary to minimize generation and downwind migration of fugitive dust, especially on dry, windy days.
- Generation of dust would be minimized by adhering to standard operating procedures to operate vehicles on existing roads and two-track trails (unless otherwise noted in standard operating procedures or in the event of emergency).
- Vehicles participating in training exercises that occur on unpaved surfaces would minimize fugitive dust generation by traveling at slow speeds.
- Aircraft, ground vehicles, and military equipment would be maintained in accordance with engine manufacturer specifications to optimize efficiency and limit emissions.

3.2.3.4.2 Proposed Monitoring

No specific monitoring needs were identified for air quality.

3.2.3.4.3 Proposed Mitigation Measures

No mitigation measures are warranted for air quality based on the analysis presented in Section 3.2.3 (Environmental Consequences) and implementation of existing best management practices.

3.2.3.5 Summary of Effects and Conclusions

Table 3.2-6 lists each stressor analyzed for potential impacts to air quality within the FRTC Study Area. None of the alternatives would result in significant impacts to air quality.

Table 3.2-6: Summary of Impacts on Air Quality

Stressor	Summary of Effects and National Environmental Policy Act Impact Determination
No Action Alternative	
Criteria Air Pollutant Emissions	Negligible. Changes to air quality would not be detectable and would be below or within historical or desired air quality conditions.
Hazardous Air Pollutant Emissions	Negligible. Changes to air quality would not be detectable and would be below or within historical or desired air quality conditions.
Fugitive Dust Emissions	Negligible. Changes to air quality would not be detectable and would be below or within historical or desired air quality conditions.
Impact Conclusion	The No Action Alternative would not result in significant impacts on air quality.
Alternative 1	
Criteria Air Pollutant Emissions	Small increase relative to baseline Nevada emissions. Measurable changes in air quality would be expected locally, but the attainment status in the Northwest Nevada Intrastate Air Quality Control Region and Nevada Intrastate Air Quality Control Region would not be affected.
Hazardous Air Pollutant Emissions	Small increase relative to baseline Nevada emissions. Measurable changes in air quality would be expected locally, but the attainment status in the Northwest Nevada Intrastate Air Quality Control Region and Nevada Intrastate Air Quality Control Region would not be affected.
Fugitive Dust Emissions	Best management practices would minimize dust.
Impact Conclusion	Alternative 1 would not result in significant impacts on air quality.
Alternative 2	
Criteria Air Pollutant Emissions	Small increase relative to baseline Nevada emissions. Measurable changes in air quality would be expected locally, but the attainment status in the Northwest Nevada Intrastate Air Quality Control Region and Nevada Intrastate Air Quality Control Region would not be affected.
Hazardous Air Pollutant Emissions	Small increase relative to baseline Nevada emissions. Measurable changes in air quality would be expected locally, but the attainment status in the Northwest Nevada Intrastate Air Quality Control Region and Nevada Intrastate Air Quality Control Region would not be affected.
Fugitive Dust Emissions	Best management practices would minimize dust.
Impact Conclusion	Alternative 2 would not result in significant impacts on air quality.

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3.3 WATER QUALITY

3.3.1 INTRODUCTION

3.3.1.1 Overview

This section discusses potential impacts on surface and groundwater resources that are found on and around the Fallon Range Training Complex (FRTC) and their relationships to the Proposed Action. In general, water resources include the following components:

- Water bodies, including lakes, ponds, reservoirs, rivers, and groundwater, and transitional areas such as wetlands
- Water processes, including seasonal changes in precipitation and runoff; percolation through the soil from the surface to aquifers; and biological, physical, and chemical changes that occur as water moves through the hydrologic cycle
- Water uses, including drinking, recreation, agriculture, and plant and animal habitat
- Water quality, including the chemical and physical compositions of groundwater and surface waters, as affected by natural conditions and human activities

Nevada is the driest state in the nation. Water quantity and quality are major concerns in the state. Water resources at FRTC, as in most other parts of Nevada, are very limited.

Elements of the Proposed Action that could impact water resources are limited to those activities that could directly affect the land areas of FRTC—air-to-ground ranges and areas used for ground training. Air pollutant emissions are assumed to remain in the atmosphere for an extended period and to not be deposited on the surface of the ground in substantial quantities. With the exception of air-to-ground bombing exercises and air-to-ground gunnery exercises, activities within the special use airspace would not affect water resources and are not considered further in this section.

3.3.1.2 Regulatory Framework and Management Practices

The federal Clean Water Act, Safe Drinking Water Act, and Resource Conservation and Recovery Act regulate or affect water quality on the FRTC. Federal regulations and policies implement these laws. In addition, the United States (U.S.) Department of the Navy (Navy) has established water resource policies to ensure its compliance with federal regulations. The State of Nevada is responsible for managing water resources within its jurisdiction and for administering the Clean Water Act and Safe Drinking Water Act within its borders, in accordance with state water resources regulations.

3.3.1.2.1 Regulatory Framework

Clean Water Act

The Clean Water Act seeks to protect surface water quality through regulatory and nonregulatory tools that reduce pollutant discharges, enhance municipal wastewater treatment, and manage polluted runoff. In Nevada, the Clean Water Act is enforced by the Division of Environmental Protection, Bureau of Water Quality Planning. The Clean Water Act emphasizes a watershed approach for monitoring water quality, protecting healthy waters, and restoring impaired ones.

Water quality standards are established for constituents of concern, and water bodies are monitored to determine whether these standards are met. If water quality standards are not met, total maximum daily load values are developed for constituents of concern. Total maximum daily loads determine what levels of contaminant inputs are consistent with maintenance of water quality standards. The Clean

Water Act also addresses point sources of pollution through National Pollutant Discharge Elimination System permits and increased pollutant loads to a water body through Section 401 permits.

Safe Drinking Water Act

The Safe Drinking Water Act is the primary law regulating public drinking water supplies and their sources. Sources of drinking water include rivers, lakes, reservoirs, springs, and groundwater wells. National health-based standards are set by the U.S. Environmental Protection Agency. There are no sole-source aquifers in Nevada.

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act applies to water resources and is described in Section 3.1.1.2.1.1.

State Regulations

Nevada Division of Environmental Protection, Bureau of Water Quality Planning manages the following water quality functions in Nevada (State of Nevada 2006):

- Collecting and analyzing water data
- Developing standards for surface waters
- Publishing informational reports
- Providing water quality education
- Implementing programs to address surface water quality

The Division of Environmental Protection, the lead agency for groundwater protection in Nevada, implements and enforces regulations under the Nevada Water Pollution Control Law and other laws included in various chapters of the Nevada Revised Statutes.

The Nevada Division of Minerals, the Nevada Department of Agriculture, the Nevada Division of Water Resources, and the Nevada State Health Division also enforce regulations that protect groundwater. The Bureau of Water Quality Planning manages a program for controlling nonpoint sources of water pollution. The Bureau of Water Quality Planning controls nonpoint sources of surface and groundwater pollution through regulatory and non-regulatory programs, including technical and financial assistance, training, technology transfer, demonstration projects, and education. This approach includes coordination of land and water resource management agencies and public outreach. The Nevada Administrative Code (Sections 445A.305–445A.340) regulates nonpoint sources. Potential contaminant sources regulated by the Nevada Administrative Code include underground storage tanks, landfills, wastewater treatment systems, mining facilities, underground injection systems, and hazardous waste treatment, storage, and disposal facilities.

3.3.1.2.2 Management Practices

The following requirements and practices apply to water resources at the FRTC:

- Incidental spills that could contaminate groundwater are avoided and minimized. Navy personnel receive initial and periodic refresher training in the proper storage, handling, and management of hazardous materials.
- Potential groundwater contamination issues are addressed in the range condition assessment and subsequent 5-year reviews, in accordance with the Range Sustainability Environmental Program Assessment Policy implementation (see Section 3.1.1.2.1.1, Resource Conservation and Recovery Act).

- The FRTC has an operational range clearance plan in compliance with Department of Defense Directive 4715.11, *Environmental and Explosives Safety Management*. The operational range clearance plan provides for safe management and removal of unexploded munitions, and recycling of training munitions, munitions debris, and range scrap that has been rendered safe (see Section 3.1.1.2.2.2, Operational Range Clearance).
- Ground training activities avoid streams, ponds, and U.S. Army Corps of Engineers' jurisdictional wetlands.

3.3.1.3 Approach to Analysis

The analysis of water resources impacts considered possible changes in the quality of surface waters or groundwater that could result from the Proposed Action. Such changes could arise from use of military munitions, incidental spills, or soil disturbance or compaction. Factors evaluated to determine whether impacts on water resources would be significant include (1) the potential for surface water or groundwater to become contaminated, (2) whether surface water or groundwater represents a substantial threat of a contaminant release to an off-range area, and (3) whether such a release would pose an unacceptable risk to human health or the environment.

3.3.2 AFFECTED ENVIRONMENT

3.3.2.1 Regional Setting

Nevada lies mostly (93,000 of 110,567 square miles [mi.^{2}] [241,000 of 286,367 square kilometers {km^2}], or 84 percent) in the Great Basin between the Sierra Nevada and the Rocky Mountains, a region of long, narrow, parallel ranges and broad, flat, isolated basins. The Study Area encompasses portions of two of Nevada's 14 hydrological regions: Carson River hydrographic basin and Central Nevada hydrographic basin. Within each region lie individual watersheds, defined by local topography, that contain the surface waters (streams, rivers, lakes, and reservoirs) and groundwater aquifers that compose the water resources of the Study Area (Figure 3.3-1). Naval Air Station (NAS) Fallon and portions of the Study Area (e.g., training ranges Bravo [B]-16 and B-20) are in the Lahontan Valley portion of Carson River basin, in the rain shadow of the Sierra Nevada.

The climate of Nevada is semiarid. Precipitation in the state averages about 5 inches per year (Western Regional Climate Center 2013), and rainfall is a secondary source of water in the region. About 90 percent of the rain falling in the region is lost to evaporation and transpiration. Only 10 percent is retained in reservoirs and groundwater aquifers, such as Lahontan Reservoir and Lahontan Aquifer in Carson basin. The primary sources of water in Nevada are major rivers: the Carson, Truckee, and Walker, all of which flow to the east from the eastern slope of the Sierra Nevada, while the Humboldt River flows from northeast to southwest through north-central Nevada. The semiarid climate, especially the low rate of precipitation and high rate of evaporation, results in generally alkaline soils (U.S. Department of Agriculture 2001).

3.3.2.1.1 Surface Waters

Surface waters are a limited and precious resource in Nevada. Surface flows provide about 60 percent of Nevada's water supply. Spring and summer snowmelt from the Sierra Nevada supplies most of the stream flow in Nevada. Surface water flow volumes can vary widely from year to year and from month to month, with maximum discharges generally in May and June as a result of snowmelt in the mountains. Only 10 percent of the rivers and streams in Nevada are perennial, while the other 90 percent are intermittent or ephemeral.

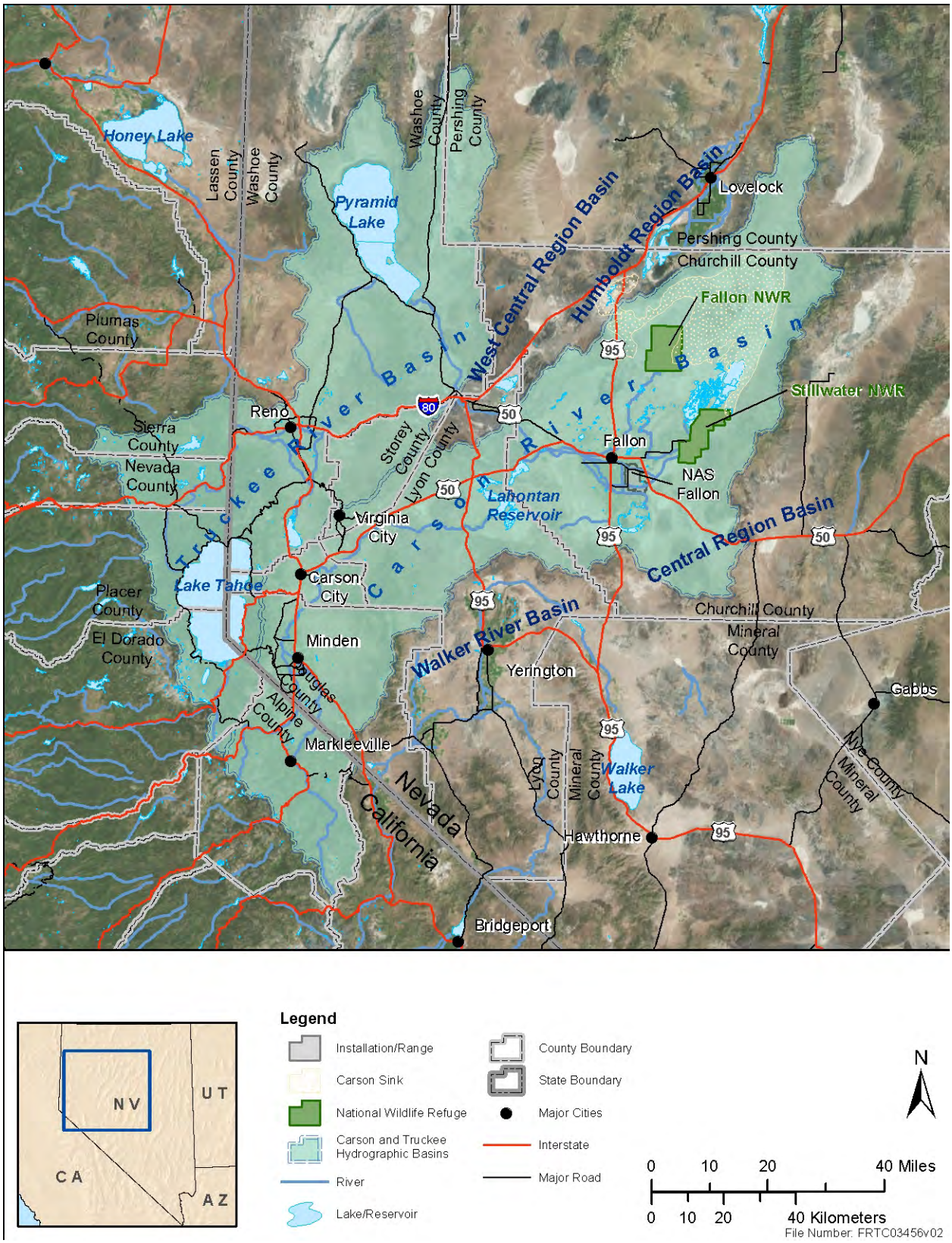


Figure 3.3-1: Surface Hydrology in the Study Area

3.3.2.1.2 Groundwater

Groundwater in Nevada is an important source of water because surface water resources in the state have been virtually fully appropriated, and future development must rely on either groundwater sources or reallocation of surface water supplies. Groundwater is water beneath the ground surface in soil pore spaces and in the fractures of rock formations. An unconsolidated rock deposit functions as an aquifer when it can yield a usable quantity of water. Groundwater basins typically have more than one aquifer because impermeable layers of rock can subdivide the groundwater basin horizontally or vertically into more than one aquifer. Water quality can vary substantially among adjacent aquifers.

3.3.2.1.3 Beneficial Uses

Under the Clean Water Act, states designate actual or desired "beneficial uses" of surface water and groundwater and then adopt water quality standards necessary to support those uses. Designated beneficial uses of surface and groundwater resources in Nevada include irrigation, recreation, aquatic life, drinking water, and watering of livestock. Nevada currently ranks 46 out of the 50 states in water quality. Water quality further constrains the uses for which Nevada's limited water resources are acceptable.

3.3.2.2 Carson River Hydrographic Basin

Carson River hydrographic basin has a surface area of approximately 3,965 mi.^{2} (10,269 km^2), of which 3,359 mi.^{2} (8,700 km^2) (85 percent) are in Nevada. The Carson City metropolitan area and other substantial urban, industrial, and agricultural lands lie within this basin. Carson River hydrographic basin is bounded by Truckee River hydrographic basin to the north, the Walker River hydrographic basin to the south, and the Central Nevada hydrographic basin to the south and east.

3.3.2.2.1 Surface Waters

Carson River, the major surface water feature in this region, flows approximately 184 miles (mi.) to the northeast from its headwaters in California to its terminus at Carson Sink in Churchill County, Nevada. Annual stream flow in Carson River is extremely variable, ranging from a low of about 26,000 acre-feet (ac.-ft.) in 1977 to slightly more than 800,000 ac.-ft. in 1983 near Fort Churchill. Data from Carson River gauging stations show an overall trend of decreasing stream flow for water in years 1940–2006 (Maurer et al. 2009).

Carson River waters are used predominately for agriculture. Only a few storage reservoirs exist in the basin, of which Lahontan Reservoir southwest of Fallon is the largest. Lahontan Reservoir stores water from Carson River as well as water diverted from Truckee River via Truckee Canal. Water from Carson River is also stored in Stillwater Point Reservoir, Sheckler Reservoir, and Carson Lake.

Nonpoint source water pollution in Carson basin is due mainly to agriculture, urban runoff, and hydrologic modifications. Water quality parameters of concern include nutrients, suspended solids, turbidity and bacteria, all of which are targeted in the state's Nonpoint Source Program administered by the Division of Environmental Protection. Water quality has improved as a result of removing point sources and implementing more-stringent standards. However, the reach of the Carson River from Lahontan Reservoir to Carson Sink is on Nevada's list of impaired waters because of high bacteria, iron, and manganese levels and because of high mercury levels in fish tissue and sediments (State of Nevada 2010). Recent data indicate that Carson River does not support irrigation, aquatic life, water-contact recreation, or fish consumption, but does support municipal and domestic uses (State of Nevada 2010).

Carson River has no outlet to the Pacific Ocean but disappears into Carson Sink, a normally dry lake northeast of the City of Fallon in the eastern portion of Carson basin. This closed basin is thus vulnerable to flooding during periods of high runoff. History shows repeated incidents of flooding, with 33 documented floods in the watershed since 1852, on an average of every 5 years (Carson Water Subconservancy District 2008). At least 17 of these events caused major flooding and extensive damage.

3.3.2.2.2 Groundwater

Within the Basin and Range Province in which the Study Area lies, aquifers are generally not continuous, or regional, because of the complex faulting in the region; regional groundwater basins are shown in Figure 3.3-2. Lahontan Valley is underlain by three alluvial aquifers and a basalt aquifer beneath a volcanic feature called Rattlesnake Hill:

- A hydraulically complex, shallow, unconsolidated sedimentary aquifer to a depth of about 50 feet (ft.) (15 meters [m]), which contains primarily hard water
- An intermediate-depth, unconsolidated sedimentary aquifer at depths generally from 50 to 500 ft. (15 to 152 m) containing generally soft water
- A deep, generally unconsolidated sedimentary aquifer at depths generally from 500 to 1,000 ft. (152 to 305 m) containing generally saline, nonpotable water
- A highly permeable basalt aquifer (Fallon Basalt Aquifer) that stratiographically transects all three sedimentary aquifers

Fallon Basalt Aquifer below Carson Desert is the sole source of potable well water for City of Fallon, NAS Fallon, and the Fallon Paiute-Shoshone Tribe. The mushroom-shaped basalt aquifer consists of highly permeable volcanic rock. The basalt aquifer has a very small horizontal footprint; the lateral extent of the basalt body is about 4 mi. (6.4 kilometers [km]) wide and 10 mi. (16 km) long. The Fallon Basalt Aquifer is recharged from the shallow and intermediate aquifers and has experienced steady water level declines and increases in total dissolved solids. Water drawn from this aquifer has arsenic levels around 100 parts per billion (ppb).

More than 67 public supply wells and 46 irrigation wells have been drilled within 0.5 mi. (0.8 km) of Carson River, raising some concern about the ability of the basalt-aquifer to continue providing municipal water supply. Withdrawals of water from the aquifer increased from about 1,700 acre feet per year (ac.-ft./yr.) in the 1970s to over 3,000 ac.-ft./yr. in the late 1990s, causing water levels in the aquifer to drop as much as 12 ft. (3.7 m) Concentrations of dissolved chloride increased over this period, but chloride concentrations are still well within U.S. Environmental Protection Agency´s drinking water standards. Increased pumping may induce inflows of water that is more saline from adjacent aquifers, or from greater depths within the basalt aquifer itself, thus increasing chloride concentrations in the aquifer.

Concentrations of arsenic in the aquifer are about 100 ppb, or 0.1 milligram per liter (mg/L), exceeding the drinking water standard of 0.01 mg/L. In November 1999, U.S. Environmental Protection Agency, Region 9 issued the City of Fallon a findings and notice of violation for violating the Safe Drinking Water Act by exceeding the arsenic maximum contaminant level of 50 ppb (since 1977). In August 2000, the City of Fallon received an administrative order from the U.S. Environmental Protection Agency requiring compliance with the arsenic maximum contaminant level by September 15, 2003. This administrative order was superseded by a subsequent administrative order in August 2002 that extended the deadline to April 15, 2004.

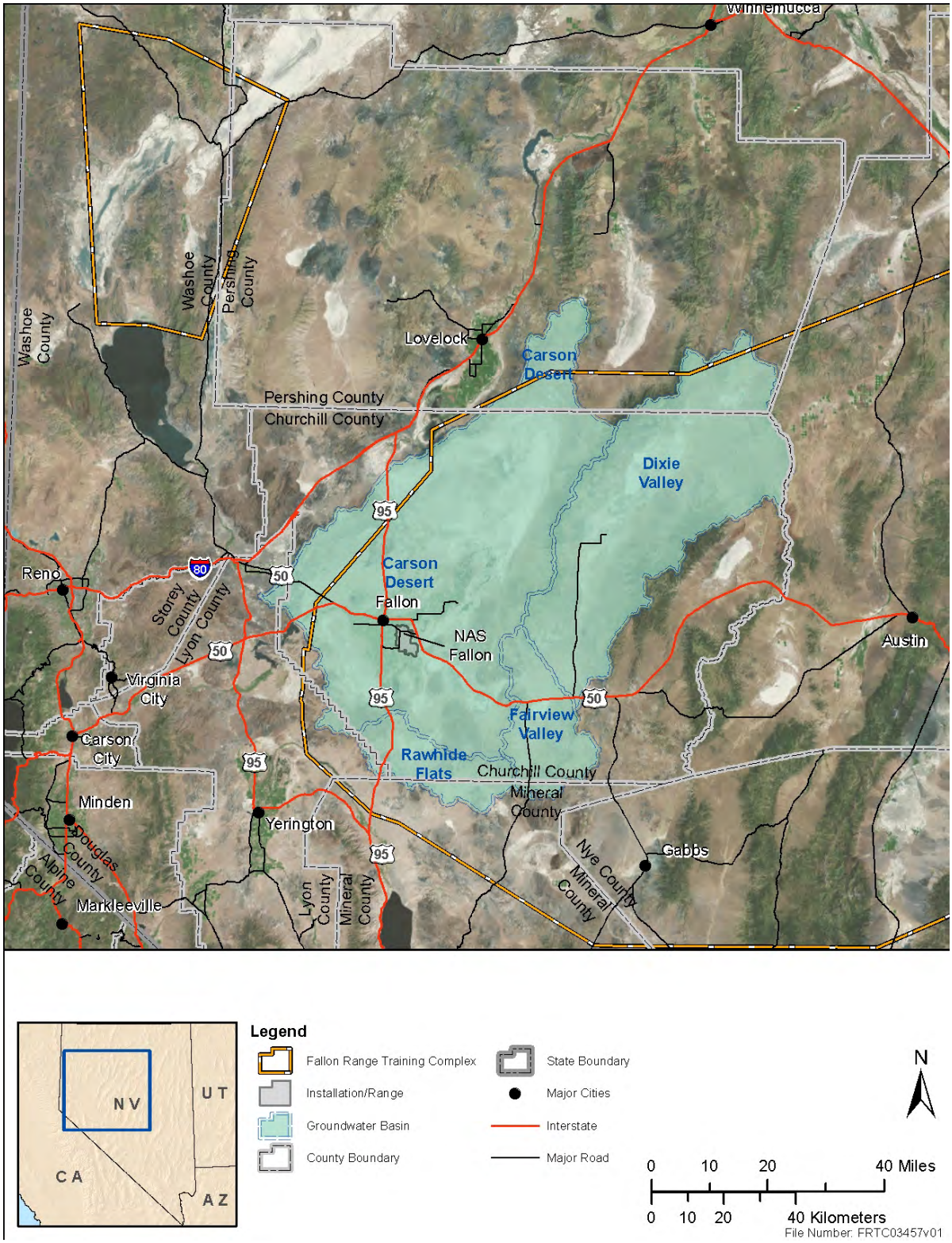


Figure 3.3-2: Regional Groundwater Basins

NAS Fallon was addressing the same water quality compliance issues as the City of Fallon at the same time due to a notice of violation and administrative order it received in September 2000 from the U.S. Environmental Protection Agency. Through independent evaluations, the City of Fallon and NAS Fallon chose similar water treatment technologies. Eventually, a single treatment plant was constructed to remove arsenic from both sources of supply. This decision was guided by anticipated economies of scale, particularly in the operational costs.

The drinking water standard for uranium in water is 30 micrograms per liter. Groundwater sampling surveys in Lahontan Valley found that 11 of 63 (17 percent) private domestic wells that were more than 50 ft. (15 m) deep had alpha radioactivity that exceeded the federal drinking water standard (University of Nevada Cooperative Extension 2011). In Nevada, communities that pump groundwater for public water supply treat the water to remove radioactivity and other contaminants.

3.3.2.2.3 Navy Properties

Training ranges B-16 and B-20 are in Carson Desert hydrographic basin, the terminal sub-basin of the larger Carson River basin. This sub-basin is commonly called the Lahontan Valley basin. Runoff in Lahontan Valley eventually reaches wetlands at Carson Lake, Stillwater National Wildlife Refuge, and Carson Sink. No ponds, streams, or other permanent surface waters occur in B-20, and no intermittent streams have been identified (U.S. Department of the Navy 1998). Springs, where they occur, are found in bedrock outcrops, near fault zones, and in areas with high water tables.

Bravo-16

Training range B-16 is a 17,280-acre (ac.) (6,993-hectare [ha]) property (U.S. Department of the Navy 1998) west of Carson Lake and immediately south of Sheckler Reservoir in the southwestern portion of Carson Desert hydrographic basin. Several major ephemeral stream channels converge northwest of B-16 and cross the training area as they flow to Carson Lake (U.S. Department of the Navy 2013). The training area contains alluvial fans, valley bottoms, alkali flats, sand dunes, and segments of three major irrigation canals. No perennial springs or streams are located in this area. During wet years, water may pond seasonally in low areas (U.S. Department of the Navy 2001).

No wells have been identified within B-16. The nearest wells are two stock wells less than 0.5 mi. (0.8 km) south of B-16 (U.S. Department of the Navy 2013). No potable water aquifers lie under B-16.

Bravo-20

Training range B-20 is a 41,006 ac. (16,595 ha) property (U.S. Department of the Navy 1998) in the central portion of Carson Desert hydrographic basin. No ponds, streams, or other permanent surface waters occur in B-20, and no intermittent streams have been identified (U.S. Department of the Navy 1998). The nearest surface waters are the lakes in Stillwater National Wildlife Refuge approximately 10 mi. (16 km) southwest of B-20.

The playa soils that cover most of B-20 are generally clayey, with very poor natural drainage and very slow infiltration (U.S. Department of the Navy 1998). Groundwater underlying B-20 is part of the shallow alluvial aquifer, a discontinuous hydrogeologic unit created by constantly shifting deposition. Recharge areas for this aquifer are mostly near the City of Fallon and consist primarily of seepage from irrigation, drains, and delivery canals. The direction of groundwater flow in the shallow aquifer is toward the northeast, with the depth to groundwater generally decreasing. The primary points of discharge for this aquifer are Stillwater National Wildlife Refuge and Carson Sink.

No wells have been drilled in B-20, but the water table is known to be shallow, generally about 3 ft. (1 m) below the surface, and the water is very saline due to the high evaporation rate (U.S. Department of the Navy 1998). Shallow groundwater in B-20 was sampled in December 1997; water collecting in bomb craters (approximately 3 ft. [1 m] below grade) was tested for inorganic and soluble constituents and for volatile organic compounds. Concentrations of most constituents were below laboratory detection levels. Concentrations of arsenic, pH, Total Dissolved Solids, chloride, sulfate, surfactants, and color, however, exceeded water quality standards (U.S. Department of the Navy 1998). Shallow groundwater on B-20 is deemed to be representative of shallow groundwater on other FRTC ground ranges because climate and soil conditions in these other areas are similar to those on B-20.

No flood hazard zone has been mapped for B-20, but flooding probably occurs periodically along the washes in this area. Ponded surface water may occur in B-20 during high runoff and flood events. During the wet years of 1982–1984, Carson Sink was inundated and most of the lands between Lovelock and Fallon, including B-20, were covered by water.

3.3.2.3 Central Region Hydrographic Basin

Central Region hydrographic basin has a surface area of approximately 46,783 mi.^{2} (121,167 km^2) spanning 13 Nevada counties. No major urban or industrial lands lie within this sparsely settled basin. Central Region hydrographic basin is bounded by Carson River Basin and Walker River Basin to the west, Humboldt River Basin to the north, Great Salt Lake Basin and Colorado River Basin to the east, and Death Valley Basin to the southwest.

3.3.2.3.1 Surface Waters

Central Region hydrographic basin consists of several small, isolated watersheds. Horse Creek in the upper Dixie Valley watershed is a perennial stream. No other surface water flows are found in this region. Ground ranges within the Study Area are located in the Rawhide, Stingaree, Fairview, and Dixie Valley watersheds.

3.3.2.3.2 Groundwater

Rawhide Flats Watershed

The 227 mi.^{2} (588 km^2) Rawhide Flats watershed is south of NAS Fallon adjacent to the Dead Camel Mountains. Current uses of groundwater in this watershed are domestic water and stock watering. Shallow groundwater lies at depths of 6–15 ft. (1.8–4.6 m). Potable groundwater is located at depths of 500–600 ft. (152–183 m), with an estimated annual yield of 500 ac.-ft.

Stingaree Watershed

The 43 mi.^{2} (111 km^2) Stingaree watershed is about 28 mi. (45 km) southeast of NAS Fallon. This small watershed was the site of a Cold War-era underground nuclear bomb test that contaminated the groundwater with radioactive materials. Shallow groundwater lies at depths of about 90–400 ft. (27–122 m). A deeper aquifer is located at depths of 900–1,100 ft. (274–335 m). Several wells have been installed in the valley to monitor groundwater radioactivity resulting from the nuclear test. There also is one natural spring in the valley. No beneficial uses of this groundwater are possible.

Fairview Valley Watershed

The 285 mi.^{2} (738 km^2) Fairview watershed is southeast of NAS Fallon. The Fairview Valley groundwater basin is a sub-basin of the Dixie Valley basin. The Fairview Valley watershed is separated from Dixie Valley by a low topographic divide. Current uses of groundwater in this watershed are stock watering,

mining, geothermal energy, and municipal and domestic water supply. Shallow groundwater is located at a depth of about 12 ft. (3.7 m). Potable groundwater is located at depths of about 300–1,400 ft. (91–427 m). The Navy owns one of four permitted wells in this watershed.

Dixie Valley Watershed

Current uses of groundwater in the 1,303 mi.^{2} (3,375 km^2) Dixie Valley watershed are industrial, irrigation, municipal, stock watering, geothermal, and wildlife. The Terra-Gen Dixie Valley Power Plant is the largest producer of geothermal energy in Nevada. Groundwater in this watershed is located at depths of < 50 ft. to about 500 ft. (< 15 m to about 152 m). Numerous thermal springs and wells are in Dixie Valley. Artesian wells are common. Dixie Valley has hydrological connections to Fairview and Stingaree Valleys. Dixie Valley has recently been identified as a candidate for water exports to the Carson Desert basin. The Navy owns 29 of 38 permitted wells in this watershed.

3.3.2.3.3 Navy Properties

Bravo-17

Training range B-17 is a 21,400 ac. (8,660 ha) property (U.S. Department of the Navy 1998) at the lower end of Fairview Valley groundwater basin. No perennial water bodies are on B-17, but water has been observed to pond within the range during wet years (U.S. Department of the Navy 2000).

Bravo-19

Training range B-19 is a 17,332 ac. (7,014 ha) property (U.S. Department of the Navy 1998) in the Rawhide Flats basin, the terminal basin of the Rawhide Flats watershed. No perennial water bodies are in B-19. However, water has been observed to pond within the range during wet years (U.S. Department of the Navy 2000).

Dixie Valley Training Area

The 68,437 ac. (27,695 ha) Dixie Valley Training Area (DVTA) is in the Dixie Valley watershed southeast of NAS Fallon. Navy lands in northern Dixie Valley are about 8 mi. (13 km) north of Humboldt Salt Marsh, a playa lake where Dixie Valley drainages terminate. Navy lands are near the junction of Shoshone Creek and Spring Creek, the principal ephemeral drainages in the area. Several manmade ponds are on Navy training lands. Several wells are in the area (U.S. Department of the Navy 2000).

Shoal Site

The 2,650 ac. (1,072 ha) Shoal Site is in the Stingaree Valley watershed southeast of NAS Fallon. The 1999 agreement withdrawing the site for Navy use prohibits the drilling of new wells on the property. The Proposed Action does not include military munitions use or ground-disturbing activities at the Shoal Site that could affect surface water or groundwater quality. Therefore, the Shoal Site is not discussed further in this section.

3.3.3 ENVIRONMENTAL CONSEQUENCES

This section evaluates how and to what degree the activities described in Chapter 2 (Description of Proposed Action and Alternatives) could impact water quality within the Study Area. The analysis focuses on potential impacts and overall changes as they relate to water quality associated with implementation of all current and proposed military readiness activities. Table 2-4 presents the baseline and proposed training activities for each alternative. Each stressor is introduced and analyzed by alternative. Table 3.0-1 shows the warfare areas and associated stressors that were considered for

analysis. The stressors vary in intensity, frequency, duration, and location within the Study Area. The following primary stressors are applicable to water quality in the Study Area and are analyzed:

- Potential Release of Contaminants
- Physical Disturbance

3.3.3.1 No Action Alternative

3.3.3.1.1 Potential Release of Contaminants

Military Munitions

Bravo-16

Various types of training munitions would continue to be expended at B-16 under the No Action Alternative, including nonexplosive practice bombs, rifle and smoke grenades, and small- and medium-caliber projectiles. Practice bombs consist of a steel or iron bomb body; some are cement-filled. A signal cartridge or spotting charge may be used with nonexplosive practice bombs, such as the smaller practice bombs (MK-76). Signal cartridges may contain either 0.4 ounce (oz.) (11.3 grams [g]) of red phosphorus or 0.7 oz. (19.8 g) of titanium tetrachloride. Spotting charges, used with the larger cement-filled bombs (MK-82, MK-83, and MK-84), typically contain 1.5 oz. (42.5 g) of titanium tetrachloride. Most of the constituents of the signal cartridge or spotting charge are consumed upon its activation. A few signal cartridges and spotting charges will fail to function as intended and thus will result in some accumulation of raw pyrotechnic materials (e.g., red phosphorus, titanium tetrachloride) on the range. Small- and medium-caliber projectiles primarily consist of steel or a lead core within a copper jacket. The empty cartridges typically consist of brass. Spent small- and medium-caliber projectiles would not be removed and would accumulate in soils.

Under the No Action Alternative, an estimated 105 tons (95,254 kilograms [kg]) per year of military munitions would be expended on B-16 (Table 3.3-1). Approximately 75 percent of these materials, consisting of nonexplosive practice bombs, would be removed during periodic range clearances. The remaining 25 percent consisting of small arms, grenades, and smoke canisters would not be removed during periodic range clearances and would accumulate near targets on the range.

Table 3.3-1: Military Munitions Expended on Bravo-16

Munitions Type	Munitions Quantities (tons/year) by Alternative		
	No Action	1	2
Inert/Practice Bombs	79	79	86
Grenades	11	23	25
Small- and Medium-Caliber Rounds	15	29	32
TOTAL	**105**	**131**	**143**
Increase (%) over No Action	**n/a**	**25**	**37**

Note: n/a = not applicable

Bombs would be removed at regular intervals in accordance with the operational range clearance plan (see Section 3.1.1.2.2.2, Operational Range Clearance), so migration of metals from these items into surface soils would be minimal. Deposition of raw pyrotechnic materials from spotting charges that

failed to function as intended would be limited because most of these materials would remain within the bomb, cartridge, or canister casing and would be recovered with the item.

Surface Waters

Surface runoff from rainfall events is one possible mechanism for transporting contaminants from expended military munitions into local surface waters., However, only very small quantities of these materials would be deposited on the ranges, and surface water flows on the range are rare and of short duration. Ponded water remains on the range, and thus would not transport dissolved metals or other contaminants off the range. Accordingly, the potential for military munitions expended on B-16 to affect surface water quality under the No Action Alternative is negligible.

Groundwater

The fate and transport of metals in soil from accumulations of projectiles, cartridges, and their fragments is a concern for groundwater, with lead being the primary constituent of concern because of its toxicity and its ability to persist in the environment (U.S. Army Environmental Center 1998). The risk of lead migrating to groundwater on B-16 is limited.

Lead will be relatively immobile in surface soils because the pH of the soils is generally neutral to mildly alkaline (pH 7–9) and annual precipitation is limited (about 5 inches per year [13 centimeters]). Elevated concentrations would likely be limited to surface soils in the immediate areas of projectile impact (see Section 3.1.3.1.1, Potential Release of Contaminants). Lead precipitates out of solution and binds to the soil within the pH range of the soils on the FRTC ranges (see Section 3.1.3.1.1, Potential Release of Contaminants, for a detailed discussion of lead transport and fate in desert soils).

The potential for groundwater contamination on B-16 would continue to be evaluated through the Range Sustainability Environmental Program Assessment process and during 5-year range condition assessment updates. Continued implementation of the operational range clearance plan would also substantially reduce potential impacts on groundwater. Accordingly, the potential for military munitions expended on B-16 to affect groundwater quality under the No Action Alternative is negligible.

Bravo-17

Various types of training munitions would continue to be expended at B-17 under the No Action Alternative, including nonexplosive practice bombs, live bombs, missiles and rockets, and small- and medium-caliber projectiles. The fate of contaminants from practice bombs and small arms on the environment of B-17 is as described for B-16.

Under the No Action Alternative, an estimated 1,286 tons per year of military munitions would be expended on B-17 (Table 3.3-2). Approximately 99 percent of these materials, consisting of live bombs and nonexplosive practice bombs, would be removed during periodic range clearances. The remaining 1 percent consisting of other munitions would not be removed during periodic range clearances and would accumulate near targets on the range.

Live bombs generally consist of a steel casing filled with an explosive such as tritonal (80 percent trinitrotoluene and 20 percent aluminum powder). Most of the explosive filler is consumed by high-order detonation upon impact. However, approximately 5 percent of munitions fail to function properly (Rand Corporation 2005), resulting in some deposition of raw explosives on the range. Guided bombs also include aluminum fins.

Table 3.3-2: Military Munitions Expended on Bravo-17

Munitions Type	Munitions Quantities (tons/year) by Alternative		
	No Action	1	2
Inert/Practice Bombs	525	525	577
Live Bombs	745	741	815
Missiles	1	2	2
Rockets	6	15	16
Small- and Medium-Caliber Rounds	9	10	11
TOTAL	**1,286**	**1,292**	**1,421**
Increase (%) over No Action	**n/a**	**0.5**	**10**

Note: n/a = not applicable

Missiles and rockets typically include a rocket motor, consisting of a casing filled with propellant, and a warhead, consisting of a casing filled with an explosive. Fixed- or folding-fin assemblies, electronic guidance systems, and batteries (e.g., thermal batteries) also may be included. Propellants, explosives, and thermal battery constituents are intended to be consumed during proper functioning of the item. However, approximately 4 percent of missiles and rockets fail to function properly (Rand Corporation 2005), resulting in some deposition of raw propellants, explosives, or battery constituents on the range.

Missiles and rockets and associated scrap would be removed at regular intervals in accordance with the operational range clearance plan (see Section 3.1.1.2.2.2, Operational Range Clearance), so migration of metals from these items into surface soils would be minimal. Deposition of raw propellants, explosives, and battery contents from missiles and rockets that failed to function as intended also would be limited because most of these materials would remain within the item and would be recovered with it. In a small number of instances, nonfunctioning munitions could break apart on impact and its contents scatter on the surface of the ground.

Surface Waters

The potential for expended military munitions used in training on B-17 to affect surface water quality under the No Action Alternative is low because only very small quantities of these materials would be deposited on the ranges, contaminants would only be mobile when exposed to surface flows of water, and surface water flows on the range are rare and of short duration. In wet years, ponded water would remain on the site and would not transport dissolved metals or other contaminants off the range. Accordingly, the potential for military munitions expended on B-17 to affect surface water quality under the No Action Alternative is negligible.

Groundwater

The fate and transport of metals in soil from accumulations of small arms is as described for B-16. The potential for groundwater contamination on B-17 would continue to be evaluated through the Range Sustainability Environmental Program assessment process and during 5-year range condition assessment updates. Continued implementation of the operational range clearance plan would also substantially reduce potential impacts on groundwater. Accordingly, the potential for military munitions expended on B-17 to affect groundwater quality under the No Action Alternative is negligible.

Bravo-19

Various types of training munitions would continue to be expended at B-19 under the No Action Alternative, including nonexplosive practice bombs, live bombs, grenades, mortars, missiles and rockets, and small- and medium-caliber projectiles. The fate of practice bombs, grenades, and small arms deposited on B-19 is as described for B-16. The fate of live bombs and of missiles and rockets is as described for B-17.

Mortar rounds typically include a casing, an explosive filler, and a fuse. The explosive filler is intended to be consumed during proper functioning of the item. However, a small percentage of mortars fail to function properly, resulting in some deposition of raw explosives on the range.

Under the No Action Alternative, an estimated 322 tons per year of military munitions would be expended on B-19 (Table 3.3-3). Approximately 93 percent of these materials, consisting of live bombs and nonexplosive practice bombs, would be removed during periodic range clearances. The approximately 7 percent consisting of small arms and other munitions would not be removed during periodic range clearances and would accumulate near targets on the range.

Table 3.3-3: Military Munitions Expended on Bravo-19

Munitions Type	Munitions Quantities (tons/year) by Alternative		
	No Action	1	2
Inert/Practice Bombs	96	96	107
Live Bombs	204	203	222
Grenades	0	0	0
Mortars	5	5	6
Missiles	1	1	1
Rockets	4	7	8
Small- and Medium-Caliber Rounds	12	12	14
TOTAL	**322**	**324**	**357**
Increase (%) over No Action	**n/a**	**1**	**11**

Note: n/a = not applicable

Mortar rounds and associated scrap would be removed at regular intervals in accordance with the operational range clearance plan (see Section 3.1.1.2.2.2, Operational Range Clearance), so migration of metals from these items into surface soils would be minimal. Deposition of raw propellants, explosives, and battery contents from mortars that fail to function as intended also would be limited because most of these materials would remain within the item and would be recovered with it. In a small number of instances, nonfunctioning munitions could break apart on impact and its contents scatter on the surface of the ground.

Surface Waters

The potential for expended military munitions used in training on B-19 to affect surface water quality under the No Action Alternative is low because only very small quantities of these materials would be deposited on the ranges, contaminants would only be mobile when exposed to surface flows of water, and because surface water flows on the range are rare and of short duration. In wet years, ponded water would remain on the site and thus would not transport dissolved metals or other contaminants

off the range. Accordingly, the potential for military munitions expended on B-19 to affect surface water quality under the No Action Alternative is negligible.

Groundwater

The fate and transport of metals in soil from accumulations of small arms is as described for B-16. The potential for groundwater contamination on B-19 would continue to be evaluated through the Range Sustainability Environmental Program assessment process and during 5-year range condition assessment updates. Continued implementation of the operational range clearance plan would also substantially reduce potential impacts on groundwater. Accordingly, the potential for military munitions expended on B-19 to affect groundwater quality under the No Action Alternative is negligible.

Bravo-20

Various types of training munitions would continue to be expended on B-20 under the No Action Alternative, including nonexplosive practice bombs, live bombs, missiles and rockets, and small- and medium-caliber projectiles. The fate of practice bombs and small arms deposited on B-20 is as described for B-16. The fate of live bombs and of missiles and rockets is as described for B-17.

Under the No Action Alternative, an estimated 369 tons per year of military munitions would be expended on B-20 (Table 3.3-4). Approximately 99 percent of these materials, consisting of live bombs and nonexplosive practice bombs, would be removed during periodic range clearances. The remaining 1 percent consisting of small arms would not be removed during periodic range clearances and would accumulate near targets on the range.

Table 3.3-4: Military Munitions Expended on Bravo-20

Munitions Type	Munitions Quantities (tons/year) by Alternative		
	No Action	1	2
Inert/Practice Bombs	104	104	115
Live Bombs	261	258	282
Missiles	0	0	1
Rockets	1	4	5
Small- and Medium-Caliber Rounds	3	3	4
TOTAL	**369**	**369**	**406**
Increase (%) over No Action	**n/a**	**0**	**10**

Note: n/a = not applicable

Surface Waters

The potential for expended military munitions used in training on B-20 to affect surface water quality under the No Action Alternative is low because only very small quantities of these materials would be deposited on the ranges, contaminants would only be mobile when exposed to surface flows of water, and because surface water flows on the range are rare and of short duration. In wet years, ponded water would remain on the site and would not transport dissolved metals or other contaminants off the range. Accordingly, the potential for military munitions expended on B-20 to affect surface water quality under the No Action Alternative is negligible.

Groundwater

The fate and transport of metals in soil from accumulations of small arms is as described for B-16. The potential for groundwater contamination on B-20 would continue to be evaluated through the Range Sustainability Environmental Program assessment process and during 5-year range condition assessment updates. Continued implementation of the operational range clearance plan would also substantially reduce potential impacts on groundwater. Accordingly, the potential for military munitions expended on B-20 to affect groundwater quality under the No Action Alternative is negligible.

Dixie Valley Training Area

Various types of training munitions would continue to be expended on the DVTA under the No Action Alternative, including inert grenades and small-caliber projectiles. Under the No Action Alternative, an estimated five tons per year of military munitions would be expended on DVTA (Table 3.3-5). These materials would be removed during periodic range clearances. The fate of grenades and small arms deposited on the DVTA is as described for B-16.

Table 3.3-5: Military Munitions Expended on Dixie Valley Training Area

Munitions Type	Munitions Quantities (tons/year) by Alternative		
	No Action	1	2
Grenades	2	5	5
Small-, Medium-, and Large-Caliber Rounds	3	6	6
TOTAL	**5**	**10**	**11**
Increase (%) over No Action	**n/a**	**100**	**120**

Note: n/a = not applicable

Surface Waters

The potential for expended military munitions used in training to affect surface waters quality on DVTA under the No Action Alternative is low because only very small quantities of these materials would be deposited, contaminants would only be mobile when exposed to surface flows of water, and because surface water flows on the range are rare and of short duration. In wet years, ponded water will remain on the site and would not transport dissolved metals or other contaminants off DVTA. Ponds in the DVTA would not be affected because these areas are avoided during training. Accordingly, the potential for military munitions expended on DVTA to affect surface water quality under the No Action Alternative is negligible.

Groundwater

The fate and transport of metals in soil from accumulations of small arms is as described for B-16. Accordingly, the potential for military munitions expended on DVTA to affect groundwater quality under the No Action Alternative is negligible.

Summary of Impacts – No Action Alternative

Under the No Action Alternative, military training activities would result in an expenditure of an estimated 2,091 tons per year of military munitions on FRTC ranges (Table 3.3-6). Of these materials, 61 percent would be deposited on B-17, 18 percent on B-20, 15 percent on B-19, 5 percent on B-16, and negligible amounts on the DVTA. In no instance would military munitions have a significant impact on surface water or groundwater quality under the No Action Alternative.

Table 3.3-6: Total Military Munitions Expended on the Fallon Range Training Complex

Range	Munitions Quantities (tons/year) by Alternative		
	No Action	1	2
B-16	105	131	143
B-17	1,286	1,292	1,421
B-19	326	324	357
B-20	369	369	406
Dixie Valley Training Area	5	10	11
TOTAL	**2,091**	**2,127**	**2,340**
Increase (%) over No Action	**n/a**	**2**	**12**

Note: n/a = not applicable

Incidental Spills

Surface Waters

Fuel, oil, and lubricants would be present in small quantities on the ranges in ground vehicles that support training activities. Fuel also may be present in larger quantities in fuel trucks or portable fuel pods used on the ranges. Wherever petroleum products are stored, transferred, or otherwise handled, small spills may occur as a result of human error or failure of mechanical devices or materials.

The risk to surface waters from an incidental spill is a function of both probability and magnitude. The potential for incidental spills of petroleum products or hazardous materials to affect surface water quality on the FRTC under the No Action Alternative is negligible because only small quantities of these materials are present on the ranges, and current requirements and practices minimize the probability of a spill.

Groundwater

The risk to surface waters from an incidental spill is a function of both probability and magnitude. The effects of incidental spills of petroleum products or hazardous materials on groundwater under the No Action Alternative would be negligible. The quantities of these materials present on FRTC are small, and current requirements and practices minimize the probability of a spill. The potential for a spill to reach groundwater, if one were to occur, is low because of the response procedures in place and because of the small quantities of materials that would be involved. Incidental spills would have no significant impact on groundwater quality under the No Action Alternative.

3.3.3.1.2 Physical Disturbance (Soil Disturbance and Compaction)

Munitions deliveries would disturb small areas of the surface at the point of impact. Ground vehicles would be used on B-16 (ground mobility), B-17 (dismounted fire and mobility), and DVTA (convoy operations, ground mobility, ground maneuver). In addition, ground vehicles would be used by explosive ordnance disposal (EOD) teams when conducting operational range clearance activities. Nevada Army National Guard activities at the small arms range in B-19 also would disturb small areas of the ground surface. These activities can disturb or compact soils, thus increasing runoff intensity and sediment loads in local watercourses. The potential for these activities to substantially affect surface water quality is negligible, however, because the areas of disturbance would be small, disturbance events would be infrequent, and intense rainfall capable of generating substantial surface flows is very infrequent.

3.3.3.2 Alternative 1

3.3.3.2.1 Potential Release of Contaminants

Military Munitions

Bravo-16

Under Alternative 1, an estimated 131 tons per year of military munitions (nonexplosive practice bombs, rifle and smoke grenades, and small- and medium-caliber projectiles) would be expended materials on B-16, an increase of approximately 25 percent over the No Action Alternative (see Table 3.3-1). Approximately 60 percent of these materials, consisting of nonexplosive practice bombs, would be removed during periodic range clearances. The remaining 40 percent consisting of small arms, grenades, and smoke canisters would not be removed during periodic range clearances and would accumulate near targets on the range. The fate of these items on B-16 would be as described under the No Action Alternative.

Surface Waters

The potential for military munitions expended on B-16 to affect surface water quality under Alternative 1 would be low because only very small quantities of these materials would be deposited on the ranges, contaminants would only be mobile when exposed to surface flows of water, and because surface water flows on the range are rare and of short duration. In wet years, ponded water would remain on the range and would not transport dissolved metals or other contaminants off the range. The potential release of contaminants from expended military munitions would have no significant impact on surface water quality on B-16 under Alternative 1.

Groundwater

The risk that metals or other constituents of military munitions would migrate into groundwater would be low because only very small quantities of these materials would be deposited on the ranges and because these materials generally are relatively immobile in soils. The potential for groundwater contamination on B-16 would continue to be evaluated through the Range Sustainability Environmental Program assessment process and during 5-year range condition assessment updates. Continued implementation of the operational range clearance plan would also substantially reduce potential impacts on groundwater. The potential release of contaminants from expended military munitions would have no significant impact on groundwater quality on B-16 under Alternative 1.

Bravo-17

Under Alternative 1, an estimated 1,292 tons per year of military munitions (nonexplosive practice bombs, live bombs, missiles and rockets, and small- and medium-caliber projectiles) would be expended on B-17, a negligible increase over the No Action Alternative (see Table 3.3-2). Approximately 99 percent of these materials, consisting of live bombs, nonexplosive practice bombs, missiles, and rockets, would be removed during periodic range clearances. The remaining 1 percent of materials consisting of other munitions would not be removed during periodic range clearances and would accumulate near targets on the range. The fate of these materials expended on B-17 would be as described under the No Action Alternative.

Surface Waters

The potential for military munitions expended on B-17 to affect surface water quality under Alternative 1 would be low because only very small quantities of these materials would be deposited on the ranges, contaminants would only be mobile when exposed to surface flows of water, and because surface water

flows on the range are rare and of short duration. In wet years, ponded water would remain on the site and would not transport dissolved metals or other contaminants off the range. The potential release of contaminants from expended military munitions would have no significant impact on surface water quality on B-17 under Alternative 1.

Groundwater

The risk that metals or other constituents of military munitions would migrate into groundwater would be low because only very small quantities of these materials would be deposited on the ranges and because these materials generally are relatively immobile in soils. The potential for groundwater contamination on B-17 would continue to be evaluated through the Range Sustainability Environmental Program assessment process and during 5-year range condition assessment updates. Continued implementation of the operational range clearance plan would also substantially reduce potential impacts on groundwater. The potential release of contaminants from expended military munitions would have no significant impact on groundwater quality on B-17 under Alternative 1.

Bravo-19

Under Alternative 1, an estimated 324 tons per year of military munitions (nonexplosive practice bombs, live bombs, grenades, mortars, missiles and rockets, and small- and medium-caliber projectiles) would be expended on B-19, an increase of approximately 1 percent over the No Action Alternative (see Table 3.3-3). Approximately 96 percent of these materials, consisting of live and nonexplosive practice bombs, mortars, missiles, and rockets, would be removed during periodic range clearances. The remaining 4 percent consisting of small arms and other munitions would not be removed during periodic range clearances and would accumulate near targets on the range. The fate of these materials expended on B-19 would be as described under the No Action Alternative.

Surface Waters

The potential for military munitions expended on B-19 to affect surface water quality under Alternative 1 would be low because only very small quantities of these materials would be deposited on the ranges, contaminants would only be mobile when exposed to surface flows of water, and because surface water flows on the range are rare and of short duration. In wet years, ponded water would remain on the site and would not transport dissolved metals or other contaminants off the range. The potential release of contaminants from expended military munitions would have no significant impact on surface water quality on B-19 under Alternative 1.

Groundwater

The risk that metals or other constituents of military munitions would migrate into groundwater would be low because only very small quantities of these materials would be deposited on the ranges and because these materials generally are relatively immobile in soils. The potential for groundwater contamination on B-19 would continue to be evaluated through the Range Sustainability Environmental Program assessment process and during 5-year range condition assessment updates. Continued implementation of the operational range clearance plan would also substantially reduce potential impacts on groundwater. The potential release of contaminants from expended military munitions would have no significant impact on groundwater quality on B-19 under Alternative 1.

Bravo-20

Under Alternative 1, an estimated 369 tons per year of military munitions would be expended on B-20, the same amount as the No Action Alternative (see Table 3.3-4). Approximately 99 percent of these

materials, consisting of live and nonexplosive practice bombs, missiles, and rockets, would be removed during periodic range clearances. The remaining 1 percent consisting of small arms would not be removed during periodic range clearances and would accumulate near targets on the range. The fate of these materials expended on B-20 would be as described under the No Action Alternative.

Surface Waters

The potential for military munitions expended on B-20 to affect surface water quality under Alternative 1 would be low because only very small quantities of these materials would be deposited on the ranges, contaminants would only be mobile when exposed to surface flows of water, and surface water flows on the range are rare and of short duration. In wet years, ponded water would remain on the site and would not transport dissolved metals or other contaminants off the range. The potential release of contaminants from expended military munitions would have no significant impact on surface water quality on B-20 under Alternative 1.

Groundwater

The risk that metals or other constituents of military munitions would migrate into groundwater would be low because only very small quantities of these materials would be deposited on the ranges and because these materials generally are relatively immobile in soils. The potential for groundwater contamination on B-20 would continue to be evaluated through the Range Sustainability Environmental Program assessment process and during 5-year range condition assessment updates. Continued implementation of the operational range clearance plan would also substantially reduce potential impacts on groundwater. The potential release of contaminants from expended military munitions would have no significant impact on groundwater quality on B-20 under Alternative 1.

Dixie Valley Training Area

Under Alternative 1, an estimated 10 tons per year of military munitions (grenades and small-caliber projectiles) would be expended on DVTA, a 100 percent increase over the No Action Alternative (see Table 3.3-5). None of these materials would be removed during periodic range clearances. The fate of these materials expended on DVTA would be as described under the No Action Alternative.

Surface Waters

The potential for military munitions to affect surface water quality on DVTA under Alternative 1 would be low because only very small quantities of these materials would be deposited on the ranges, contaminants would only be mobile when exposed to surface flows of water, and surface water flows on the range are rare and of short duration. In wet years, ponded water would remain on the site and would not transport dissolved metals or other contaminants off the range. The potential release of contaminants from expended military munitions would have no significant impact on surface water quality on DVTA under Alternative 1.

Groundwater

The risk that metals or other constituents of military munitions would migrate into groundwater would be low because only very small quantities of these materials would be deposited on the ranges and because these materials generally are relatively immobile in soils. The potential release of contaminants from expended military munitions would have no significant impact on groundwater quality on DVTA under Alternative 1.

Summary of Impacts – Alternative 1

Under Alternative 1, military training activities would result in expenditure of an estimated 2,127 tons per year of military munitions on FRTC ranges, an increase of approximately 2 percent over the No Action Alternative (see Table 3.3-6). Of these materials, 61 percent would be expended on B-17, 17 percent on B-20, 15 percent on B-19, 6 percent on B-16, and negligible amounts on DVTA. In no instance would military munitions have a significant impact on surface water or groundwater quality under Alternative 1.

Incidental Spills

The potential for incidental spills to occur would increase under Alternative 1, primarily from refueling during training activities. All refueling of vehicles would be conducted in designated secondary containment areas. All refueling would comply with applicable state and federal regulations. Some hazardous materials (e.g., lubricants, antifreeze) would be used to maintain military vehicles during training. Drip pads would be placed under all military vehicles when parked on a ground range. The Navy would prepare and implement a spill prevention, control, and countermeasures plan if quantities of fuel or other petroleum products above the spill prevention, containment, and countermeasures quantity thresholds were stored on the FRTC or a fuel truck were parked on the FRTC. Any spills would be managed and cleaned up in accordance with applicable state and federal regulatory requirements.

3.3.3.2.2 Physical Disturbance (Soil Disturbance and Compaction)

Increased levels of munitions deliveries would disturb small areas of the surface at the point of impact. Ground vehicles would be used more frequently on B-16 (ground mobility), B-17 (dismounted fire and mobility), and DVTA (convoy operations, ground mobility, ground maneuver). In addition, ground vehicles would be used more frequently by EOD teams during operational range clearance activities. Nevada Army National Guard activities at the small arms range in B-19 also would continue to disturb small areas of the ground surface. These activities can disturb or compact soils, thus increasing runoff intensity and sediment loads in local watercourses. The potential for these activities to substantially affect surface water quality is low, however, because the areas of disturbance would be small, disturbance events would be infrequent, and intense rainfall capable of generating substantial surface flows are very infrequent.

3.3.3.3 Alternative 2 (Preferred Alternative)

3.3.3.3.1 Potential Release of Contaminants

Military Munitions

Bravo-16

Under Alternative 2, an estimated 143 tons per year of military munitions (nonexplosive practice bombs, rifle and smoke grenades, and small- and medium-caliber projectiles) would be expended on B-16, an increase of approximately 37 percent over the No Action Alternative (see Table 3.3-1). Approximately 60 percent of these materials, consisting of nonexplosive practice bombs, would be removed during periodic range clearances. The remaining 40 percent consisting of small arms, grenades, and smoke canisters would not be removed during periodic range clearances and would accumulate on the range. The fate of these items on B-16 would be as described under the No Action Alternative.

Surface Waters

The potential for military munitions expended on B-16 to affect surface water quality under Alternative 2 would be low because only very small quantities of these materials would be deposited on the ranges,

contaminants would only be mobile when exposed to surface flows of water, and because surface water flows on the range are rare and of short duration. In wet years, ponded water would remain on the range and would not transport dissolved metals or other contaminants off the range. The potential release of contaminants from expended military munitions would have no significant impact on surface water quality on B-16 under Alternative 2.

Groundwater

The risk that metals or other constituents of military munitions would migrate into groundwater would be low because only very small quantities of these materials would be deposited on the ranges and because these materials generally are relatively immobile in soils. The potential for groundwater contamination on B-16 would continue to be evaluated through the Range Sustainability Environmental Program assessment process and during 5-year range condition assessment updates. Continued implementation of the operational range clearance plan would also substantially reduce potential impacts on groundwater. The potential release of contaminants from expended military munitions would have no significant impact on groundwater quality on B-16 under Alternative 2.

Bravo-17

Under Alternative 2, an estimated 1,421 tons per year of military munitions (nonexplosive practice bombs, live bombs, missiles and rockets, and small- and medium-caliber projectiles) would be expended on B-17, an increase of approximately 10 percent over the No Action Alternative (see Table 3.3-2). Approximately 99 percent of these materials, consisting of live bombs and nonexplosive practice bombs, would be removed during periodic range clearances. The remaining 2 percent consisting of other munitions would not be removed during periodic range clearances and would accumulate near targets on the range. The fate of these items on B-17 would be as described under the No Action Alternative.

Surface Waters

The potential for military munitions expended on B-17 to affect surface water quality under Alternative 2 is low because only very small quantities of these materials would be deposited on the ranges, contaminants would only be mobile when exposed to surface flows of water, and surface water flows on the range are rare and of short duration. In wet years, ponded water would remain on the site and would not transport dissolved metals or other contaminants off the range. The potential release of contaminants from expended military munitions would have no significant impact on surface water quality on B-17 under Alternative 2.

Groundwater

The risk that metals or other constituents of military munitions would migrate into groundwater would be low because only very small quantities of these materials would be deposited on the ranges and because these materials generally are relatively immobile in soils. The potential for groundwater contamination on B-17 would continue to be evaluated through the Range Sustainability Environmental Program assessment process and during 5-year range condition assessment updates. Continued implementation of the operational range clearance plan would also substantially reduce potential impacts on groundwater. The potential release of contaminants from expended military munitions would have no significant impact on groundwater quality on B-17 under Alternative 2.

Bravo-19

Under Alternative 2, an estimated 357 tons per year of military munitions (nonexplosive practice bombs, live bombs, grenades, mortars, missiles and rockets, and small- and medium-caliber projectiles) would

be expended on B-19, an increase of approximately 11 percent over the No Action Alternative (see Table 3.3-3). Approximately 96 percent of these materials, consisting of live and nonexplosive practice bombs, mortars, missiles, and rockets, would be removed during periodic range clearances. The remaining 4 percent consisting of small arms and other munitions would not be removed during periodic range clearances and would accumulate near targets on the range. The fate of these items on B-19 would be as described under the No Action Alternative.

Surface Waters

The potential for military munitions expended on B-19 to affect surface water quality under Alternative 2 would be low because only very small quantities of these materials would be deposited on the ranges, contaminants would only be mobile when exposed to surface flows of water, and surface water flows on the range are rare and of short duration. In wet years, ponded water would remain on the site and would not transport dissolved metals or other contaminants off the range. The potential release of contaminants from expended military munitions would have no significant impact on surface water quality on B-19 under Alternative 2.

Groundwater

The risk that metals or other constituents of military munitions would migrate into groundwater would be low because only very small quantities of these materials would be deposited on the ranges and because these materials generally are relatively immobile in soils. The potential for groundwater contamination on B-19 would continue to be evaluated through the Range Sustainability Environmental Program assessment process and during 5-year range condition assessment updates. Continued implementation of the operational range clearance plan would also substantially reduce potential impacts on groundwater. The potential release of contaminants from expended military munitions would have no significant impact on groundwater quality on B-19 under Alternative 2.

Bravo-20

Under Alternative 2, an estimated 406 tons per year of military munitions (nonexplosive practice bombs, live bombs, missiles and rockets, and small- and medium-caliber projectiles) would be expended on B-20, an increase of approximately 10 percent over the No Action Alternative (see Table 3.3-4). Approximately 98 percent of these materials, consisting of live bombs and nonexplosive practice bombs, would be removed during periodic range clearances. The remaining 2 percent consisting of small arms would not be removed during periodic range clearances and would accumulate near targets on the range. The environmental fate of these items on B-20 would be as described under the No Action Alternative.

Surface Waters

The potential for military munitions expended on B-20 to affect surface water quality under Alternative 2 would be low because only very small quantities of these materials would be deposited on the ranges, contaminants would only be mobile when exposed to surface flows of water, and surface water flows on the range are rare and of short duration. In wet years, ponded water would remain on the site and would not transport dissolved metals or other contaminants off the range. The potential release of contaminants from expended military munitions would have no significant impact on surface water quality on B-20 under Alternative 2.

Groundwater

The risk that metals or other constituents of military munitions would migrate into groundwater would be low because only very small quantities of these materials would be deposited on the ranges and

because these materials generally are relatively immobile in soils. The potential for groundwater contamination on B-20 would continue to be evaluated through the Range Sustainability Environmental Program assessment process and during 5-year range condition assessment updates. Continued implementation of the operational range clearance plan would also substantially reduce potential impacts on groundwater. The potential release of contaminants from expended military munitions would have no significant impact on groundwater quality on B-20 under Alternative 2.

Dixie Valley Training Area

Under Alternative 2, an estimated 11 tons per year of military munitions (inert grenades and small-caliber blanks) would be expended on DVTA, a 120 percent increase over the No Action Alternative (see Table 3.3-5). None of these materials would be removed during periodic range clearances. The fate of these items on DVTA would be as described under the No Action Alternative.

Surface Waters

The potential for military munitions to affect surface water quality on DVTA under Alternative 2 would be low because only very small quantities of these materials would be deposited on the ranges, contaminants would only be mobile when exposed to surface flows of water, and surface water flows on the range are rare and of short duration. In wet years, ponded water would remain on the site and would not transport dissolved metals or other contaminants off the range. The potential release of contaminants from expended military munitions would have no significant impact on surface water quality on DVTA under Alternative 2.

Groundwater

The risk that metals or other constituents of military munitions would migrate into groundwater would be low because only very small quantities of these materials would be deposited on the ranges and because these materials generally are relatively immobile in soils. The potential release of contaminants from expended military munitions would have no significant impact on groundwater quality on DVTA under Alternative 2.

Summary of Impacts – Alternative 2

Under Alternative 2, an estimated 2,340 tons per year of military munitions would be expended on FRTC ranges, an increase of approximately 12 percent over the No Action Alternative (see Table 3.3-6). Of these materials, 61 percent would be deposited on B-17, 17 percent on B-20, 15 percent on B-19, 6 percent on B-16, and negligible amounts on DVTA. In no instance would military munitions have a significant impact on surface water or groundwater quality under Alternative 2.

Incidental Spills

The potential for incidental spills to occur would increase under Alternative 2, primarily from refueling activities during certain training activities. All refueling of vehicles on the ranges would be conducted in designated secondary containment areas and would comply with applicable state and federal regulations. Some hazardous materials (e.g., lubricants, antifreeze) would be used for maintenance on military vehicles during training. Drip pads would be placed under all military vehicles when parked on a ground range. The Navy would prepare a spill prevention, control, and countermeasures plan if quantities of fuel or other petroleum products above the spill prevention, containment, and countermeasures quantity thresholds were stored on FRTC ground ranges or if a fuel truck were parked on FRTC ground ranges. Any spills would be managed and cleaned up in accordance with applicable state and federal regulatory requirements.

3.3.3.3.2 Physical Disturbance (Soil Disturbance and Compaction)

Increased levels of munitions deliveries would disturb small areas of the surface at the point of impact. Ground vehicles would be used more frequently on B-16 (ground mobility), B-17 (dismounted fire and mobility), and DVTA (convoy operations, ground mobility, ground maneuver). In addition, ground vehicles would be used more frequently by EOD teams during operational range clearance activities. Nevada Army National Guard activities at the small arms range in B-19 also would continue to disturb small areas of the ground surface. These activities can disturb or compact soils, thus increasing runoff intensity and sediment loads in local watercourses. The potential for these activities to substantially affect surface water quality is low, however, because the areas of disturbance would be small, disturbance events would be infrequent, and intense rainfall capable of generating substantial surface flows are very infrequent.

3.3.3.4 Proposed Management Practices, Monitoring, and Mitigation Measures

3.3.3.4.1 Proposed Best Management Practices

The current management practices listed in Section 3.3.1.2.2 (Management Practices) would continue to be implemented under Alternatives 1 and 2, and existing programs and plans would be updated to reflect new conditions. The following best management practices would be implemented to avoid and minimize potential impacts on water quality under Alternatives 1 and 2:

- Incidental fuel spills would be avoided by conducting all refueling activities in a secondary containment area.
- Drip pads would be placed under equipment when parked to avoid soil contamination from leaking fluids.
- A spill prevention, control, and countermeasures plan would be developed if quantities of fuel or other petroleum products above the spill prevention, containment, and countermeasures quantity threshold were stored. The plan would help to ensure rapid and effective response to incidental spills and avoid contaminant migration to groundwater.
    - Any spills would be managed and cleaned up in accordance with applicable state and federal regulatory requirements. If the spill exceeded 42 gallons (159 liters) of regulated material, the event would be immediately reported.
    - The operational range clearance plan would be updated and implemented to address any new requirements for the ranges.
    - Range condition assessment 5-year reviews would continue to be conducted, and appropriate steps would be taken, if necessary, to prevent or respond to a release or substantial threat of a release of munitions constituents of potential concern to off-range areas that could pose unacceptable risks to human health or the environment.

3.3.3.4.2 Proposed Monitoring

No specific monitoring needs were identified for water quality. However, the need for groundwater sampling, analysis, or monitoring would continue to be considered during range condition assessment 5-year reviews conducted under the Navy's Range Sustainability Environmental Program assessment program.

3.3.3.4.3 Proposed Mitigation Measures

No mitigation measures are warranted for water quality based on the analysis presented in Section 3.3.3 (Environmental Consequences), implementation of current management practices, and implementation of proposed best management practices.

3.3.3.5 Summary of Effects and Conclusions

Table 3.3-7 lists each stressor analyzed for potential impacts on water quality at the FRTC. None of the alternatives would result in significant impacts on water quality.

Table 3.3-7: Summary of Impacts on Water Quality

Resource	Impact	Stressor	Potential Effect
No Action Alternative			
Surface Waters	Water Quality Degradation	Munitions	Negligible. Potential contaminants would not migrate to surface waters.
		Incidental Spills	Negligible. Extremely low risk of spills based on current activities.
		Soil Disturbance	Negligible. Low risk of soil sediments migrating into surface waters.
	Increased Runoff	Soil Compaction	Negligible. Portions of ranges compacted by ground vehicles would be very small relative to the overall range area.
Ground-water	Water Quality Degradation	Munitions	Negligible. Potential contaminants would not migrate to groundwater.
		Incidental Spills	Negligible. Extremely low risk of spills based on current activities.
		Soil Disturbance	Negligible. Soil sediments would not migrate to groundwater.
	Decreased Infiltration	Soil Compaction	Negligible. Portions of ranges compacted by ground vehicles would be very small relative to the overall range area.
Alternative 1			
Surface Waters	Water Quality Degradation	Munitions	Negligible. Potential contaminants would not migrate to surface waters.
		Incidental Spills	Negligible. Extremely low risk of spills based on current activities.
		Soil Disturbance	Negligible. Low risk of soil sediments migrating into surface waters.
	Increased Runoff	Soil Compaction	Negligible. Portions of ranges compacted by ground vehicles would be very small relative to the overall range area.
Ground-water	Water Quality Degradation	Munitions	Negligible. Potential contaminants would not migrate to groundwater.
		Incidental Spills	Negligible. Extremely low risk of spills based on current activities.
		Soil Disturbance	Negligible. Soil sediments would not migrate to groundwater.
	Decreased Infiltration	Soil Compaction	Negligible. Portions of ranges compacted by ground vehicles would be very small relative to the overall range area.
Alternative 2			
Surface Waters	Water Quality Degradation	Munitions	Negligible. Potential contaminants would not migrate to surface waters.
		Incidental Spills	Negligible. Extremely low risk of spills based on current activities.
		Soil Disturbance	Negligible. Low risk of soil sediments migrating into surface waters.
	Increased Runoff	Soil Compaction	Negligible. Portions of ranges compacted by ground vehicles would be very small relative to the overall range area.
Ground-water	Water Quality Degradation	Munitions	Negligible. Potential contaminants would not migrate to groundwater.
		Incidental Spills	Negligible. Extremely low risk of spills based on current activities.
		Soil Disturbance	Negligible. Soil sediments would not migrate to groundwater.
	Decreased Infiltration	Soil Compaction	Negligible. Portions of ranges compacted by ground vehicles would be very small relative to the overall range area.

3.4 NOISE (AIRBORNE)

3.4.1 INTRODUCTION

This section addresses potential noise impacts on the human environment in the vicinity of Fallon Range Training Complex (FRTC) from noise generated by activities identified in the alternatives, including the Proposed Action. Potential impacts of noise on biological resources are addressed in Section 3.5 (Biological Resources), while impacts on sensitive receptors are addressed in Section 3.10 (Public Health and Safety).

3.4.1.1 Overview

3.4.1.1.1 Sound Characteristics

Sound results from vibrations, introduced into a medium such as air, that stimulate the auditory nerves of a receptor to produce the sensation of hearing. Sound is undesirable if it interferes with communication, is intense enough to damage hearing, or diminishes the quality of the environment. Undesirable sound is commonly referred to as “noise.” Human responses to sound vary with the types and characteristics of the sound source, the distance between the source and receptor, receptor sensitivity, the background sound level, and other factors such as time of day. Sound may be intermittent or continuous, steady or impulsive, and may be generated by stationary sources such as industrial plants or transient noise sources such as cars and aircraft. While aircraft are not the only sources of noise in an urban, suburban, or even rural, environment, they are readily identified by their output and are given special attention in this Environmental Impact Statement.

Sound energy travels in waves. Its intensity at a receptor varies as a function of source intensity, the characteristics of the sound wave, the distance between source and receiver, and environmental conditions. Reflection, refraction, diffraction, and absorption are physical interactions between sound waves and surfaces or the medium through which the sound travels.

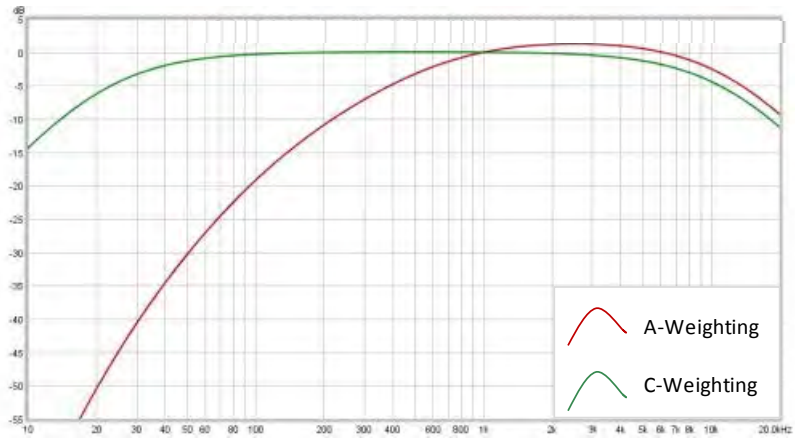
Most environments include near-constant, long-term sound sources that create a background sound level, and intermittent, intrusive sources that create sound peaks that are noticeably higher than the background levels. In remote areas far away from any human activities, the background sound level is determined by natural sources such as water (e.g., rain), and wind blowing through the vegetation. The extent to which an intrusive sound affects a given receptor in the environment depends upon the degree to which the intruding sound exceeds the background sound level. Both background and intrusive sound may affect the quality of life in a given environment. Cumulative, long-term exposure to excessive background sound is recognized as the primary cause of hearing loss. Intrusive sound, although not a cause of permanent hearing loss, can contribute to stress, irritability, loss of sleep, and impaired work efficiency.

Impulsive sound is short in duration—less than 1 second—and high in intensity. Impulsive sound has an abrupt onset and decays rapidly; it is characteristic of small arms fire and sonic booms, and is expressed in peak, unweighted decibels (dBP). Although impulsive sound is short in duration, it may be a source of discomfort for many people as the rapid onset of sound may produce a “startle” effect (U.S. Department of the Navy 1978).

3.4.1.1.2 Sound Spectrum

Sound oscillates in waves, and the rates of oscillation (frequencies) are measured in cycles per second, or Hertz (Hz). The human ear can detect sounds ranging in frequency from about 20 to 20,000 Hz, with the ear most sensitive to frequencies from 1,000 to 4,000 Hz (U.S. Army 2005). Most environmental

sounds consist not of a single frequency, but rather a broad band of frequencies that vary in intensity. Sound frequencies from military training activities vary greatly. Some examples of frequencies at peak sound energy include fixed-wing aircraft (2,000–4,000 Hz), small arms (approximately 500 Hz), explosives (approximately 31 Hz), street vehicles (approximately 60 Hz), and diesel trucks (approximately 250 Hz) (U.S. Department of the Navy 1978; U.S. Army 2005). The human ear is not equally sensitive to all sound frequencies within the frequency range of human hearing; the human ear cannot detect lower frequencies as well as it can detect higher frequencies. Thus, the "raw" sound intensity measured by mechanical devices is selectively weighted—or filtered—to simulate the non-linear response of the human ear. The two accepted weighting networks are the C scale and the A scale (Figure 3.4-1).



Source: U.S. Army 2005

Figure 3.4-1: A and C Weighting Scales

Weighting networks are used in sound meters to adjust their frequency response to "raw" (unweighted) measured sounds. The A-weighting network is designed to duplicate the sensitivity of the human ear, heavily discounting sound energy at low frequencies and at very high frequencies and corresponding roughly to the average sensitivity of the human ear at low to moderate sound levels. In several studies, a person's judgment of the loudness of a sound has been shown to correlate well with the A-weighted values of those sounds (U.S. Department of the Navy 1978). For this reason, the A scale is the most common weighting scheme for community sound measurements and standards, and is used for most environmental noise evaluations. These adjusted sound levels are termed "A-weighted" sound levels, denoted as dB(A) or simply dBA. The A-weighted scale is used internationally in sound standards and regulations. Therefore, dBA is the primary sound metric to be used in analyzing sound effects under environmental consequences because its characteristics are reflective of the human ear's frequency response.

The C-weighting network approximates the ear's sensitivity at high sound levels and weighs sound energy levels equally across the frequency range of human hearing, while discounting some of the very high and very low frequencies at each end of the range. Accordingly, the C scale closely resembles the actual sound pressure level received by sound level meters, and is often used to calibrate sound meters. C-weighted sound levels also are often used for the analysis of low-frequency sounds such as artillery and detonations. Sound measurements thus adjusted are termed "C-weighted" sound levels, denoted as dB(C) or simply dBC.

Impulsive sound is measured and expressed in dBP. Peak impulsive sound weighting is used for single-event sound, or impulsive sound events that last less than 1 second in duration, such as gun noise. Peak sound (dBP) does not correlate directly with time-averaged ambient sound standards. The peak sound values presented in this analysis are PK-15, or the calculated peak sound level expected to be exceeded 15 percent of the time. PK-15 accounts for statistical variation in the peak sound level due to weather conditions (U.S. Army 2005). The PK-15 sound value is conservative and is considered to represent meteorological conditions that favor atmospheric transmission of sound.

3.4.1.1.3 Sound Metrics

Transient sound is defined as an "event having a beginning and an end where the sound temporarily rises above the background and then fades into it" (U.S. Army 2005). These types of sounds, measured in terms of Sound Exposure Level (SEL), are associated with vehicles driving by, aircraft overflights, or impulse noise. The SEL is based on two characteristics of transient sound, duration and intensity, where a long duration, low-intensity event can be as annoying as a high-intensity, shorter event. The SEL is the total acoustic energy in an event normalized to 1 second (U.S. Army 2005). This number represents all of the acoustic energy for the event in a 1-second period.

A continually varying sound level over a given period can be described as a single "equivalent" sound level (L_{eq}) that contains an amount of sound energy equal to that of the actual sound level. As shown in the top panel of Figure 3.4-2, the sound level varies over time and increases during a sound "event" (in this case, an aircraft overflight). Thus, the L_{eq} is a measure of the average acoustic energy over a stated period, which includes both quiet periods and sound events. Equivalent sound levels can represent any length of time, but typically are associated with some meaningful period, such as an 8-hour L_{eq} for an office, or a 1-hour L_{eq} for a classroom lecture (U.S. Army 2005). The L_{eq} is averaged over a 1-, 8-, or 24-hour period. The L_{eq} is used to describe continuous sound sources, and may be obtained by averaging sound levels over a selected period. This level is the estimation of the continuous sound level that would be equivalent to the fluctuating sound signal under consideration (U.S. Department of the Navy 1978). A L_{eq} that is a 24-hour average can also be termed the Day-Night Average Sound Level (Ldn or DNL), with a caveat. The DNL is the average noise level over a 24-hour period (as shown in the bottom panel of Figure 3.4-2; this represents the average of 24 1-hour L_{eq} values). However, the noise between the hours of 10 p.m. and 7 a.m. is artificially increased by 10 decibels (dB). This noise is weighted to take into account the decrease in community background noise of 10 dB during this period (Figure 3.4-2).

3.4.1.1.4 Sound Intensity and Perception

Sound intensity is expressed in dB, a logarithmic scale that compares the power of an acoustical signal to a reference power level. A sound level of 0 dB is defined as the threshold of human hearing. The quietest environmental conditions yield sound levels of about 20 dBA. Typical nighttime sound levels in quiet residential areas have a sound level of about 35–45 dBA. Normal speech has a sound level of about 60 dBA at a distance of about 1 meter (m). A freight train passing by at about 15 m (49.2 feet [ft.]) yields a sound level of about 85 dBA. The human pain threshold is about 120 dBA (Table 3.4-1).

A 1 dB change in the sound level is not perceptible to humans (imperceptible change), a 3 dB change is barely perceptible, and a 5 dB change is clearly noticeable. A change in sound level of 10 dB represents more than a threefold change in sound intensity. However, a 10 dB change is perceived by the human ear as a doubling or halving in loudness.

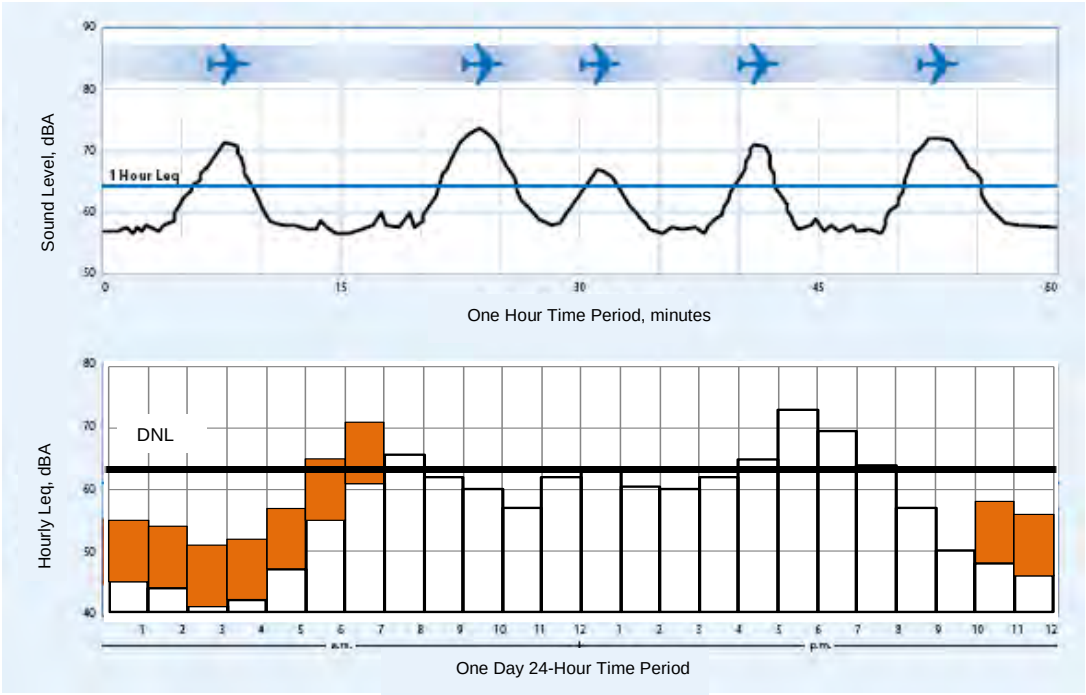


Figure 3.4-2: Relationship of Sound Level, L_{eq}, and Day-Night Average Sound Level

Table 3.4-1: Sound Levels of Selected Sound Sources and Environments

Source	Sound Level (dBA)	Human Perception of Loudness (relative to 70 dBA)
Military Jet Takeoff w/ afterburner at 50 ft. (15.2 m), Civil Defense Siren	130	**Above Threshold of Pain**
Commercial Jet Takeoff at 200 ft. (61 m)	120	**Threshold of Pain** 32 times as loud
Pile Driver at 50 ft. (15.2 m)	110	16 times as loud
Ambulance Siren at 100 ft. (30.5 m) Power Lawn Mower at 3 ft. (0.9 m)	100	**Very Loud** 8 times as loud
Motorcycle at 25 ft. (7.6 m) Propeller Plane at 1,000 ft. (304.8 m)	90	4 times as loud
Garbage Disposal at 3 ft. (0.9 m) Passenger car, 65 mph at 25 ft. (7.6 m)	80	2 times as loud
Vacuum Cleaner at 3 ft. (0.9 m) Living Room Stereo at 15 ft. (4.6 m)	70	**Moderately Loud** (Reference Loudness)
Normal Conversation at 5 ft. (1.5 m)	60	1/2 as loud
Light Traffic at 100 ft. (30.5 m)	50	1/4 as loud
Distant Bird Calls	40	**Quiet** 1/8 as loud
Soft Whisper at 5 ft. (1.5 m)	30	1/16 as loud
	0	**Threshold of Hearing**

Notes: dBA = decibels, A-weighted; ft. = feet; m = meter(s); mph = miles per hour
Sources: FICON 1992, U.S. Army 2005

3.4.1.1.5 Sound Propagation

Sound energy radiates outward from its source. This sound energy attenuates (decreases in intensity) as it moves away from its source because of geometric spreading of the sound energy, atmospheric absorption, ground attenuation, and shielding. Sound metrics for discrete sources are expressed in terms of a distance from the source (a typical reference distance is 50 ft. [15.2 m]).

Sound waves from point sources radiate in a spherical pattern, with the wave intensity attenuating due to geometric spreading by 6 dB per doubling of distance from the source (U.S. Army 2005). Line sources such as roads generate composite sound waves from numerous moving point sources that radiate outward in parallel planes; these waves attenuate due to geometric spreading by only 3 dB per doubling of distance.

At substantial distances from the source, air absorption and ground attenuation can affect sound propagation. The efficiency of atmospheric absorption varies over the range of sound frequencies. At frequencies around 2,000 Hz, air absorption is about 20 dB per kilometer (km). At 1,000 Hz, it is about 7 dB per km. At frequencies below 125 Hz, it is less than 1 dB per km. Factors for ground attenuation and barrier attenuation likewise vary by frequency. In practice, empirical determinations of sound attenuation (i.e., measuring the actual source in its proposed location) are best able to account for all possible factors.

3.4.1.1.6 Time-Averaged Sound Levels

Ambient sound standards regulate ambient sound levels through time-averaged sound level (L_{eq}) limits. Sound standards for land use compatibility established by Department of Defense (DoD) and civilian jurisdictions are expressed in terms of the DNL. Based on numerous sociological surveys and recommendations of federal interagency councils, the most common benchmark for assessing environmental sound impacts is a DNL of 65 dBA (Schomer 2005, FICON 1992). Sound levels up to 65 dBA DNL are considered to be compatible with land uses such as residences, transient lodging, and medical facilities.

Small Arms and Aviation Land Use Zones

Planning in the Noise Environment (U.S. Department of the Navy 1978) provides compatibility criteria for various land uses. Compatible land use means the use of land that is identified as normally compatible with the outdoor sound environment (or an adequately attenuated sound level reduction for any indoor activities involved) at the location because the yearly day-night average sound level is at or below those identified for that land use.

The United States (U.S.) Army Public Health Command has defined three land use planning zones (Table 3.4-2) for small arms and aviation noise (U.S. Army 2005); these land use planning zones and Army guidance are utilized by the U.S. Department of the Navy (Navy) for small arms and aviation noise as well.

- Noise Zone I includes all areas in which the A-weighted DNL (ADNL) from small arms or aviation activities is less than 65 dBA. Noise Zone I is the zone farthest from the sound source and includes all areas not within the other two Noise Zones. Zone I is generally acceptable with any residential or noise-sensitive uses
- Noise Zone II includes all areas in which the ADNL is between 65 and 75 dBA. Sound exposure in this zone is substantial, and allowable land uses include manufacturing,

warehousing, and transportation. Residential development in this zone is not normally recommended.

- Noise Zone III includes all areas in which the ADNL is above 75 dBA. Sound-sensitive land uses, such as housing, schools, churches, and medical facilities, are not compatible with this zone.

Table 3.4-2: Noise Zones and Compatibility Levels for Small Arms and Aviation A-Weighted Day-Night Levels

Zone	Small Arms/Aviation A-weighted DNL	Compatibility with Residential/Noise-Sensitive Land Uses
I	< 65 dBA	Compatible (OK for all land uses)
II	65–75 dBA	Normally Incompatible (Not OK for sensitive receptors[1])
III	> 75 dBA	Incompatible (Not OK for sensitive receptors or some other land uses)

[1] Sensitive receptors include residences, mobile home parks, transient lodging, schools, hospitals, and churches

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

Sources: U.S. Army 2005, *Operational Noise Manual*; 14 C.F.R. Part 150, Table 1

Impulse Sound

To determine the land use compatibility when employing sound sources that are impulsive in nature, less than 1 second in duration, but are not small arms related (e.g., larger munitions, explosive detonations), the C-weighted DNL (CDNL) is used. C-weighted sound levels are often used for the analysis of low-frequency sounds such as artillery and detonations. The U.S. Army Public Health Command has defined the following three land use planning zones (Table 3.4-3) for explosive/impulse noise in its Operational Noise Manual: An Orientation for Department of Defense Facilities (U.S. Army 2005):

- Noise Zone I includes all areas in which the C-weighted DNL (CDNL) from explosives is below 62 dBC. Noise Zone I is the zone farthest from the sound source and includes all areas not within the other two Noise Zones. This area is suitable for all types of land uses.
- Noise Zone II includes all areas in which the CDNL is between 62 and 70 dBC. Sound exposure in this zone is substantial, and allowable land uses include manufacturing, warehousing, and transportation. Residential development in this zone is not normally recommended.
- Noise Zone III includes all areas in which the CDNL is above 70 dBC. Sound-sensitive land uses, such as housing, schools, churches, and medical facilities, are not recommended within this zone.

Additionally, community annoyance from impulsive sound can be assessed using CDNL. The relationship between CDNL and annoyance has been estimated, based on community reaction to impulsive sounds over several years (Federal Interagency Committee on Noise 1992). Whereas occupational sound levels are assessed in terms of hearing loss, environmental sound levels are assessed in terms of their potential to interfere with personal, workplace, and community activities, and in terms of their potential to annoy occupants of nearby land uses.

Table 3.4-3: Noise Zones and Compatibility Levels for Impulse and Large Arms Day-Night Levels

Zone	Explosives Day-Night Average C-weighted DNL	Compatibility with Residential/Noise-Sensitive Land Uses
I	< 62 dBC	Compatible (OK for all land uses)
II	62–70 dBC	Normally Incompatible (Not OK for sensitive receptors)
III	> 70 dBC	Incompatible (Not OK for sensitive receptors or some other land uses)

Notes: dBC = decibels, C-weighted; DNL = Day-Night Average Level; PK-15 = Unweighted Peak, 15% Metric
Source: U.S. Army 2005, *Operational Noise Manual*

Naval Facilities Engineering Command P-970, Planning in the Noise Environment (U.S. Department of the Navy 1978), provides compatibility criteria for various land uses. P-970 indicates that impulse sounds should be considered separately when the peak sound level exceeds 110 dB. The effects of impulse sounds should be determined based on CDNL (U.S. Department of the Navy 1978). Table 3.4-4 presents DoD guidelines for evaluating the effects on the community of impulsive gun noise. The DoD developed metrics to evaluate the complaint potential from impulsive noise. This set of metrics, developed by the Naval Surface Warfare Center, Dahlgren, Virginia, are based on over 10 years' experience using meteorological forecasts. The guidelines are shown in the table below. These levels resulted from the best compromise between cost, efficiency of range operations, and good community relations. The metrics are presented in Table 3.4-4 and are expressed in dBP rather than dBC, and correspond to areas of low to high risk of noise complaints (U.S. Army 2005). These impulsive noise levels are an additional metric used to assess the extent of impulsive effects on the region.

Table 3.4-4: Impulse and Large Arms Complaint Prediction Guidelines

Predicted Sound Level (dBP)	Risk of Complaints	Action
< 115	LOW	Fire all programs
115–130	MODERATE	Fire important tests Postpone non-critical testing if possible
130–140	HIGH	Only extremely important tests should be fired.
> 140	HIGH (risk of physiological and structural damage claims)	Postpone all explosive activities

Notes: 1. For rapid-fire test programs or programs that involve many repetitions of impulse sound, reduce allowed sound levels by 15 dBP; 2. dBP = peak, unweighted decibels
Source: U.S. Army 2005

Technical literature (e.g., Schomer 2005) suggests that "regular" impulse sounds be given a 5 dBP penalty to properly account for their characteristics, and penalties of 12–15 dBP are suggested for highly energetic impulsive sound. As Table 3.4-4 indicates, the Naval Surface Warfare Center recommends a 15 dBP weighting for rapid-fire impulse sound. Such an adjustment potentially moves a sound source up one risk category.

3.4.1.1.7 Sensitive Receptors

Noise sensitive areas are those areas where noise interferes with normal activities associated with its use. Normally, noise sensitive areas include residential, educational, health, and religious structures and sites; parks; recreational areas (including areas with wilderness characteristics); wildlife refuges; and

cultural and historical sites. For example, in the context of noise from airplanes and helicopters, noise sensitive areas include such locations within the 65 dB DNL noise contour. Individuals and isolated, residential structures may be considered compatible within the 65 dB DNL noise contour where the primary use of land is agricultural and adequate noise attenuation is provided (U.S. Department of the Navy 1978). Also, transient residential use such as motels may be considered compatible within the 65 dB DNL noise contour where adequate noise attenuation is provided. In the context of facilities and equipment, such as explosives firing ranges, but not including aircraft, noise sensitive areas may include areas in the immediate vicinity of operations, pursuant to the Noise Control Act of 1972. Users of designated recreational areas are considered sensitive receptors.

The FRTC airspace overlies portions of Washoe, Lyon, Churchill, Pershing, Mineral, Nye, Lander, and Eureka counties (Figure 3.4-3). Most of the lands under the FRTC airspace are public lands administered by the Bureau of Land Management (BLM). Any residential zone (or residences outside those zones), hospital, education facility, recreational areas, or libraries that underlie the Federal Aviation Administration Special Use Airspace (SUA) designated for the FRTC would be considered sensitive receptors, potentially receiving noise from aircraft activities utilizing the FRTC during training activities.

Bravo (B)-16 is approximately 9 miles (mi.) southwest of the Naval Air Station (NAS) Fallon Main Station (Figure 3.4-4). It is the closest of the four training ranges to the Main Station. The BLM and Reclamation administer the lands around B-16. Land status designations within B-16 include both closed withdrawn and open withdrawn lands. B-16 is located approximately 10 mi. (16 km) southwest of the main cantonment area of NAS Fallon and within 0.2 mi. (0.32 km) of rural county residences southwest of the City of Fallon. Existing major land uses in the vicinity of B-16 include farming, ranching, mining, and recreation (e.g., trail use, hunting, and off-highway vehicle use). The closest offsite receptors are located approximately 0.2 mi. (0.32 km) from the area south of Sand Canyon Road. The drop zone and bull's-eye targets are located 3–5 mi. (4.8–8 km) from the closest residence.

B-17 is in central Fairview Valley, approximately 35 mi. southeast of NAS Fallon Main Station (Figure 3.4-5) and is the most heavily used training range within the FRTC. Public lands primarily surround the range. B-17 is just south of U.S. Route 50 and is flanked on the west by the Sand Spring Mountains and State Highway 839 and on the east by Fairview Peak. With the exception of a small parcel of Navy-acquired land (Frenchman's Station, south of U.S. Route 50), all of the land within B-17 is designated as closed withdrawn.

The B-19 range is west of the Blow Sand Mountains and 16 mi. south of the NAS Fallon Main Station (Figure 3.4-6). Highway 95 borders the western boundary, and the Walker River Indian Reservation borders the southern boundary. B-19 is approximately 14 km south of public residences of Fallon, approximately 20 km northeast of Schurz, and approximately 22 km northwest of Rawhide.

The B-20 range is in the Carson Sink, approximately 17 mi. east of Highway 95 and 7 mi. north of the Stillwater Wildlife Management Area (Figure 3.4-7). B-20 has the largest impact area and is the most remote and the least developed of all the FRTC training ranges. Land status designations in B-20 include both closed withdrawn and lands purchased by the Navy.

The Dixie Valley Training Area is north of U.S. Route 50, approximately 35 mi. east of the NAS Fallon Main Station. The Dixie Valley Training Area is a mixture of Navy-acquired lands and withdrawn public lands and is composed of six areas: Northern Dixie Valley Properties, Settlement Area, Dixie Meadows, Withdrawn Lands North of U.S. Route 50, Frenchman's Station North of U.S. Route 50, and Horse Creek.

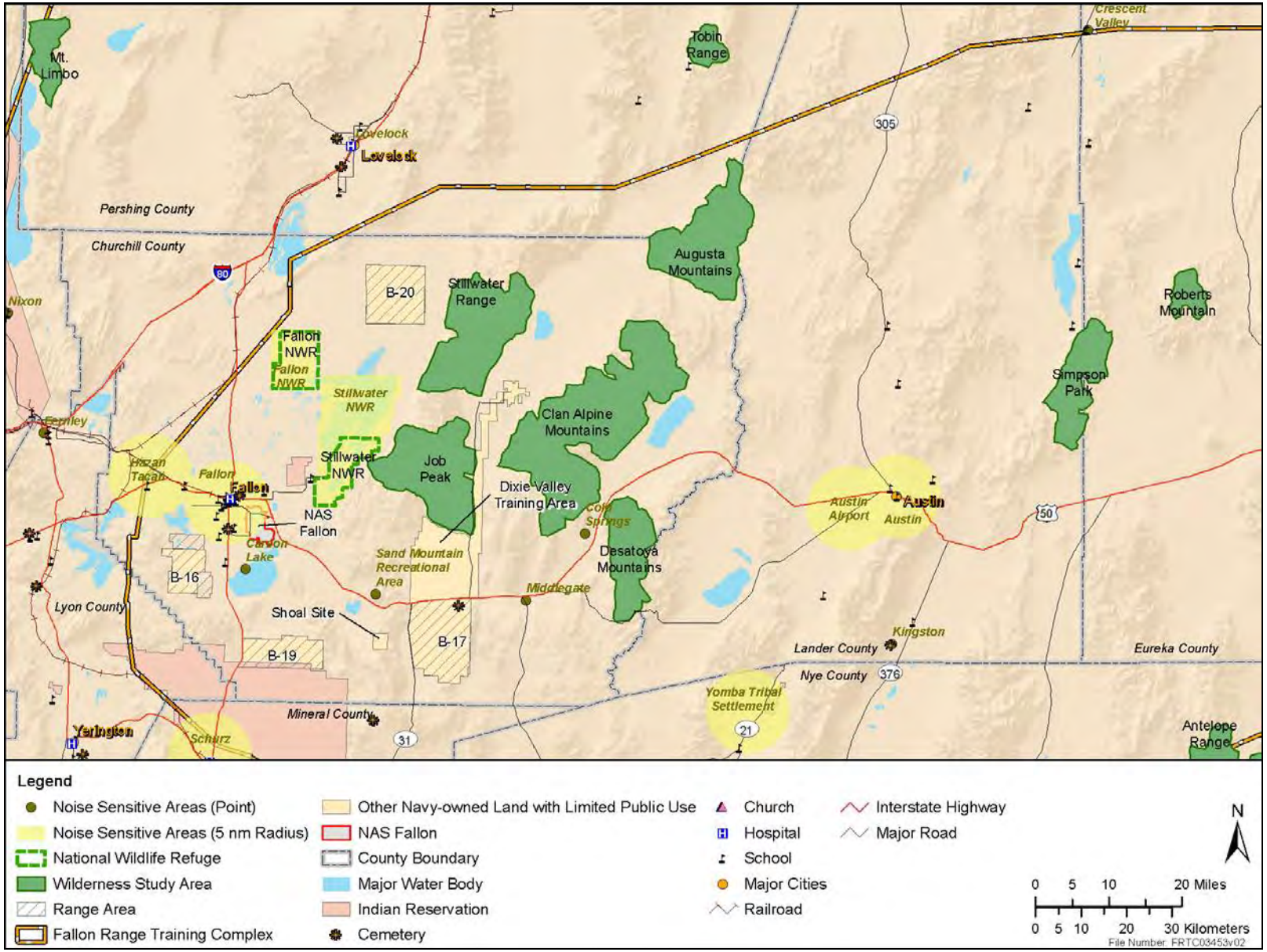


Figure 3.4-3: Sensitive Receptors in Proximity the Fallon Range Training Complex

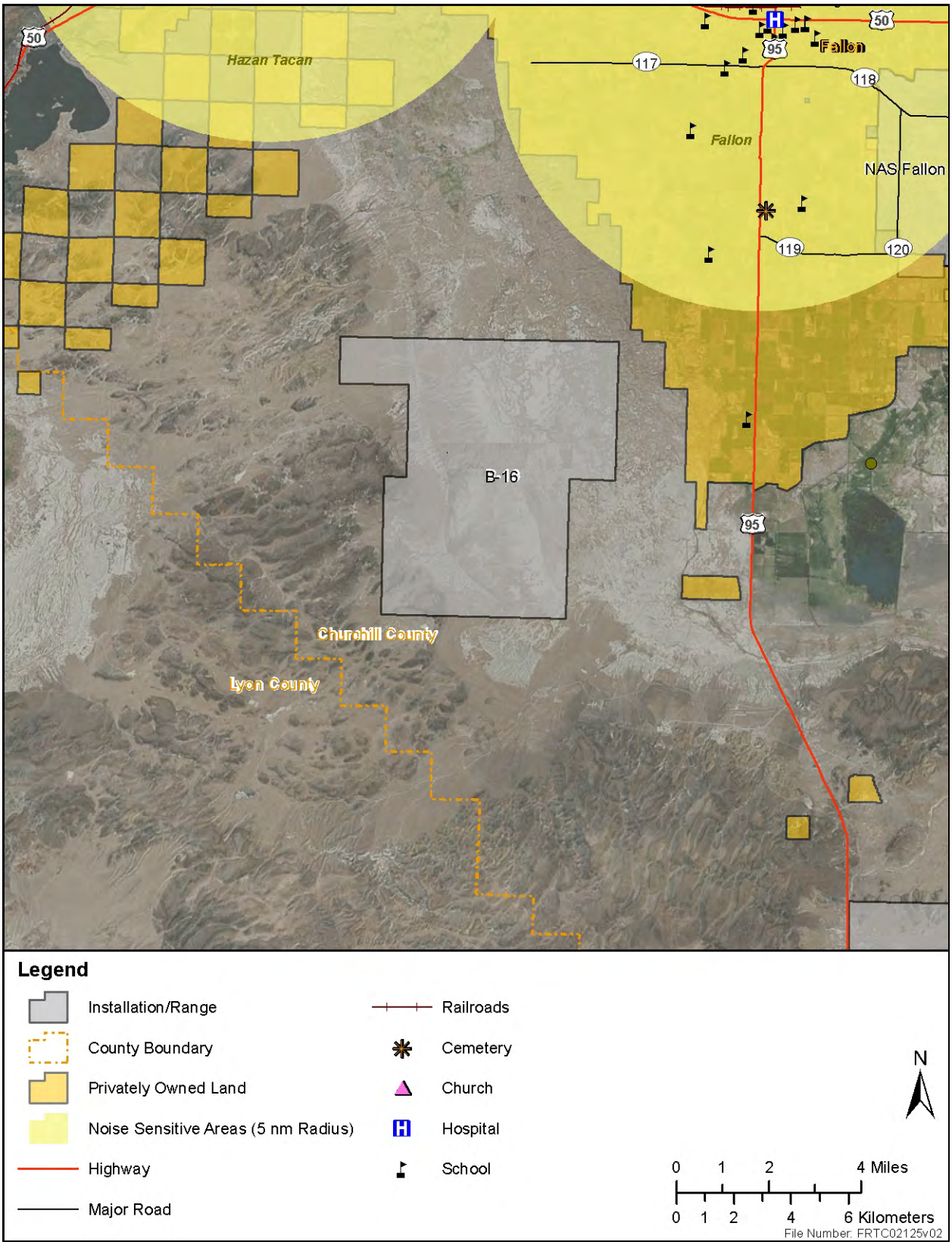


Figure 3.4-4: Sensitive Receptors in Proximity to Bravo-16

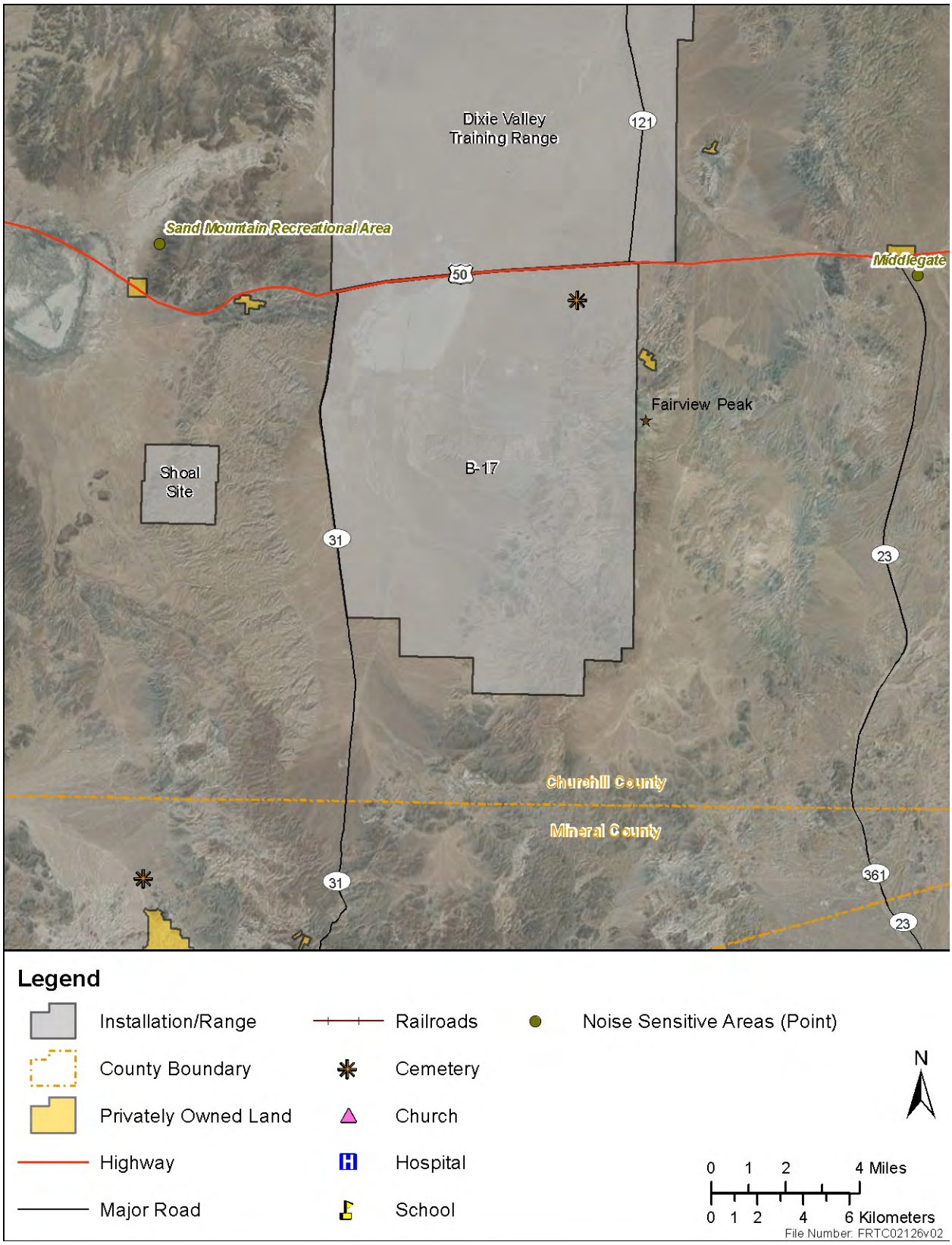


Figure 3.4-5: Sensitive Receptors in Proximity to Bravo-17

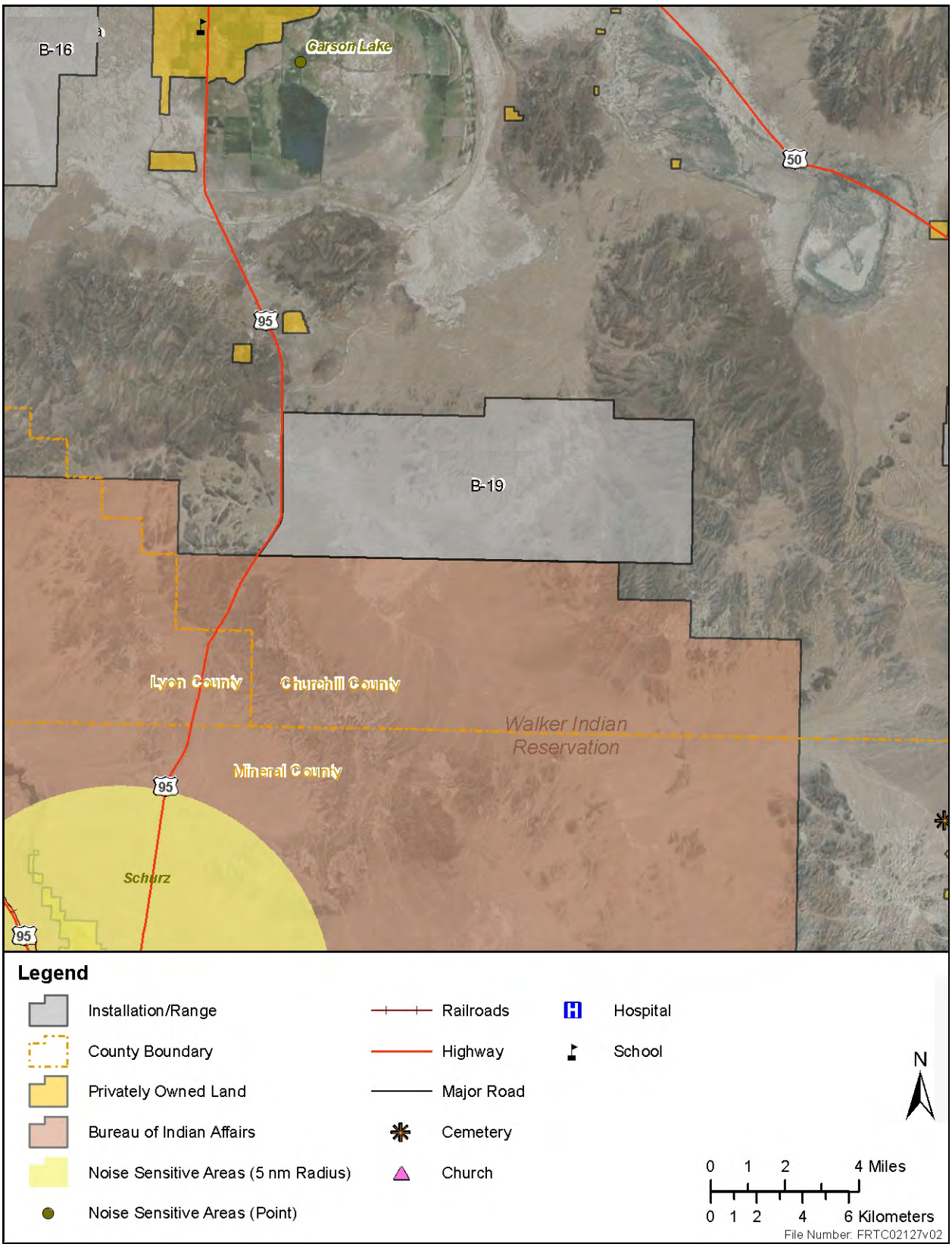


Figure 3.4-6: Sensitive Receptors in Proximity to Bravo-19

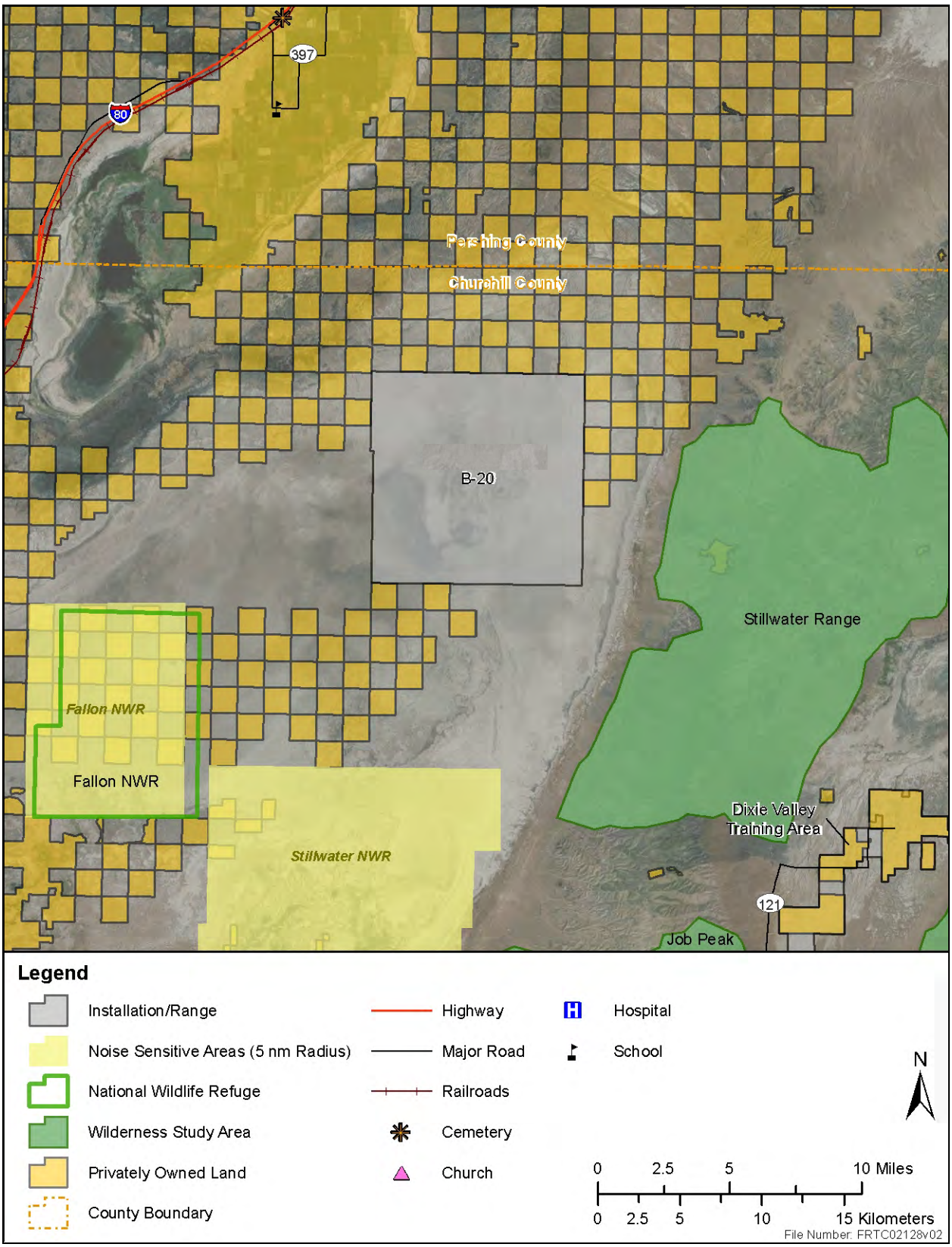


Figure 3.4-7: Sensitive Receptors in Proximity to Bravo-20

3.4.1.2 Regulatory Framework and Management Practices

Activities at the FRTC comply with standard operating procedures to ensure that neither participants nor non-participants engage in activities that would endanger life or property. Safely conducting activities in the controlled training and testing areas is ensured through implementation of the Navy's safety policies and procedures that include, but are not limited to, the following:

- Abiding by Visual Flight Rules (VFR), Instrument Flight Rules, and Naval Air Training and Operating Procedures Standardization Publications
- Scheduling activities through Naval Strike and Air Warfare Center (NSAWC)
- Ensuring that the entire hazard zone is clear before commencing hazardous activities
- Coordinating with Range Safety Officers prior to expending munitions
- Ensuring clearance of appropriate safety zones

While aircraft standard operating procedures are largely oriented toward safety, they also provide significant noise abatement benefits. For example, many standard operating procedures involve flight routing and minimum altitudes. Each of these procedures increases the distance from the noise source to human receptors, thus reducing potentially adverse noise impacts.

Navy occupational noise exposure prevention procedures are required at the FRTC for those personnel who might be exposed to occupational hearing hazards (e.g., military aircraft operations or land detonations) to meet all applicable Occupational Safety and Health Administration and Navy occupational noise exposure regulations. As these measures are designed to minimize occupational hearing hazards, there is no risk of hearing impacts from occupational noise exposure.

Additionally, the FRTC User's Manual specifies a number of noise-sensitive areas, either as coordinate points or areas defined by buffers from coordinate points, as shown in Figure 3.4-3. Pilots overflying these areas are instructed to maintain altitudes of no lower than 3,000 ft. (914.4 m) above ground level (AGL).

3.4.1.3 Approach to Analysis

Noise contours for aviation activity, and large arms noise were generated for activities performed under the No Action Alternative, Alternative 1, and Alternative 2. The contours for activities performed under Alternative 1 or 2 were compared to the contours for activities performed under the No Action Alternative.

3.4.2 Environmental Consequences

The primary factor considered in determining potential noise impacts includes the extent or degree to which implementation of the Proposed Action would affect the baseline sound environment. Concerns over noise include hearing loss, non-auditory health effects, annoyance, speech interference, and sleep interference. At elevated noise levels, people living in high noise environments for an extended period of time (40 years) can be at risk for hearing loss called Noise Induced Permanent Threshold Shift. DoD policy (Methodology for Assessing Hearing Loss Risk and Impacts in DoD Environmental Impact Analysis) requires that hearing loss risk be estimated for the at-risk population, defined as the population exposed to 80 DNL or greater. Specifically, DoD components are directed to use the 80 DNL noise contour to identify populations at the most risk of potential hearing loss (of which there are none at in the FRTC Study Area, see Appendix E, Noise Study). Training activities at FRTC do not generate noise at intensities that could contribute to hearing loss, so this issue is not further addressed. However, the potential

effects would be conversation interruption, sleep interference, distraction, and annoyance. Based on numerous sociological surveys, and recommendations of federal interagency councils, the most common benchmark for assessing environmental noise impacts is a DNL of 65 dB for A-weighted sound (Department of Defense Noise Working Group 2009, Schomer 2005, FICON 1992). When subjected to sound levels of 65 dBA DNL, approximately 12 percent of exposed individuals would be "highly annoyed." A sound level of 75 dBA DNL is a threshold above which effects other than annoyance can occur.

Table 2-4 presents the baseline and proposed training activities for each alternative. Each noise category is introduced and analyzed by alternative. Table 3.0-2 shows the warfare areas and associated stressors that were considered for analysis. The stressors vary in intensity, frequency, duration, and location within the Study Area. The primary stressors applicable in the Study Area and that are analyzed include the following:

- Noise (Aircraft Noise, Military Munitions Noise)

An additional issue of concern with regard to noise is the potential for impacts on biological resources (terrestrial wildlife). Potential noise impacts on biological resources are discussed in Section 3.5 (Biological Resources). A discussion of noise impacts on land use is presented in Section 3.6 (Land Use and Recreation).

3.4.2.1 No Action Alternative

3.4.2.1.1 Aircraft Noise

Table 2-6 of Chapter 2 (Description of Proposed Action and Alternatives) presents annual estimates of aircraft sorties. This table presents the total number of fixed-wing, rotary-wing, and unmanned autonomous systems (UAS) proposed under each action alternative. The sections below will present each subset of aircraft activities that occur at each training range as well as large-scale and supersonic training activities.

Under the No Action Alternative, about 43,186 aircraft sorties per year (fixed-wing, rotary-wing, and UAS) would be flown for training within the FRTC airspace, or about 118 sorties per training day. Under the No Action Alternative, aircraft involved in aerial training activities would be present somewhere in the restricted airspace for about 58,469 hours per year (see Table 2-4 for numbers). One reason for this high number is because more than one aircraft may be in the airspace at one time, hence multiple flight hours during 1 real hour. Under the No Action Alternative, the F/A-18 accounts for approximately 74 percent of all aircraft sorties (31,981 of 43,186 total sorties, Table 2-6), averaging over 87 sorties per day. As presented in Table 2-6, the majority of fixed-wing activities occur above 3,000 ft. AGL. Rotary-wing aircraft are flown almost exclusively under 3,000 ft. (914.4 m) AGL, although these flights only represent approximately 3 percent of all sorties flown in the FRTC Airspace. Similarly, most UAS (169 total sorties per year) are flown under 3,000 ft. (914.4 m) AGL. Approximately 35 percent of all sorties are flown during nighttime hours ("nighttime" hours are defined as occurring between 10 p.m. and 7 a.m. regardless of whether there is sunlight).

Community noise modeling was performed for aircraft activities conducted under the No Action Alternative at FRTC. The noise modeling utilized the DoD computer-based programs Military Operations Area (MOA) and Range Noise Model (MR_NMAP; Version 2.2) for analysis of aircraft and compatible land uses. The program is most accurate and useful for comparing "before-and-after" noise levels that would result from scenarios when calculations are made in a consistent manner. The programs allow

noise exposure prediction of proposed actions without actual implementation and/or noise monitoring of those actions (see Appendix E, Noise Study, for details]).

Military aircraft utilizing SUA, such as Military Training Routes (MTRs), MOAs, and Restricted Areas/Ranges, generate a noise environment that is somewhat different from that associated with airfield operations. As opposed to patterned or continuous noise environments associated with airfields, flight activity in SUAs is highly sporadic and often seasonal, ranging from 10 per hour to less than 1 per week. Individual military overflight events also differ from typical community noise events in that noise from a low-altitude, high-airspeed flyover can have a rather sudden onset, exhibiting a rate of increase in noise level (onset rate) of up to 150 dB per second. To represent these differences, the conventional SEL metric is adjusted to account for the "surprise" effect of the sudden onset of aircraft noise events on humans with an adjustment ranging up to 11 dB above the normal SEL. Onset rates between 15 and 150 dB per second require an adjustment of 0–11 dB, while onset rates below 15 dB per second require no adjustment. The adjusted SEL is designated as the onset-rate adjusted sound exposure level (SELr). Because of the sporadic characteristic of SUA activity, noise assessments for these types of airspaces are normally conducted for the month with the most operations or sorties—the so-called busiest month. The cumulative exposure to noise in these areas is computed by the DNL over the busy month, but using SELr instead of SEL. This monthly average is denoted Ldnmr.

The MR_NMAP and NOISEMAP programs incorporate the number of monthly operations by time period, specified distributions, volume of the airspaces, and profiles of the aircraft to primarily calculate (1) Ldnmr at many points on the ground, (2) average Ldnmr for entire airspaces, or (3) maximum Ldnmr under MTRs or specific tracks. From the grid of points, lines of equal Ldnmr (contours) of 60–75 dBA, in 5 dBA increments, were plotted. Figure 3.4-8 shows the community Ldnmr levels based on the number of activities listed under Table 2-4. As explained previously in this document, Noise Zone I includes all areas in which the DNL from aviation activities is below 65 dBA, Noise Zone II includes all areas in which the DNL is between 65 and 75 dBA, and Noise Zone III includes all areas in which the DNL is above 75 dBA.

The number of aircraft events commonly varies day to day. As previously noted, due to the sporadic characteristic of SUA activity, noise assessments for the Ldnmr noise metric are normally conducted for the busiest month. The busiest month sorties are the basis for the modeling of aircraft operations within SUA throughout this analysis. The F/A-18C/D, F/A-18E/F, F-16, F-5 and H-60 aircraft were modeled for the No Action Alternative (except the F-16 and H-60 in B-16) and account for 87 percent of all FRTC aircraft activity. The contributions to the overall noise environment of the remaining aircraft are negligible relative to the modeled aircraft so they were not included in this analysis.

Using the busiest month sorties, NOISEMAP was used to calculate the 60–85 dB DNL contours at B-16 and MR_NMAP was used to calculate the 60–85 dB Ldnmr contours for the other ranges, in 5 dB increments, for the No Action Alternative. Overall, aircraft overflights would create discrete brief noise events that, while noticeable because they would exceed the ambient background sound level, would contribute very little to the hourly average sound level. Community sound levels from aircraft activities are compatible with land uses such as residences, transient lodging, and medical facilities. Therefore, there are no significant impacts to the sound environment. The sections below present discussions for each range and their respective contours.

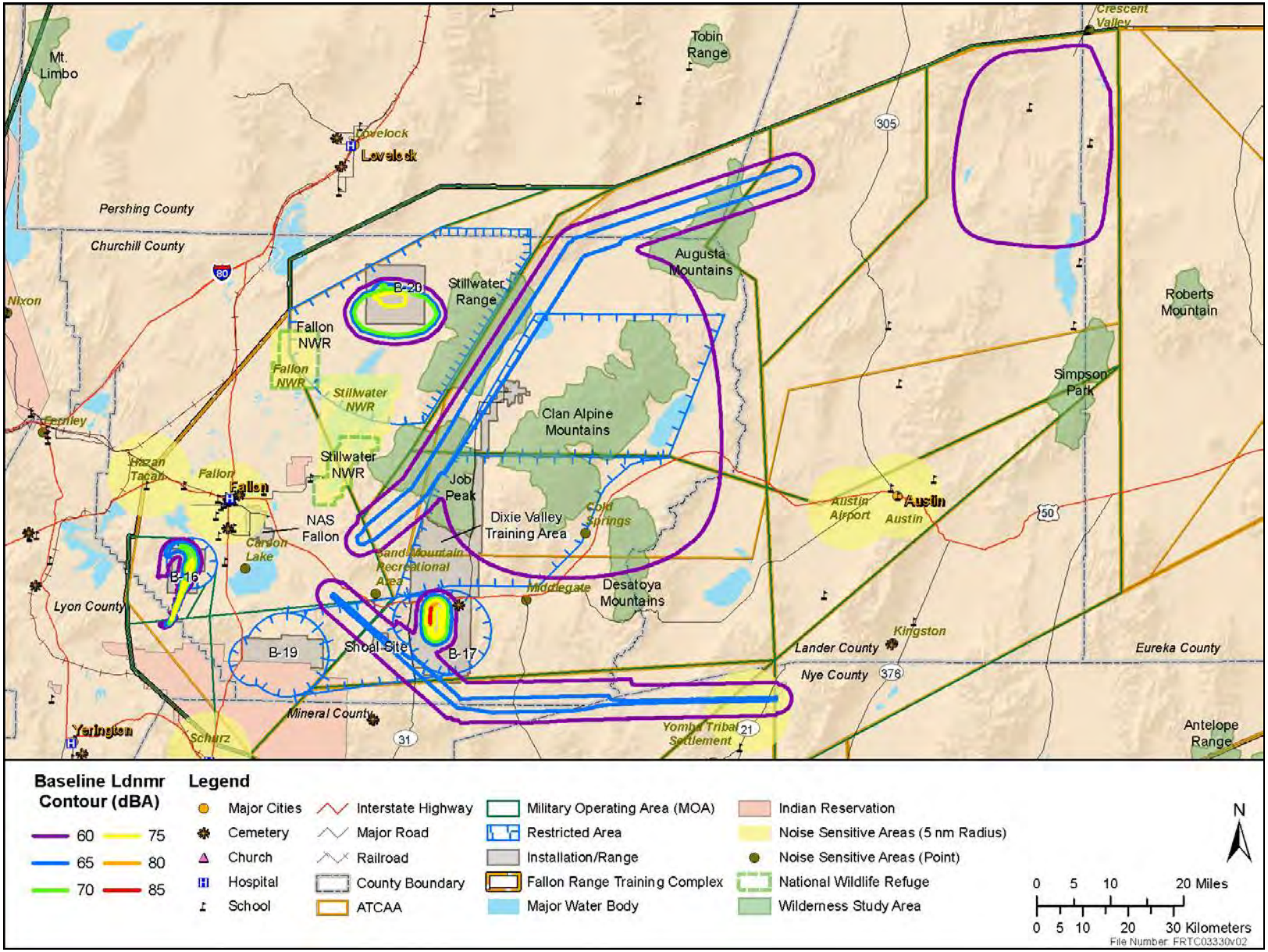


Figure 3.4-8: Aircraft Contours under the No Action Alternative

Bravo-16

As indicated in Table 2-4 of Chapter 2 (Description of Proposed Action and Alternatives), under the No Action Alternative aircraft use B-16 for Bombing Exercises, Gunnery Exercises (Air-to-Ground), and Tactical Ground Mobility Activities. The B-16 consists of two Weapons Impact Scoring Set scored bull's-eyes. The elevation of the bull's-eye is approximately 3,900 ft. mean sea level (MSL) with local terrain relatively flat and a slight slope up to the low-lying mountains which bound the southwestern edge of the range. The primary training activities in B-16 are bombing patterns to the convention bull's-eye utilizing a run-in line from the south at a magnetic heading of approximately 4 degrees east of magnetic north.

As explained previously in this document, Noise Zone I includes all areas in which the DNL from aviation activities is below 65 dBA, Noise Zone II includes all areas in which the DNL is between 65 and 75 dBA, and Noise Zone III includes all areas in which the DNL is above 75 dBA. Sound levels up to 65 dBA are considered to be compatible with land uses such as residences, transient lodging, and medical facilities. As displayed in Figure 3.4-9, under the No Action Alternative, approximately 2,910 acres (ac.) (approximately 4.5 square miles [mi.^{2}]) to the north and to the southwest of B-16 have community DNLs greater than 65 dBA and are within Noise Zone II. A portion of this area has a community DNL greater than 75 dBA and is in Noise Zone III (approximately 254 ac. [0.4 mi.^{2}]).

Visual inspection of aerial maps of the areas within regions where the DNL indicates Noise Zone II or Noise Zone III reveals no sensitive receptors (e.g., residences, lodging, or medical facilities) or inconsistency with current land use. In these areas, during busy months of training activities at FRTC, noise would not interfere with normal activities associated with its use.

Bravo-17

As indicated in Table 2-4 of Chapter 2 (Description of Proposed Action and Alternatives), under the No Action Alternative aircraft use B-17 for Close Air Support, Gunnery Exercise (Air-to-Ground), Missile Exercise (Air-to-Ground), and Bombing Exercise (Air-to-Ground) activities. MR_NMAP was used to calculate the 60–85 dB Ldnmr contours, in 5 dB increments, for sorties occurring at B-17 under the No Action Alternative. The resulting community DNL contours for all FRTC aircraft operations combined are shown in Figure 3.4-10. During busy months of activities under the No Action Alternative at B-17, the majority of elevated community DNL levels are contained within the range boundary. However, a small portion of lands outside of the northern boundary of B-17 fall into Noise Zone II. Noise Zone III does not extend past the B-17 boundary.

Visual inspection of aerial maps indicates no sensitive receptors (e.g., residences, lodging, medical facilities) in this area. Further, the northern boundary of B-17 is immediately adjacent to State Highway 50, where the DNL associated with aircraft would be considered compatible with land use. Immediately north of State Highway 50 is the Dixie Valley Training Range, which is off-limits to public use. Therefore, in these areas, during busy months of activities at FRTC, even with elevated community noise levels, noise would not interfere with normal activities associated with its use.

Bravo-19

As indicated in Table 2-4 of Chapter 2 (Description of Proposed Action and Alternatives), under the No Action Alternative aircraft use B-19 for Bombing Exercise (Air-to-Ground), Close Air Support, Gunnery Exercise (Air-to-Ground), and Missile Exercise (Air-to-Ground) activities.

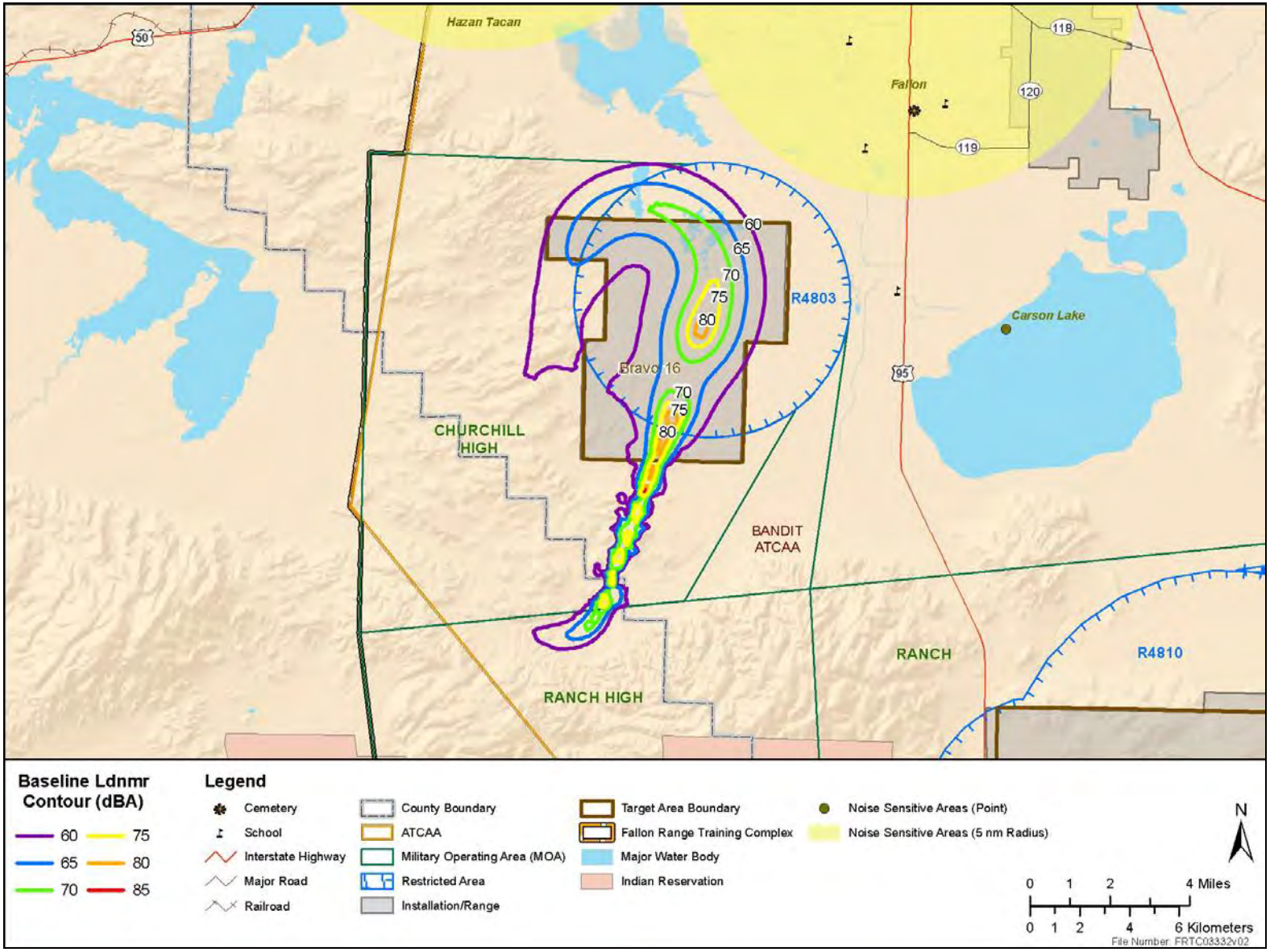


Figure 3.4-9: Estimated Ldnmr Contours under the No Action Alternative at Bravo-16

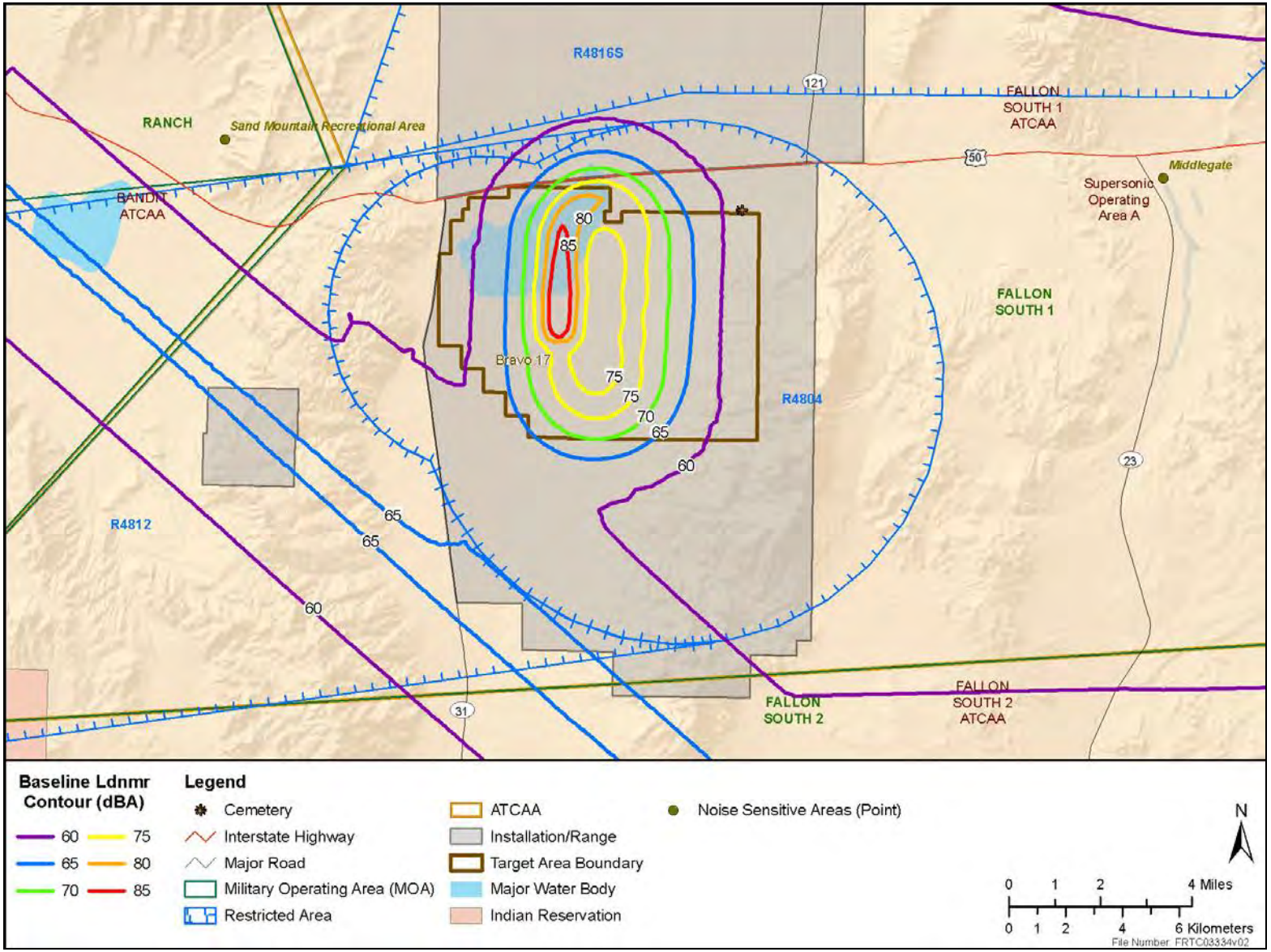


Figure 3.4-10: Estimated Ldnmr Contours under the No Action Alternative at Bravo-17

MR_NMAP was used to calculate the 60–85 dB Ldnmr contours, in 5 dB increments, for sorties occurring at B-19 under the No Action Alternative. The resulting Ldnmr contours for all FRTC aircraft operations combined do not reach or exceed 60 dB. This is due to the low number of events and the relatively high altitude of 7,000–15,000 ft. (2,133.6–4572 m) AGL for fixed-wing operations. Even though the helicopters operate at altitudes of 100–3000 ft. (30.5-914.4 m) AGL, their numbers of operations combined with their single-event noise levels are insufficient to generate an Ldnmr of 60 dB or greater and lands underneath this airspace are within Noise Zone I. Therefore, noise from aircraft overflights at B-17 would not interfere with normal activities associated with its use.

Bravo-20

As indicated in Table 2-4 of Chapter 2 (Description of Proposed Action and Alternatives), under the No Action Alternative aircraft use B-20 for Bombing Exercises (Air-to-Ground), Gunnery Exercises (Air-to-Ground), and Missile Exercises (Air-to-Ground).

MR_NMAP was used to calculate the 60–85 dB Ldnmr contours, in 5 dB increments, for sorties occurring at B-20 under the No Action Alternative. On the west, east, and south sides of B-20, modeled community DNL are within Noise Zone II (excess of 65 dBA but not in excess of 75 dBA), which extends past the range boundary. Figure 3.4-11 shows an area (approximately 17,330 ac. [27.1 mi.^{2}]) with a DNL in excess of 65 dBA. Within this footprint, approximately 12,370 ac. (19.3 mi.^{2}) are above 70 dBA. Community DNLs above 75 dBA and Noise Zone III do not extend past the B-20 range boundary.

Visual inspection of these lands utilizing aerial imagery indicates no sensitive receptors (e.g., residences, lodging, or medical facilities). As shown in Figure 3.4-7, lands to the east and south of B-20 are a mixture of privately owned parcels, or BLM-managed lands, none of which is currently developed. The Stillwater Range Wilderness Study area is immediately to the east of B-20, but neither the 60 dBA nor the 65 dBA contour extend to the Wilderness Study Area boundary. Given the lack of sensitive receptors or inconsistency with current land use, during busy months of activities at FRTC, noise would not interfere with normal activities associated with its use.

Ingress/Egress

In order to utilize the four Bravo training ranges, aircraft typically follow predetermined routes ("course rules routes") for access into (ingress) and out of (egress) the training range. Four ingress and five egress routes were identified for fixed- and rotary-wing aircraft (as described in Appendix E, Noise Study). Aircraft typically originate at NAS Fallon for training in FRTC but may also arrive from other stations such as NAS Lemoore.

MR_NMAP was used to calculate the 60–85 dB Ldnmr contours, in 5 dB increments, for events utilizing the ingress/egress routes under the No Action Alternative. The resulting Ldnmr contours for all FRTC aircraft operations combined do not reach or exceed 70 dBA, as shown in Figure 3.4-8. Two of the fixed-wing ingress/egress routes generate community DNLs above 65 dBA (but not exceeding 70 dBA). As shown in Figure 4-3 of Appendix E (Noise Study), these two routes are Admiral (noted as Stillwater in the Noise Study, which runs southwest to northeast to the east of B-20) and Commodore (noted as Shoshone in the Noise Study, which runs west to east to the south of B-17). Fixed-wing aircraft utilize Shoshone as the primary ingress route for 70 percent of all sorties. This higher frequency of events by the F/A-18 and F-16 cause community DNLs up to 66 dBA along the Commodore route and up to 13,000 ft. (3,962.4 m) in width. Although the usage of Admiral ingress/egress is relatively low, 40 percent of

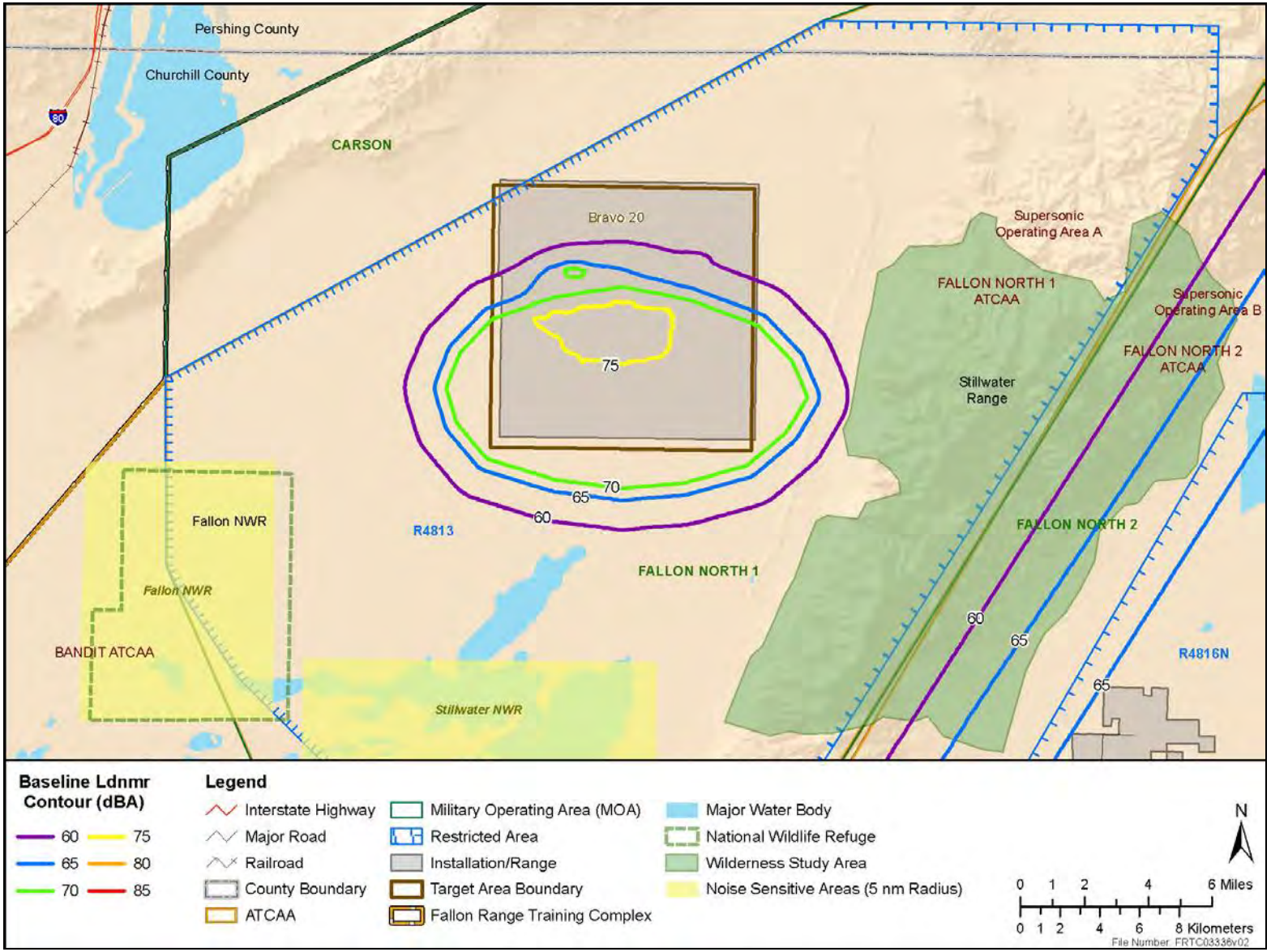


Figure 3.4-11: Estimated Ldnmr Contours under the No Action Alternative at Bravo-20

egress events utilize a low altitude of 500–1,000 ft. (152.4–304.8) AGL. These low altitude egress events by the F/A-18 are the primary cause of community DNLs up to 67 dB (Noise Zone II) that exist along the length of the Admiral route with a width of approximately 17,000 ft (5,181.6 m).

Visual inspection of these lands utilizing aerial imagery indicates no sensitive receptors (e.g., residences, lodging, or medical facilities). In most areas, during busy months of activities at FRTC, noise would not interfere with normal activities associated with its use. However, the Admiral ingress/egress route overlies several Wildlife Study Areas (Job Peak, Stillwater Range, and August Mountain), whose usage is not compatible with Noise Zone II.

Large Scale Activities

The FRTC is the focal point for all Navy, and some Marine, graduate level aviation strike warfare training. This training is under the cognizance of NSAWC, which develops realistic combat training scenarios for military aircrew flying high-performance jet aircraft and helicopters, employing state-of-the-art military equipment and tactics. NSAWC includes the Naval Strike Warfare Center (STRIKE U), Navy Fighter Weapons School (TOPGUN), and the Carrier Airborne Early Warning Weapons School (TOPDOME).

Analysis of aircraft operations in the previous sections focused on activity in and around the Bravo training ranges that commonly utilizes ground targets. A significant portion of range operations do not focus on the Bravo ranges but instead utilize much larger portions of FRTC. This includes the utilization of multiple contiguous areas as single flight areas. Based upon information provided by NSAWC personnel to Wyle Inc., it was determined that a typical busiest month for these large area operations would include the first 3 weeks of TOPGUN and 4 weeks of Carrier Air Wing (CVW) training.

The TOPGUN and CVW training often utilizes large portions of FRTC that extend beyond individual MOAs. The TOPGUN students, flying F/A-18 aircraft, typically set up in the Staging area in the east (see Figure 4-18 in Appendix E, Noise Study). The instructors operate F-5, F-16, and F/A-18 aircraft to represent enemy aircraft, referred to as “bandits,” and set up in the Bandit area, northwest of NAS Fallon (see Figure 4-18 in Appendix E, Noise Study). Once all aircraft are in the proper initial locations, the simulated combat begins with air-to-air combat in the engagement area. As the simulated combat begins to conclude, aircraft typically conclude in the Ending area. The CVW air-to-air combat training is conducted in a similar manner with students initiating in the east while instructors operating F-5 aircraft begin in the west.

Aircraft fly at varying speeds and altitudes during these combat training exercises. Aircraft typically begin at higher altitudes and lower power settings. As the combat simulation begins, average aircraft power settings increase. As aircraft engagement continues, aircraft typically “fight” their way down in altitude. When aircraft near the end of the simulation and the Ending area, aircraft speeds and power settings are the highest and altitude is lowest.

Using this information, MR_NMAP was used to calculate the 60–85 dB Ldnmr contours, in 5 dB increments, for adversary events under the No Action Alternative. The resulting Ldnmr contours for all FRTC aircraft operations are plotted in Figure 3.4-8. The adversary events contribute to community DNLs of less than 65 dBA (Noise Zone I) along the modeled Staging area and the Ending area. Additionally, the Engagement area has a maximum distributed Ldnmr of 58 dBA, which contributes to the widening of the 60 and 65 dB contours along the fixed-wing course rules routes (ingress/egress). However, adversarial events, or large-scale activities, do not contribute to community DNLs that would fall under Noise Zone

II or Noise Zone III. Therefore, in these areas, during busy months of activities at FRTC, noise would not interfere with normal activities associated with its use.

Supersonic Activities

The FRTC offers a unique environment for combat training not available elsewhere. In addition to the ranges discussed in the previous section, the FRTC includes two Supersonic Operating Areas (SOAs) to support high-speed training activities and maneuvers in excess of Mach 1. The SOAs are shown in Figure 2-1, with a minimum altitude of 11,000 ft. (3,352.8 m) MSL for supersonic flight in SOA A, and above 30,000 ft. (914.4 m) MSL in SOA B. The noise experienced on the ground from supersonic aircraft travelling above 11,000 ft. (3,352.8 m) MSL is typically a sonic boom. As discussed earlier, to determine the land use compatibility when employing noise sources that are impulsive in nature, less than 1 second in duration, but are not small arms related (e.g., sonic booms), the C-weighted DNL is used. BooMap96 was used to calculate the 57–85 dB CDNL contours, in 5 dB increments, for the supersonic operations under the No Action Alternative. The resulting CDNL contours do not reach or exceed 57 dB due to insufficient activity for the size of the flight area. The maximum CDNL of 52 dB occurs near the center of the SOA. While individual sonic booms may provide a brief, impulsive noise, the contribution to community DNLs would not be sufficient enough to represent a degradation of the noise environment.

3.4.2.1.2 Munitions Noise

Community noise modeling was performed for aircraft activities conducted under the No Action Alternative at FRTC. Noise from munitions (blast noise) is impulsive in nature and of short duration. Blast noise can consist of two components, the firing of the projectile from the weapon and the detonation of the projectile if it contains an explosive charge. When a projectile or bomb is released from an aircraft, and the projectile contains explosive material, only the noise resulting from the detonation of the projectile is calculated. The same process is applied to a projectile that is ground-delivered. If the projectile is non-explosive, only the noise resulting from the firing of the projectile is calculated. Blast noise is often a source of discomfort for persons, and vibrations of buildings and structures induced by blast noise may result in increased annoyance and risk of noise complaints or damage.

Blast noise contours are developed using the DoD's Blast Noise Prediction (BNOISE) program. BNOISE is a suite of computer programs, which together can produce CDNL contours for blasting activities or military operations resulting in impulsive noise. As described in Section 3.4.1.1.6 (Time-Averaged Sound Levels) the U.S. Army Public Health Command has defined the following three land use planning zones for explosive/impulse noise: Noise Zone I includes all areas in which the CDNL from explosives or impulse noise is below 62 dBC, Noise Zone II includes all areas in which the CDNL is between 62 and 70 dBC, and Noise Zone III includes all areas in which the CDNL is above 70 dBC.

Overall, noise-generating events from training would be intermittent, occur in areas removed from sensitive receptors, and would not expose sensitive receptors to high noise levels. With the exception of B-17, CDNL contours would not extend beyond range boundaries. At B-17, the 62dBC CDNL contour extends just south of the range, but does not overlap with any sensitive receptors. Therefore, there are no incompatible land use areas, and no significant impacts to the sound environment. The sections below present discussions for each range and their respective contours.

Bravo-16

Table 2-5 of Chapter 2 summarizes the munitions proposed for use at B-16 under all alternatives. Munitions used on B-16 are restricted to .50 caliber, 5.56 millimeters (mm), 7.62 mm and 9 mm. Table 3.4-5 displays the maximum noise levels from various small arms at various distances from firing points.

Small arms munitions were not modeled as firing locations at B-16 are typically greater than 3,500 m (11,483 ft.) from the edge of the restricted range. Distances to sensitive receptors are such that noise levels would not significantly contribute to the noise environment, as received noise levels from these activities would be at or near ambient levels. Given that small arms are the main source of munitions noise at B-16, noise levels are not expected to contribute to the noise environment at locations adjacent to the range, at levels that are incompatible with land use of those areas.

Table 3.4-5: Maximum Noise Levels (A-Weighted Decibels) at Various Distances Generated by Small Arms Weapons Firing

Munition Type	Distance from Source[1]			
	500 m (1,640 ft.)	1,000 m (3,281 ft.)	2,000 m (6,562 ft.)	3,000 m (9,842 ft.)
5.56 mm	*	65	55	48
7.62 mm	71	62	54	49
.50 caliber	92	85	78	*

[1] Noise Level in the direction of fire
* Not presented in source material
Notes: ft. = feet, m = meters, mm = millimeters
Source: U.S. Army Environmental Command 2012

Bravo-17

Table 2-5 summarizes the munitions proposed for use at B-17 under all alternatives. While small arms are utilized at B-17, under the No Action Alternative large-caliber weapons (defined as weapons projectiles with diameters larger than 20 mm) are modeled. Small arms munitions were not modeled as firing locations at B-17 are at distances from sensitive receptors where noise levels would not significantly contribute to the noise environment. Further, noises from small arms would likely be subsumed by noises from large-caliber weapons use on B-17. Similarly, inert munitions were not modeled, as noise associated with inert munitions is minimal. Under the No Action Alternative, approximately 14,500 live bombs would be utilized at B-17.

As listed in Section 3.4.1.1.6 (Time-Averaged Sound Levels), Noise Zone I includes all areas in which the CDNL from explosives is below 62 dBC and is suitable for all types of land uses. Noise Zone II includes all areas in which the CDNL is between 62 and 70 dBC; allowable land uses include manufacturing, warehousing, and transportation. Residential development in this zone is not normally recommended. Noise Zone III includes all areas in which the CDNL is above 70 dBC; land uses such as housing, schools, churches, and medical facilities are not recommended within this zone.

During busy months of activities under the No Action Alternative at B-17, all of elevated community DNL levels are contained within the range boundary (Figure 3.4-12). Activities at these locations would not affect surrounding areas or sensitive receptors because the 62 dB contour does not extend beyond the range boundary.

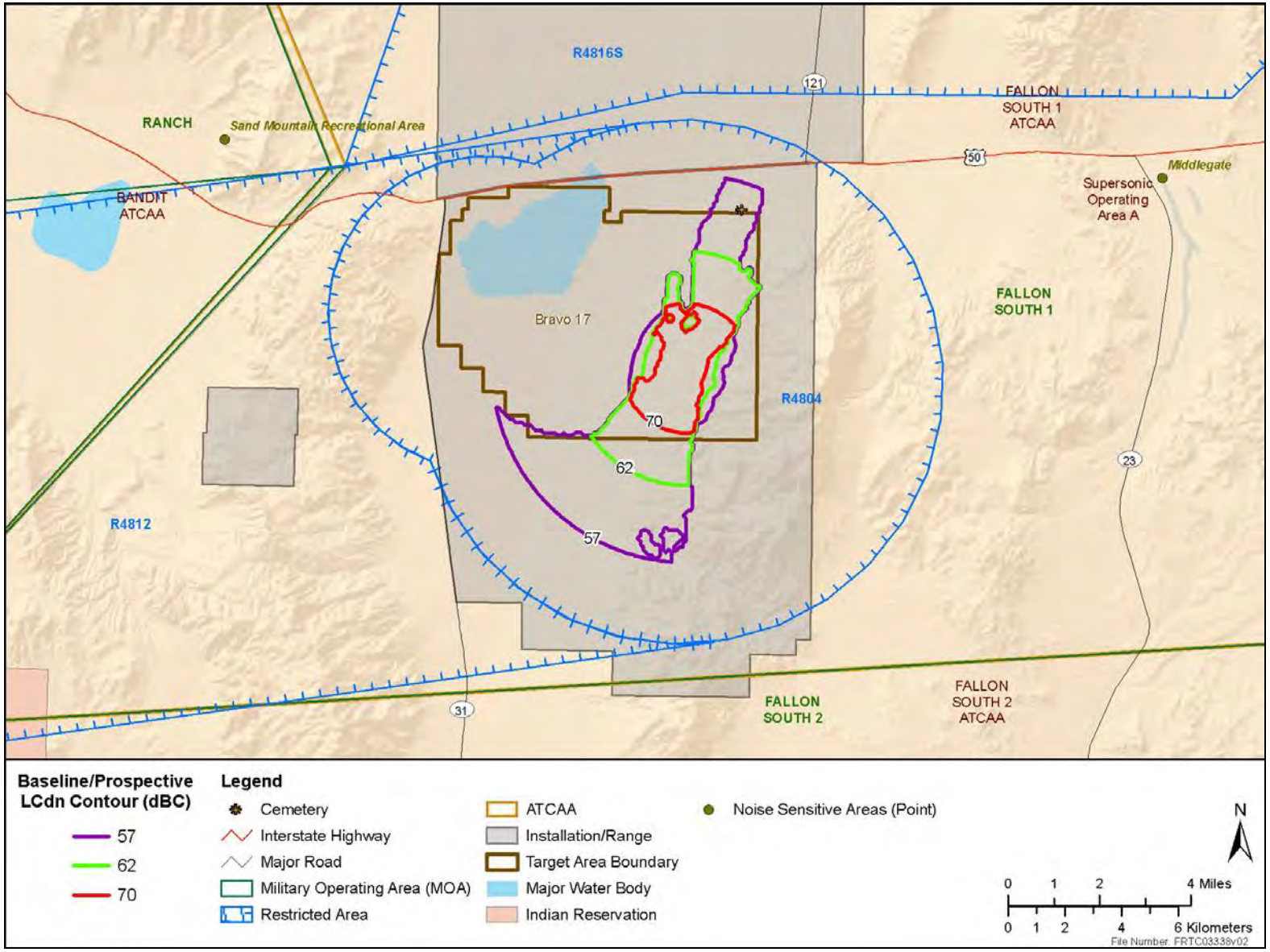


Figure 3.4-12: Estimated CDNL Contours for Munitions Activity under the No Action Alternative at Bravo-17

Bravo-19

Table 2-5 summarizes the munitions proposed for use at B-19 under all alternatives. While small arms are utilized at B-19, under the No Action Alternative large-caliber weapons (defined as weapons projectiles with diameters larger than 20 mm) are also used. Small arms munitions was not modeled as firing locations at B-19 are at distances from sensitive receptors where noise levels would not significantly contribute to the noise environment. Further, noises from small arms would likely be subsumed by noises from large-caliber weapons use on B-19. Similarly, inert munitions were not modeled, as noise associated with inert munitions is minimal. Under the No Action Alternative, approximately 4,039 live bombs would be utilized at B-19.

During busy months of activities under the No Action Alternative at B-19, the majority of elevated community DNL levels are contained within the range boundary (Figure 3.4-13). However, a small portion of lands southern boundary of B-19 fall under contours which indicate CDNL levels above 62 dBC. This area, approximately 260 ac. (0.4 mi.^{2}), is located on lands belonging to the Walker River Indian Reservation. Visual inspection of these lands utilizing aerial imagery indicates no sensitive receptors, which would be incompatible with Noise Zone II. Therefore, in these areas, during busy months of activities at FRTC, noise would not interfere with normal activities associated with its use.

Bravo-20

Table 2-5 summarizes the munitions proposed for use at B-20 under all alternatives. While small arms are utilized at B-20, under the No Action Alternative large-caliber weapons (defined as weapons projectiles with diameters larger than 20 mm) are also used. Small arms munitions were not modeled, as firing locations at B-20 are at distances from sensitive receptors where noise levels would not significantly contribute to the noise environment. Further, noises from small arms would likely be subsumed by noises from large-caliber weapons use on B-20. Similarly, inert munitions were not modeled, as noise associated with inert munitions is minimal.

Under the No Action Alternative, approximately 4,250 live bombs would be utilized at B-20. Figure 3.4-14 shows 57, 62, and 70 CDNL levels during the busiest month at B-20. Activities at these locations would not affect surrounding areas or sensitive receptors because the 62 dB contour does not extend beyond the range boundary.

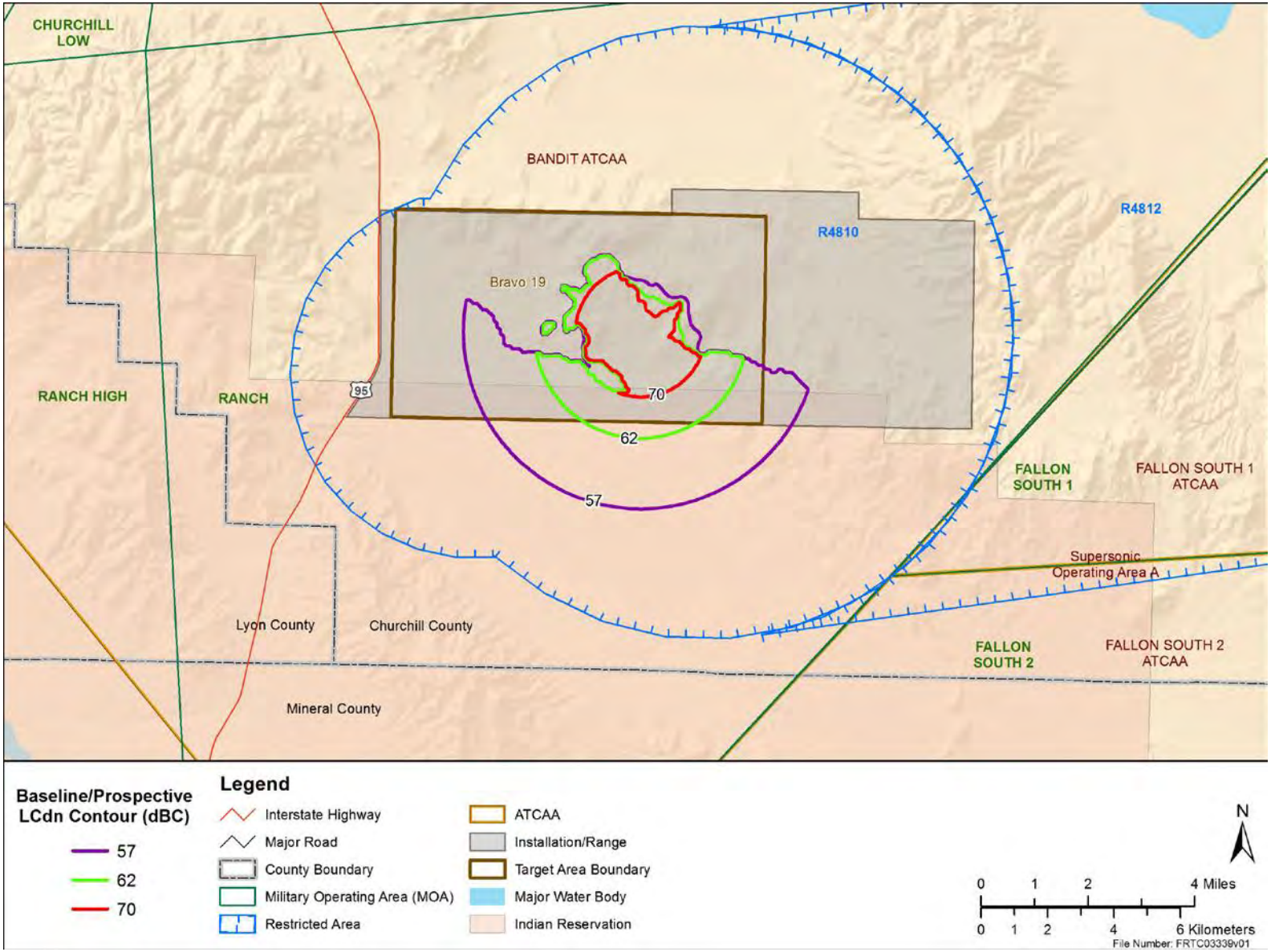


Figure 3.4-13: Estimated CDNL Contours for Munitions Activity under the No Action Alternative at Bravo-19

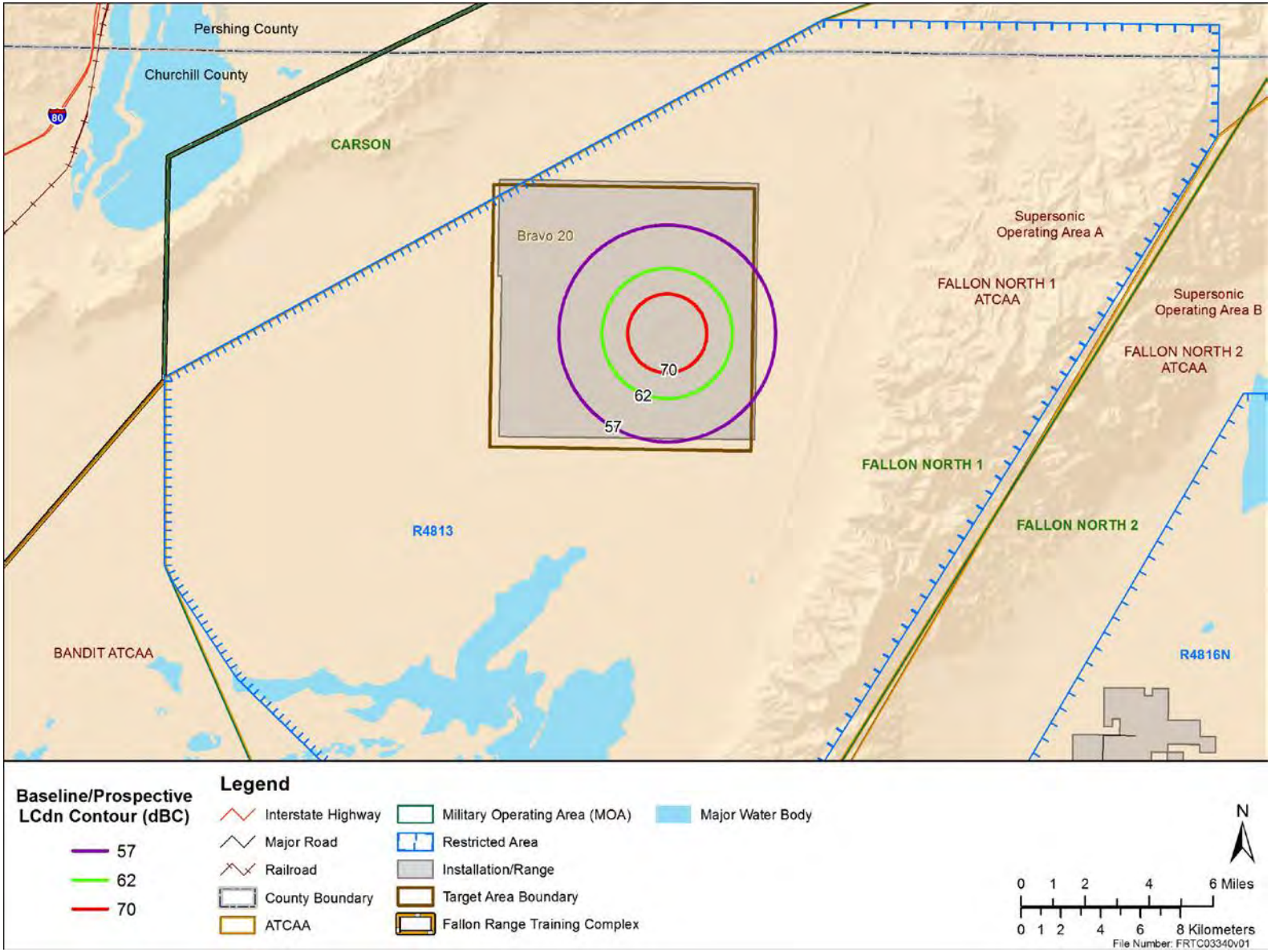


Figure 3.4-14: Estimated CDNL Contours for Munitions Activity under the No Action Alternative at Bravo-20

3.4.2.2 Alternative 1

3.4.2.2.1 Aircraft Noise

Table 2-6 of Chapter 2 (Description of Proposed Action and Alternatives) presents annual estimates of aircraft sorties. This table presents the total number of fixed-wing, rotary-wing, and unmanned aircraft systems proposed under each action alternative. The sections below will present each subset of aircraft activities that occur at each training range as well as large scale and supersonic training activities.

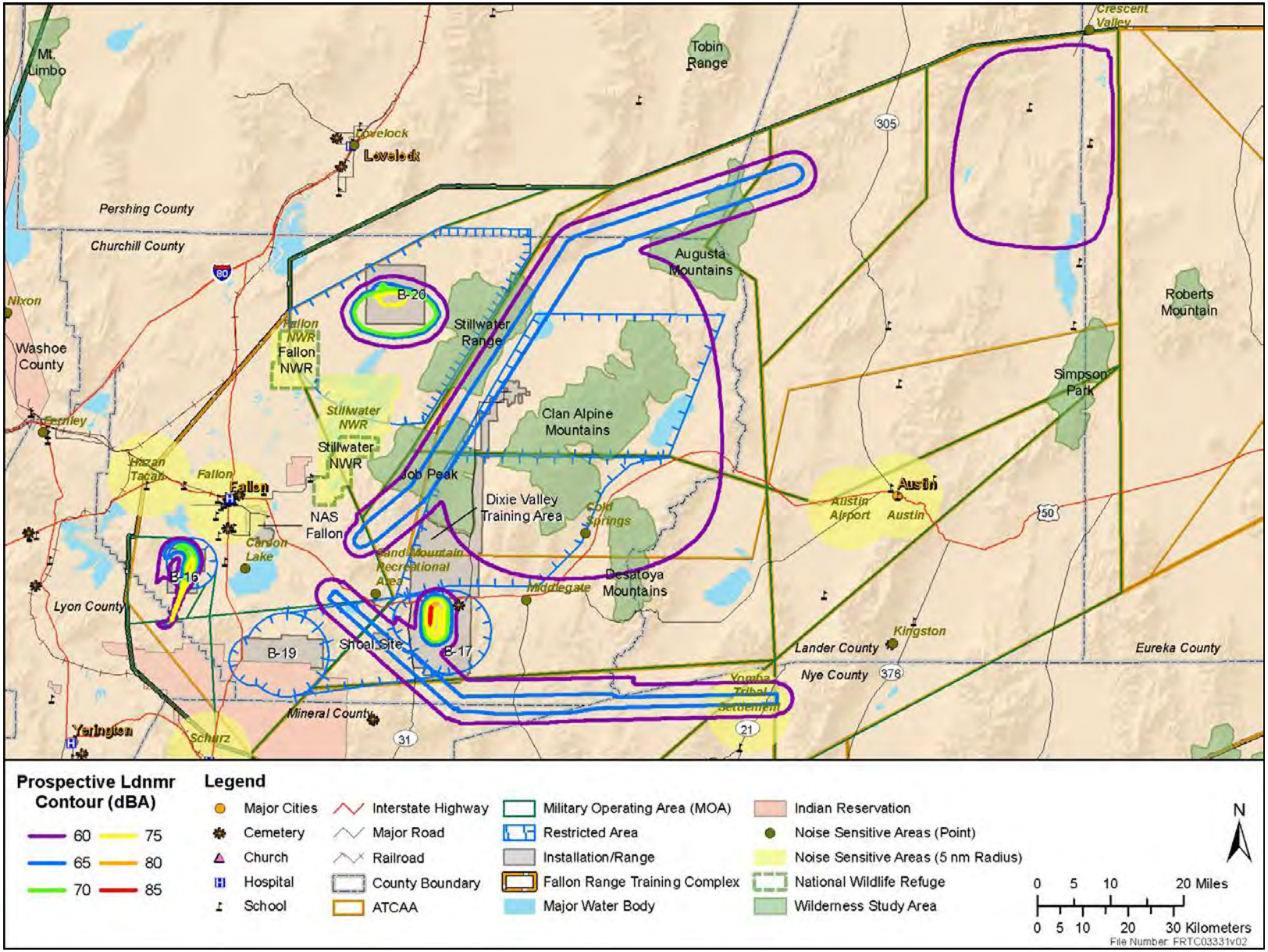
Under Alternative 1, the number of aircraft sorties would increase to about 45,993 aircraft sorties per year (fixed-wing, rotary-wing, and UAS) for training within the FRTC airspace, or about 126 sorties per training day. Under Alternative 1, aircraft involved in aerial training activities would be present somewhere in the restricted airspace for about 62,270 hours per year (see Table 2-4). As indicated in Section 2.5.3.1 (Aircraft), the F-35 Joint Strike Fighter Lightning II aircraft will be utilized under Alternative 1, which will complement and replace the Navy's FA-18E/F. The F-35 will operate similarly to the aircraft it replaces or complements. It will operate in the same areas and will be used in the same training exercises, such as air-to-surface and air-to-air missile exercises, bombing exercises, and any other exercises where fixed-wing aircraft are used in training.

In 2008, the F-35 Joint Program Office collected aircraft noise data from a pre-production aircraft (F-35AA1), and in 2013 noise data was collected from F-35A and F-35B variants for ground run-up and flyover activities. Results from these studies indicated that while in the air performing straight flight and at 100 percent engine thrust, the F-35 was within 1–3 dBs of other high performance fighter aircraft (e.g., F-18C/D and F-18 E/F) on the ground directly under the aircraft, with the aircraft at 1,000 feet AGL. When operating with afterburner, the F-35 was louder than the F-18C/D by 3 dBA and quieter than the F-18E/F by 1 dBA.

As described in Section 3.4.1.1.4 (Sound Intensity and Perception), a 1 dB change in the sound level is not perceptible to humans (imperceptible change), a 3 dB change is barely perceptible, and a 5 dB change is clearly noticeable. It is important to note that F-35 may sound different (i.e., in tone) than previous military jets, and this "difference" could cause people to perceive the noise as being louder, even if the measured noise levels are essentially the same.

Under Alternative 1, the F/A-18 and F-35 would account for approximately 74 percent of all aircraft sorties (34,060 of 45,993 total sorties; see Table 2-6). As presented in Table 2-6, the majority of fixed-wing activities occur above 3,000 ft. (914.4 m) AGL. Rotary-wing aircraft are flown almost exclusively under 3,000 ft. (914.4 m) AGL, although these flights only represent approximately 3 percent of all sorties flown in the FRTC Airspace. Similarly, most UAS (180 total sorties per year) are flown under 3,000 ft. (914.4 m) AGL. Approximately 35 percent of all sorties are flown during nighttime hours.

Using the busiest month sorties, NOISEMAP was used to calculate the 60–85 dB DNL contours at B-16, and MR_NMAP was used to calculate the 60–85 dB Ldnmr contours for the other ranges, in 5 dB increments, for Alternative 1 (Figure 3.4-15). Aircraft overflights would create discrete brief noise events that, while noticeable because they would exceed the ambient background sound level, would contribute very little to the hourly average sound level. Community sound levels from aircraft activities are compatible with land uses such as residences, transient lodging, and medical facilities. Therefore, there are no significant impacts to the sound environment. The sections below present discussions for each range and their respective contours.



Prospective Ldnmr Contour (dBA)

60 75
65 80
70 85

Legend

Major Cities
Cemetery
Church
Hospital
School
Interstate Highway
Major Road
Railroad
County Boundary
ATCAA
Military Operating Area (MOA)
Restricted Area
Installation/Range
Fallon Range Training Complex
Major Water Body
Indian Reservation
Noise Sensitive Areas (Point)
Noise Sensitive Areas (5 nm Radius)
National Wildlife Refuge
Wilderness Study Area

N

0 5 10 20 Miles
0 5 10 20 30 Kilometers

File Number: FRTC03331v02

Figure 3.4-15: Aircraft Contours under Alternative 1 and 2

Bravo-16

As indicated in Table 2-4 of Chapter 2 (Description of Proposed Action and Alternatives), under Alternative 1 aircraft use B-16 for Bombing Exercises, Gunnery Exercises (Air-to-Ground), and Tactical Ground Mobility Activities. There would not be any changes to the flight tracks or flight profiles at B-16 under Alternative 1 when compared to the No Action Alternative.

Noise contours for all FRTC aircraft operations for B-16 are plotted in Figure 3.4-16. The 65 dB DNL contours would encompass an additional 390 ac. compared to the No Action Alternative, but would be similar to No Action Alternative in terms of shape. While the size of Noise Zone II would increase slightly under Alternative 1, the DNL within this area would increase by less than 1 dB. As described in Section 3.4.1.1.4 (Sound Intensity and Perception), a 1 dB change in the sound level is not perceptible to humans (imperceptible change), a 3 dB change is barely perceptible, and a 5 dB change is clearly noticeable. As displayed in Figure 3.4-17, under Alternative 2 approximately 3,300 ac. (5.2 mi^2) to the north and to the southwest of B-16 have community DNLs greater than 65 dBA and are within Noise Zone II. A portion of this area has a community DNL greater than 75 dBA and is in Noise Zone III (approximately 313 ac. [0.5 mi^2]). Visual inspection of aerial maps of the areas within regions where the DNL is in excess of 65 dBA reveals no sensitive receptors (e.g., residences, lodging, medical facilities). In these areas, during busy months of training activities at FRTC, noise would not interfere with normal activities associated with its use, and noise from aircraft activities under Alternative 1 would not represent degradation in the noise environment at these locations.

Bravo-17

The noise contours for FRTC aircraft operations for B-17 are plotted in Figure 3.4-18. The 65 dB Ldnmr contours are very similar to the No Action Alternative in terms of shape, and the size of the contours expands very slightly to both the north and south. During busy months of activities under Alternative 1 at B-17, the majority of elevated community DNL levels are contained within the range boundary. However, a small portion of lands outside of the northern boundary of B-17 fall into Noise Zone II. Noise Zone III does not extend past the B-17 boundary. While the size of Noise Zone II increases in comparison to the No Action Alternative, the Ldnmr would increase less than 1 dB along the B-17 patterns, which is not a perceptible increase.

Visual inspection of aerial maps indicates no sensitive receptors (e.g., residences, lodging, medical facilities) in this area. Further, the northern boundary of B-17 is immediately adjacent to State Highway 50, where the DNL associated with aircraft would be considered compatible with land use. Immediately north of State Highway 50 is the Dixie Valley Training Range, which is off-limits to public use. Therefore, in these areas, during busy months of activities at FRTC and with elevated community noise levels, noise would not interfere with normal activities associated with its use, and noise from aircraft activities under Alternative 1 would not represent degradation in the noise environment at these locations.

Bravo-19

As indicated in Table 2-4 of Chapter 2 (Description of Proposed Action and Alternatives), under Alternative 1 aircraft use B-19 for Bombing Exercise (Air-to-Ground), Close Air Support, Gunnery Exercise (Air-to-Ground), and Missile Exercise (Air-to-Ground) activities.

MR_NMAP was used to calculate the 60–85 dB Ldnmr contours, in 5 dB increments, for sorties occurring at B-19 under the No Action Alternative. The resulting Ldnmr contours for all FRTC aircraft operations combined do not reach or exceed 60 dB. This is due to the low number of events and the relatively high

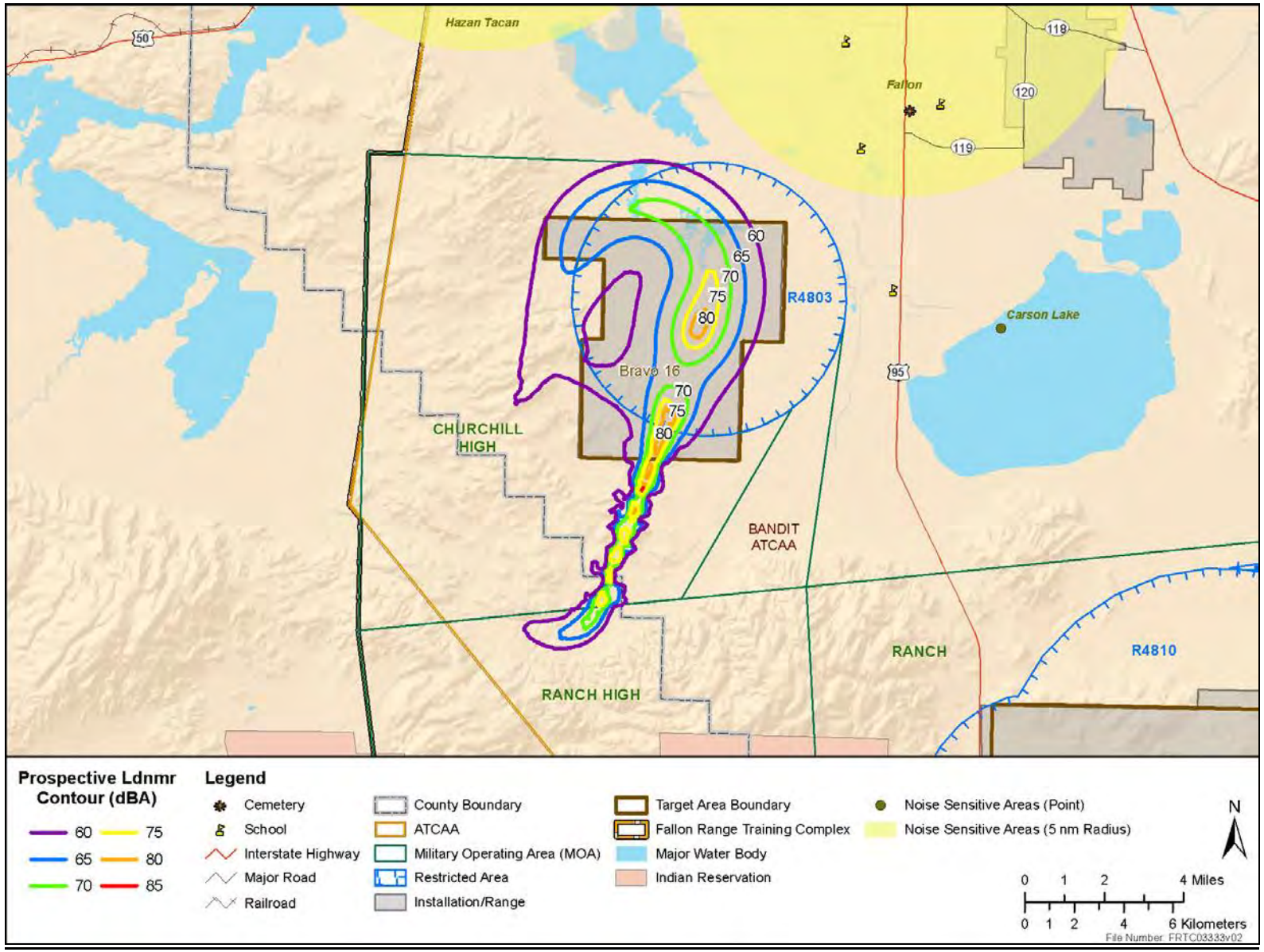


Figure 3.4-16: Estimated Ldnmr Contours under Alternative 1 and 2 at Bravo-16

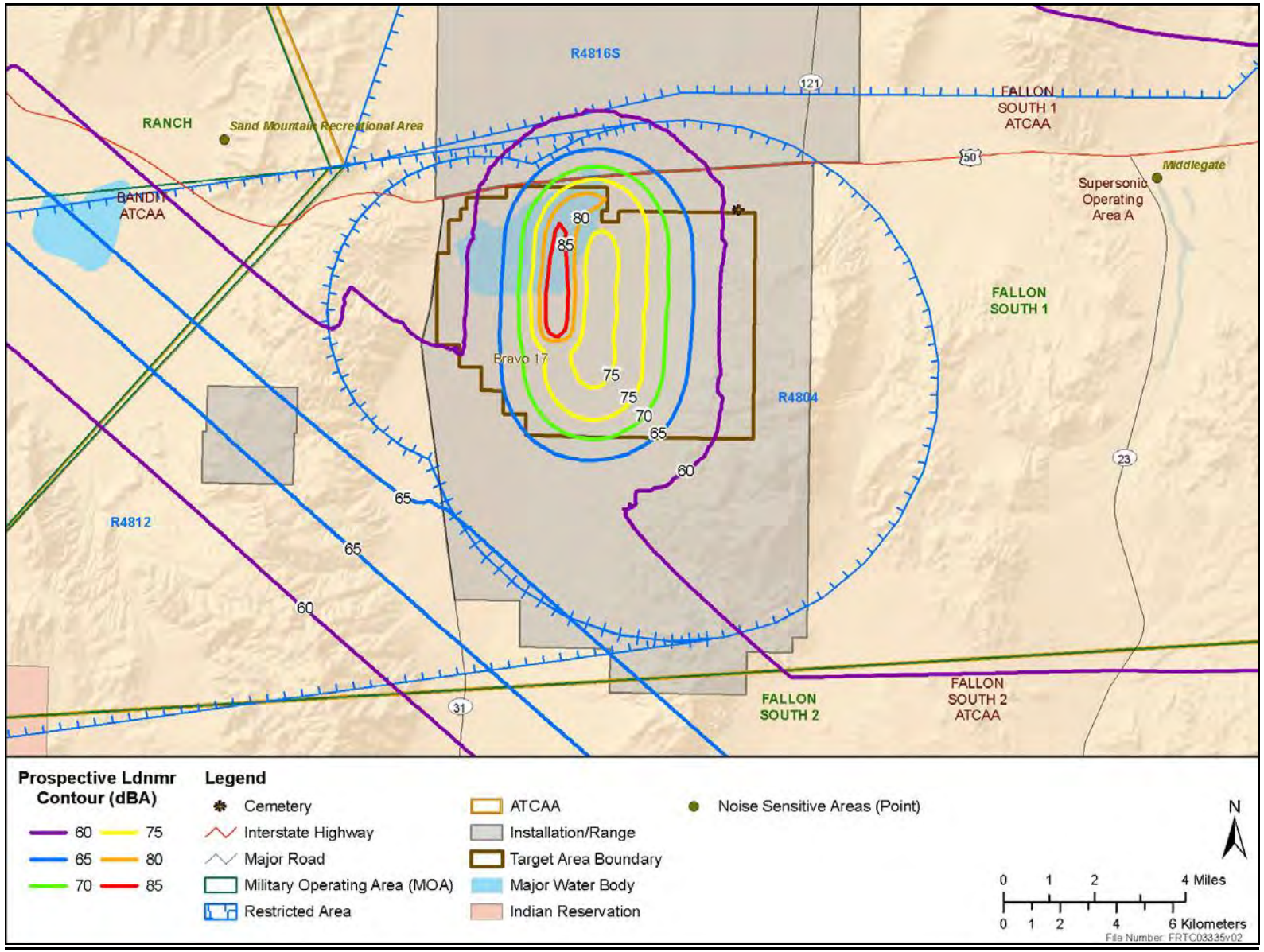


Figure 3.4-17: Estimated Ldnmr Contours under Alternative 1 and 2 at Bravo-17

altitude of 7,000–15,000 ft. (2,133.6–4572 m) AGL for fixed-wing operations. Even though the helicopters operate at altitudes of 100–3000 ft. (30.5–914.4 m) AGL, their numbers of operations combined with their single-event noise levels are insufficient to generate an Ldnmr of 60 dB or greater. Therefore, noise from aircraft overflights at B-17 would not interfere with normal activities associated with its use, and noise from aircraft activities under Alternative 1 would not represent degradation in the noise environment at these locations.

Bravo-20

As indicated in Tables 2-4 and 2-5 of Chapter 2 (Description of Proposed Action and Alternatives), under Alternative 1 the number of aircraft operations would increase by approximately 7 percent in comparison to the No Action Alternative. There would not be any changes to the flight tracks or the flight profiles in B-20.

MR_NMAP was used to calculate the 60–85 dB Ldnmr contours, in 5 dB increments, for sorties occurring at B-20 under Alternative 1. The 60 dB and 65 dB Ldnmr contours would be very similar to the No Action Alternative in terms of size and shape. On the west, east, and south sides of B-20, modeled community DNL are within Noise Zone II (excess of 65 dBA but not in excess of 75 dBA), which extends past the range boundary. Figure 3.4-19 shows an area (approximately 17,430 ac. [27.2 mi.^{2}]) with a DNL in excess of 65 dBA. Within this footprint, approximately 12,350 ac. (19.3 mi.^{2}) are above 70 dBA, which is slightly smaller than the No Action Alternative contour. Community DNLs above 75 dBA and Noise Zone III do not extend past the B-20 range boundary. Within the Noise Zone II area that extends off the B-20 range, DNLs would increase less than 1 dB, which is not a perceptible change by humans.

Similar to the No Action Alternative, visual inspection of these lands utilizing aerial imagery indicates no sensitive receptors (e.g., residences, lodging, medical facilities). The Stillwater Range Wilderness Study area is immediately to the east of B-20, but neither the 60 dBA nor the 65 dBA contour extend to the Wilderness Study Area boundary. Therefore, in these areas, during busy months of activities at FRTC, noise would not interfere with normal activities associated with its use, and noise from aircraft activities under the No Action Alternative would not represent degradation in the noise environment at these locations.

Ingress/Egress

MR_NMAP was used to calculate the 60–85 dB Ldnmr contours, in 5 dB increments, for events utilizing the ingress/egress routes under the No Action Alternative. The resulting Ldnmr contours for all FRTC aircraft operations combined do not reach or exceed 70 dBA, as shown in Figure 3.4-15. The 65 dB DNL contours along the ingress and egress routes are very similar to the No Action Alternative in terms of size and shape. The DNL would increase less than 1 dB (which is less than a perceptible change in noise level) along all ingress and egress routes, and the widths of the 65 dB Ldnmr would remain approximately the same as The No Action Alternative. In most areas, during busy months of activities at FRTC, noise would not interfere with normal activities associated with its use. However, the Admiral ingress/egress route overlies several Wildlife Study Areas (Job Peak, Stillwater Range, and August Mountain), whose usage is not compatible with Noise Zone II. The 60 dB contour along the ingress/egress routes would be virtually identical to the No Action Alternative and would not affect any densely populated areas but would encompass some agricultural land use in Pershing and Nye Counties. Overall, these minor increases in noise and their contribution to community DNLs would not be sufficient enough to represent a degradation of the noise environment.

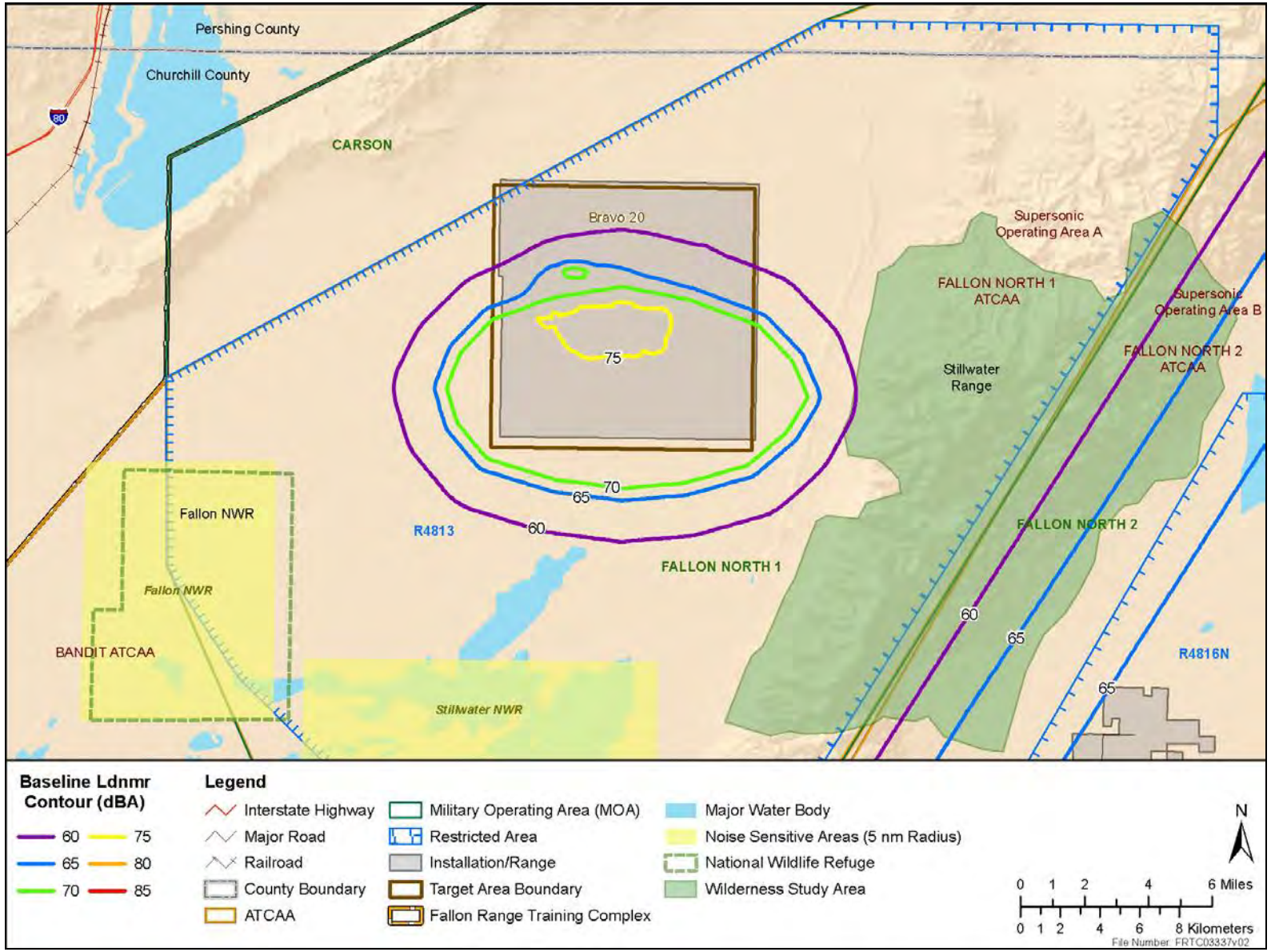


Figure 3.4-18: Estimated Ldnmr Contours under Alternative 1 and 2 at Bravo-20

Large-Scale Activities

As listed in Table 2-5, there would be no change in Anti-Air Warfare or Large Force Exercises under Alternative 1, and the contribution to the noise contours would be the same as those reported for the No Action Alternative.

Supersonic Activities

As listed in Table 2-5, there would be no change in Anti-Air Warfare or Large Force Exercises under Alternative 1, and the estimated supersonic events during busiest month would remain at 458 (Appendix E, Noise Study). The resulting CDNL contours do not reach or exceed 57 dB due to insufficient activity for the size of the flight area. The maximum CDNL of 52 dB occurs near the center of the SOA. While individual sonic booms may provide a brief, impulsive noise, the contribution to community DNLs would not be sufficient enough to represent a degradation of the noise environment.

3.4.2.2.2 Munitions Noise

Bravo-16

Table 2-5 summarizes the munitions proposed for use at B-16 under all alternatives. Munitions used on B-16 are restricted to .50 caliber, 5.56 mm, 7.62 mm and 9 mm. Table 3.4-5 displays the maximum noise levels from small arms at various distances from firing points. Small arms munitions was not modeled, as firing locations at B-16 are typically greater than 3,500 m (approximately 11,500 ft.) from the edge of the restricted range, and distances to sensitive receptors are such that noise levels would not significantly contribute to the noise environment. Given that small arms are the main source of munitions noise at B-16, noise levels are not expected to contribute to the noise environment at locations adjacent to the range at levels that are incompatible with land use of those areas.

Bravo-17

Table 2-5 summarizes the munitions proposed for use at B-17 under all alternatives. While small arms are utilized at B-17, under Alternative 1 large-caliber weapons (defined as weapons projectiles with diameters larger than 20 mm) are modeled. Small arms munitions were not modeled, as firing locations at B-17 are at distances from sensitive receptors where noise levels would not significantly contribute to the noise environment. Further, noises from small arms would likely be subsumed by noises from large-caliber weapons use on B-17. Similarly, inert munitions were not modeled, as noise associated with inert munitions is minimal. Under Alternative 1, approximately 14,500 live bombs would be utilized at B-17. Though munitions use increases under Alternative 1, the busiest month scenario remains the same. None of the CDNL contours extend beyond the B-17 boundary (Figure 3.4-12). Activities at these locations would not affect surrounding areas or sensitive receptors because the 62 dB contour does not extend beyond the range boundary.

Bravo-19

Table 2-5 summarizes the munitions proposed for use at B-19 under all alternatives. While small arms are utilized at B-19, under Alternative 1 large-caliber weapons (defined as weapons projectiles with diameters larger than 20 mm) are also used. Small arms munitions were not modeled, as firing locations at B-19 are at distances from sensitive receptors where noise levels would not significantly contribute to the noise environment. Further, noises from small arms would likely be subsumed by noises from large-caliber weapons use on B-19. Similarly, inert munitions were not modeled, as noise associated with inert munitions is minimal. Under Alternative 1, approximately 4,100 live bombs would be utilized at B-19.

While the amount of munitions used at B-19 increases relative to the No Action Alternative, the busiest month of activities remains the same as that for the No Action Alternative. The majority of elevated

community DNL levels are contained within the range boundary (Figure 3.4-13). However, a small portion of lands at the southern boundary of B-19 fall under contours that indicate CDNL levels above 62 dBC. Approximately 260 ac. (0.4 mi.^{2}) is located on lands belonging to the Walker River Indian Reservation. Visual inspection of these lands utilizing aerial imagery indicates no sensitive receptors that would be incompatible with Noise Zone II. Therefore, in these areas, during busy months of activities at FRTC, noise would not interfere with normal activities associated with its use, and noise from aircraft activities under the No Action Alternative would not represent degradation in the noise environment at these locations.

Bravo-20

Table 2-5 summarizes the munitions proposed for use at B-20 under all alternatives. Similar to the No Action Alternative, small arms munitions were not modeled, as firing locations at B-20 are at distances from sensitive receptors where noise levels would not significantly contribute to the noise environment. Further, noises from small arms would likely be subsumed by noises from large-caliber weapons use on B-20. Similarly, inert munitions were not modeled, as noise associated with inert munitions is minimal.

Under Alternative 1, approximately 4,300 live bombs would be utilized at B-20. Figure 3.4-14 shows 57, 62, and 70 CDNL levels during the busiest month at B-20. Although the amount of munitions used at B-20 increases under Alternative 1, the busiest month remains the same. Activities at these locations would not affect surrounding areas or sensitive receptors because the 62 dB contour does not extend beyond the range boundary.

3.4.2.3 Alternative 2 (Preferred Alternative)

3.4.2.3.1 Aircraft Noise

Table 2-6 of Chapter 2 (Description of Proposed Action and Alternatives) presents annual estimates of aircraft sorties. This table presents the total number of fixed-wing, rotary-wing, and un-manned aerial systems proposed under each action alternative.

Under Alternative 2, the number of aircraft sorties would increase to about 50,592 aircraft sorties per year (fixed-wing, rotary-wing, and UAS) for training within the FRTC airspace, or about 139 sorties per training day. Under Alternative 2, aircraft involved in aerial training activities would be present somewhere in the restricted airspace for about 68,494 hours per year (see Table 2-4). Under Alternative 2, the F/A-18 and F-35 continue to account for approximately 74 percent of all aircraft sorties (37,466 of 50,592 total sorties). As presented in Table 2-6, the majority of fixed-wing activities occur above 3,000 ft. (914.4 ft.) AGL. Rotary-wing aircraft are flown almost exclusively under 3,000 ft. (914.4 ft.) AGL, although these flights only represent approximately 3 percent of all sorties flown in the FRTC Airspace. Similarly, most UAS (196 total sorties per year) are flown under 3,000 ft. (914.4 ft.) AGL. Approximately 35 percent of all sorties are flown during nighttime hours. Although aircraft activities increase under Alternative 2 in comparison to the No Action Alternative, the busiest month (what is used for modeling) is the same as Alternative 1. Aircraft overflights would create discrete brief noise events that, while noticeable because they would exceed the ambient background sound level, would contribute very little to the hourly average sound level. Community sound levels from aircraft activities are compatible with land uses such as residences, transient lodging, and medical facilities. Therefore, there are no significant impacts to the sound environment.

MR_NMAP was used to calculate the 60 dB through 85 dB Ldnmr contours for large-scale activities, in 5 dB increments, for the adversary events under Alternative 1. The resulting Ldnmr contours for all FRTC aircraft operations are plotted in Figure 3.4-15. Similar to the No Action Alternative, Alternative 2

adversary events would contribute to generation of the 60 dB Ldnmr contour along the modeled Staging area and the Ending area. Additionally, the Engagement area would have a maximum distributed Ldnmr of 58 dB, which would contribute to the widening of the 60 and 65 dB contours along the fixed-wing ingress/egress routes and increase in contour area at Bravo 17 and Bravo 20. Relative to the No Action Alternative, the change in Ldnmr would be less than 0.5 dB, which, as described in Section 3.4.1.1.4 (Sound Intensity and Perception), is not perceptible to humans.

Supersonic Activities

The 57 dB through 85 dB CDNL contours were calculated, in 5 dB increments, for Alternative 2 aircraft supersonic operations. The resulting CDNL contours would not reach or exceed 57 dB due to insufficient activity for the size of the flight area. The maximum CDNL of 53 dB would occur near the center of the SOA. The CDNL due to supersonic operations would increase approximately 1 dB relative to the No Action Alternative, which is not a perceptible change in the noise environment.

During busy months of activities at FRTC, noise would not interfere with normal activities associated with its use, and noise from aircraft activities under Alternative 2 would not represent degradation in the noise environment at these locations.

3.4.2.3.2 Munitions Noise

Table 2-5 of Chapter 2 (Description of Proposed Action and Alternatives) presents annual estimates of munitions use throughout the FRTC. Although munitions use increases under Alternative 2 in comparison to the No Action Alternative, the busiest month (what is used for modeling) is the same as Alternative 1. For all ranges and activities, the contours and the conclusions drawn from them are identical to Alternative 1. Noise-generating events from training would be intermittent, occur in areas removed from sensitive receptors, and would not expose sensitive receptors to high noise levels. With the exception of B-17, CDNL contours would not extend beyond range boundaries. At B-17, the 62 dBC CDNL contour extends just south of the range, but does not overlap with any sensitive receptors. During busy months of activities at FRTC, noise would not interfere with normal activities associated with its use, and noise from munitions under Alternative 2 would not represent degradation in the noise environment at these locations.

3.4.2.4 Proposed Management Practices, Monitoring, and Mitigation Measures

3.4.2.4.1 Proposed Best Management Practices

No specific best management practices were identified for acoustics.

3.4.2.4.2 Proposed Monitoring

No specific monitoring needs were identified for acoustics.

3.4.2.4.3 Proposed Mitigation Measures

No specific mitigation needs were identified for acoustics.

3.4.2.5 Summary of Effects and Conclusions

Noise levels generated by the proposed action under the No Action Alternative and Alternatives 1 and 2 would not have significant impacts on sensitive receptors, as noise from aircraft and munitions would be dispersed and intermittent and would not contribute significantly to long-term noise levels, and no sensitive receptors would be exposed to these noise events due to the area land use that is affected. Table 3.4-6 summarizes the airborne noise effects for the No Action, Alternative 1, and Alternative 2.

Table 3.4-6: Summary of Effects

Noise Stressor	Summary of Effects and National Environmental Policy Act Determination
No Action Alternative, Alternative 1, and Alternative 2	
Aircraft	• Aircraft overflights would create discrete brief noise events that, while noticeable because they would exceed the ambient background sound level, would contribute very little to the hourly average sound level. • Community sound levels from aircraft activities are compatible with land uses such as residences, transient lodging, and medical facilities.
Military Munitions	• Noise-generating events from training would be intermittent, occur in areas removed from sensitive receptors, and would not expose sensitive receptors to high noise levels. • With the exception of B-17, CDNL contours would not extend beyond range boundaries. At B-17, the 62 dBC CDNL contour extends just south of the range but does not overlap with any sensitive receptors. Therefore, there are no incompatible land use areas.
Impact Conclusion	• Noise from aircraft or munitions would not represent degradation in the noise environment under the No Action Alternative, Alternative 1, or Alternative 2.

Notes: CDNL = C-weighted Day-Night Average Sound Level, dBC = C-weighted decibels

3.5 BIOLOGICAL RESOURCES

3.5.1 INTRODUCTION

3.5.1.1 Overview

This section addresses biological resources, including vegetation, mammals, birds, fish, reptiles, and amphibians. The Study Area for biological resources includes all lands that lie beneath the existing Fallon Range Training Complex (FRTC) special use airspace (SUA) (see Figure 1-1) as well at the airspace itself. With the exception of noise, potential direct and indirect effects of the Proposed Action to biological resources would be limited to certain areas within ground ranges of the FRTC. Accordingly, the analysis focuses on these ranges, but also considers the effects of noise on wildlife (fish, birds, mammals, and reptiles/amphibians) beneath the existing SUA.

The Affected Environment section is organized by major groups (vegetation, mammals, birds, fish, and amphibians/reptiles). General descriptions are provided for each group, followed by detailed descriptions of any "special status species" in that group. For the purposes of this Environmental Impact Statement (EIS), special status species include:

- Species listed as threatened or endangered under the Endangered Species Act of 1973 (ESA) and species proposed for listing.
- Species considered by the United States (U.S.) Fish and Wildlife Service (USFWS) as a candidate for ESA listing.
- Species of concern identified by USFWS. As an informal category not defined by the ESA, the term commonly refers to species that are declining or appear to be in need of conservation. The USFWS Nevada Ecological Services Field Office maintains a list of species of concern (U.S. Fish and Wildlife Service 2013a) for the region.
- Birds of conservation concern identified by USFWS for Bird Conservation Region 9 (U.S. Fish and Wildlife Service 2008). The overall goal of this category is to accurately identify those species (beyond those already federally listed as threatened or endangered) in greatest need of conservation action at three different geographic scales (Bird Conservation Regions, USFWS Regions, and national).
- Species classified as threatened, endangered, protected, or sensitive under the Nevada Natural Heritage Program.

The Environmental Consequences section presents an analysis of the potential impacts of the No Action Alternative, Alternative 1, and Alternative 2. For each alternative, the analysis is organized by potential stressors (noise, physical disturbance and strikes, electromagnetic radiation and lasers, and secondary stressors). The analysis for each stressor begins with an overview of the potential effects on wildlife in general, and then provides more detailed analysis for specific groups of wildlife and special status species, as appropriate.

3.5.1.2 Regulatory Framework and Management Practices

3.5.1.2.1 Endangered Species Act

The ESA of 1973 (16 U.S. Code [U.S.C.] 1531–1543) established protection over and conservation of threatened and endangered species and the ecosystems on which they depend. An "endangered" species is a species that is in danger of extinction throughout all or a significant portion of its range, while a "threatened" species is one that is likely to become endangered within the foreseeable future throughout all or in a significant portion of its range. The USFWS and National Marine Fisheries Service

(NMFS) administer the ESA. The USFWS has primary responsibility for terrestrial and freshwater species, while the NMFS has primary responsibility for marine species and anadromous fish species (species that migrate from saltwater to freshwater to spawn). No species under NMFS jurisdiction are found on lands of the FRTC. The ESA allows the designation of geographic areas as critical habitat for threatened or endangered species.

Section 7(a)(1) of the ESA directs federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Section 7(a)(2) requires each federal agency to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species. When a federal agency's action “is likely to adversely affect” a listed species, that agency is required to consult formally with USFWS or the NMFS, depending upon the species or designated critical habitat that may be affected by the action (50 Code of Federal Regulations [C.F.R.] 402.14(a)). Under the terms of Section 7(b)(4) and Section 7(o)(2) of the ESA, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act, provided that such taking is in compliance with the terms and conditions of an Incidental Take Statement. For species that are proposed for listing as endangered or threatened, Section 7(a)(4) of the ESA requires agencies to confer with the USFWS on any agency action that is likely to jeopardize the continued existence of the species. Three species of fish (Cui-ui [*Chasmistes cujus*], Lahontan cutthroat trout [*Onchoryhncus clarkia henshawi*], and Railroad Valley Springfish [*Crenichtys nevadae*]), one bird species (Greater sage-grouse [*Centrocercus urophasianus*]), and one amphibian (Columbian spotted frog [*Rana luteiventris*]) are currently either listed or proposed for listing under ESA.

3.5.1.2.2 Federal Noxious Weed Act

The Federal Noxious Weed Act of 1974 was enacted in 1975 with the purpose of managing and controlling the spread of noxious weeds. Pursuant to the Act, the U.S. Secretary of Agriculture was given the authority to declare plants "noxious weeds," and limit the interstate spread of such plants without a permit. The Federal Noxious Weed Act was amended by the Farm Bill on November 28, 1990. The amendment requires all federal land managing agencies to (1) designate an office or person trained in managing undesirable plant species to develop and coordinate a program to control such plants on the agency's land, (2) ensure that the agency’s budget process adequately funds the plant management program, (3) develop and implement cooperative agreements with the States regarding undesirable plants on agency land, and (4) establish integrated management systems to control or contain undesirable plants targeted under the cooperative agreements.

3.5.1.2.3 Executive Order 13112, *Invasive Species*

Executive Order (EO) 13112, *Invasive Species*, directs federal agencies whose actions may affect the status of invasive species to use relevant programs and authorities to:

- Prevent the introduction of invasive species.
- Detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner.
- Monitor invasive species populations accurately and reliably.

In addition, agencies may not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species unless the agency has determined that the

benefits of such actions clearly outweigh the potential harm. All feasible and prudent measures to minimize risk of harm must also be taken in conjunction with the actions.

3.5.1.2.4 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703 et seq.) and the Migratory Bird Conservation Act (16 U.S.C. 715–715d, 715e, 715f–715r) of February 18, 1929 (45 Stat. 1222) are the primary legislation in the United States established to conserve migratory birds. The MBTA prohibits the taking, killing, or possessing of migratory birds or the parts, nests, or eggs of such birds, unless permitted by regulation. The list of species protected by the MBTA appears in Title 50, Section 10.13 of the C.F.R. (50 C.F.R. 10.13) and represents almost all avian families found in North America. With the exception of the following non-migratory species, California quail (*Callipepla californica*), European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), rock pigeon (*Columba livia*), and ring-necked pheasant (*Phasianus colchicus*), all bird species recorded at the FRTC are protected by the MBTA.

Pursuant to EO 13186 (January 21, 2001), *Responsibilities of Federal Agencies to Protect Migratory Birds*, the Department of Defense (DoD) and USFWS developed a Memorandum of Understanding to Promote the Conservation of Migratory Birds. The original Memorandum of Understanding was signed in July 2006, and the replacement was signed in September 2013. The Memorandum of Understanding describes specific actions that should be taken by the Department of Defense (DoD) to advance migratory bird conservation, avoid or minimize the take of migratory birds, and ensure DoD activities (other than military readiness activities) are consistent with the MBTA. The Memorandum of Understanding also describes how DoD and USFWS will work together cooperatively to achieve these ends. The *Integrated Natural Resource Management Plan and Environmental Assessment for Naval Air Station Fallon, Nevada* (U.S. Department of the Navy 2006a) is designed to be in compliance with the requirements of the DoD and USFWS Memorandum of Understanding.

On December 2, 2003, the President signed the 2003 National Defense Authorization Act. The Act provides that the Secretary of the Interior shall exercise his/her authority under the MBTA to prescribe regulations to allow the incidental taking of migratory birds by the Armed Forces during military readiness activities authorized by the Secretary of Defense. Congress defined military readiness activities as all training and operations of the Armed Forces that relate to combat and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. Congress further provided that military readiness activities do not include the following:

- The routine operation of installation operating support functions, such as administrative offices, military exchanges, commissaries, water treatment facilities, storage facilities, schools, housing, motor pools, laundries, morale, welfare, recreation activities, shops, and mess halls
- The operation of industrial activities
- The construction or demolition of facilities used for a purpose described in the previous two bullets

The Final Rule authorizing the DoD to take migratory birds during military readiness activities was published in the Federal Register (FR) on February 28, 2007 (50 C.F.R. Part 21.15). The regulation provides that the Armed Forces must confer and cooperate with USFWS on the development and implementation of conservation measures to minimize or mitigate adverse effects of a military readiness activity if it determines that such activity may have a “significant adverse effect” on a population of a migratory bird species. An activity has a significant adverse effect if, over a reasonable

period of time, it diminishes the capacity of a population of a migratory bird species to maintain genetic diversity, to reproduce, and to function effectively in its native ecosystem. As used here, population means a group of distinct, coexisting, conspecific individuals (i.e., organisms of the same species), whose breeding site fidelity, migration routes, and wintering areas are temporally and spatially stable, sufficiently distinct geographically (at some time of the year), and adequately described so that the population can be effectively monitored to discern changes in its status.

3.5.1.2.5 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (Eagle Act) prohibits killing, selling, or otherwise harming eagles, their nests, or eggs. Specifically, the Eagle Act (16 U.S.C. 668-668c), enacted in 1940, and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald or golden eagles, including their parts, nests, or eggs. The Act defines "take" as pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb. "Disturb" means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle; (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.

3.5.1.2.6 Sikes Act

The Sikes Act (16 U.S.C. 670) of 1960 ensures cooperation by the Department of the Interior and DoD with State agencies in planning, development, and maintenance of fish and wildlife resources on military reservations throughout the U.S. Chief of Naval Operations Instruction (OPNAVINST) 5090.1D and the Office of the Chief of Naval Operations (OPNAV) Manual (M) (OPNAV M-5090.1), Environmental Readiness Program Manual discuss requirements, delineate responsibilities, and issue policy for the management of the environment and natural resources for all U.S. Department of the Navy (Navy) shore activities. In order to comply with the Sikes Act, the Navy developed an Integrated Natural Resource Management Plan (INRMP) in July 2014 to ensure that natural resources conservation measures and military operations on Naval Air Station (NAS) Fallon and NAS Fallon-administered lands are integrated and consistent with stewardship and legal requirements. The INRMP ensures consistency with the use of NAS Fallon and NAS Fallon-administered lands to support the preparedness of the Armed Forces, while providing for the following: (1) the conservation and rehabilitation of natural resources on NAS Fallon-administered lands; (2) the sustainable multipurpose use of the resources, including hunting, fishing, trapping, and non-consumptive uses; and (3) public access to NAS Fallon-administered lands within safety and military security requirements.

3.5.1.2.7 Wild Free-Roaming Horse and Burro Act

The Wild Free-Roaming Horse and Burro Act (Public Law 92-195), signed December 15, 1971, and amended in 1976 by the Federal Land Policy and Management Act (Public Law 94-579), provides the parameters by which these species are to be managed. These guidelines stipulate the determined control of these species based on their importance as a cultural icon and the possible damages they may impose on native flora and fauna. Their habitats, as well as daily and seasonal movements, are typically determined by water availability (U.S. Department of the Navy 2008). The Bureau of Land Management (BLM) Stillwater Field Office manages wild horse and burros in this area in accordance with the Wild Free-Roaming Horses and Burro Act (U.S. Department of the Navy 2006a).

3.5.1.2.8 Nevada Endangered and Sensitive Species Laws and Regulations

For purposes of National Environmental Policy Act analysis, this EIS considers potential effects on

species that are classified by the state as endangered, threatened, protected, or sensitive. As discussed in Section 3.5.1.1 (Overview), these species are collectively referred to as special status species in this EIS, along with species that are federally listed, proposed for listing, or classified as candidates for listing under ESA.

Under state law the Fish and Wildlife Commission through the Nevada Department of Conservation and Natural Resources maintains the list of native wildlife species and plants in Nevada that have been determined to be either threatened, endangered, protected, or sensitive according to criteria set forth by rule (Nevada Revised Statues 501.105, 501.181). The classification of sensitive species helps focus wildlife management and research activities to prevent species from further decline. The state uses the following classification terms:

- Endangered – A species or subspecies of wildlife may be classified as endangered when a species or subspecies is in danger of extinction throughout all or a significant portion of its range.
- Threatened – A species or subspecies of wildlife may be classified as threatened when a species or subspecies is likely to become an endangered species in the near future throughout all or a significant portion of its range.
- Protected – A species or subspecies of wildlife may be classified as protected if one of the following criteria exists: the wildlife is found only in this State and its population; distribution or habitat is limited; the wildlife has a limited population or distribution within this State that is likely to decline as a result of human or natural causes; the population of the wildlife is threatened as a result of the deterioration or loss of its habitat; the wildlife have ecological, scientific, educational, or other value that justifies its classification as protected; the available data is not adequate to determine the exact status of the population of the wildlife, but does indicate a limited population, distribution or habitat; the wildlife is listed by the USFWS in the Federal Register as a candidate species, or it is classified as threatened or endangered in the federal ESA; or other evidence exists to justify classifying the wildlife as protected.
- Sensitive – A species or subspecies of wildlife may be classified as sensitive if one of the following criteria exists: the population or distribution of the wildlife is in a significant decline; the population of wildlife is threatened as a result of disease, predation, or ecological or human causes; the primary habitat of the wildlife is deteriorating; the wildlife is listed by the USFWS in the Federal Register as a candidate species or is classified as threatened or endangered in the federal ESA.

3.5.1.3 Approach to Analysis

3.5.1.3.1 Vegetation

The impact analysis for vegetation considered effects of the Proposed Action on plant communities and populations. Potential changes in plant communities arising from invasive species and wildfire were also considered. The significance of impacts on vegetation was considered in the context of local plant communities and populations of special status plant species. Factors used in determining the significance of impacts on vegetation included the amount of habitat permanently lost, in relationship to the abundance of that habitat and the extent to which proposed activities would contribute to existing invasive plant management issues.

3.5.1.3.2 Wildlife

The impact analysis for wildlife (fish, birds, mammals, and reptiles/amphibians) considered effects of the

Proposed Action on individual animals and populations. The analysis first looked at how individuals would respond to a stressor or combination of stressors and whether the response would affect the fitness of an individual. Fitness refers to changes in an individual's growth, survival, annual reproductive success, or lifetime reproductive success. If individual fitness is not affected, then no impacts on populations would be expected. The potential for impacts to occur at the population level depends on several things, including whether individual fitness has been reduced, the number of individuals affected, the size of the affected population, and numerous life history and ecological factors.

The significance of impacts on wildlife was considered in the context of populations. A population is broadly defined as a group of animals of one species that interbreed and live in the same place at the same time. The geographic scale used to define a particular wildlife population is influenced by species-specific life history characteristics such as migratory and breeding behavior, as well as ecological factors such as habitat availability and barriers to migration or dispersal. These species-specific characteristics and ecological factors are discussed in more detail in Section 3.5.2 (Affected Environment). In particular, impacts on special status wildlife species were considered because populations of these species have declined historically or are currently declining on a regional or national level.

Impacts on wildlife would be determined significant if the fitness of individual animals were affected directly or indirectly to the extent that populations would decline or become unstable. For an outcome to be biologically significant to a population, it must have a measurable impact on the population and/or its habitat that could reasonably be expected to affect its stability, and as a result influence a population's viability. The scientific limitations associated with predicting the responses of individuals and populations to stressors create a relatively high degree of uncertainty. Accordingly, a conservative approach was used in making significance determinations when the level of uncertainty was considered high.

3.5.2 AFFECTED ENVIRONMENT

3.5.2.1 Vegetation

In this document, only vegetative communities are discussed for areas where ground disturbing activities may occur. The majority of the area in and around the FRTC Study Area is desert habitat. Elevation ranges from mountains of nearly 8,000 ft. to playas around 3,300 ft. Most of the habitats are new alluvial fans or old fans transformed into desert mounds. There are some hillside and mountain habitats as well. The dominant shrub over much of this land is Bailey's greasewood (*Sarcobatus baileyi*). In the sections below, unless otherwise noted, all species are considered native to the area.

3.5.2.1.1 Naval Air Station Fallon Main Station

NAS Fallon (Figure 3.5-1) is in the Lahontan Valley of the Carson Desert. The air station itself is situated in a large closed drainage basin (basin floor habitat), where the soils are predominantly clay, have a large content of salts and other minerals, and are low in nutrients. Industrial facilities and residential areas have been developed within the base property boundaries. Most of the lands surrounding the developed central portions of NAS Fallon are managed as part of the greenbelt and are currently in agricultural production, are fallow, or are disturbed. Native upland habitats that are still present within the base boundaries include relatively small isolated areas of playa and sandy habitats, with more extensive occurrences of basin floor habitats in the southwestern and southeastern portions of the property. The native habitats within the base boundaries have sodic or strongly alkaline soils with greasewood (*Sarcobatus vermiculatus*) as the dominant or co-dominant shrub.

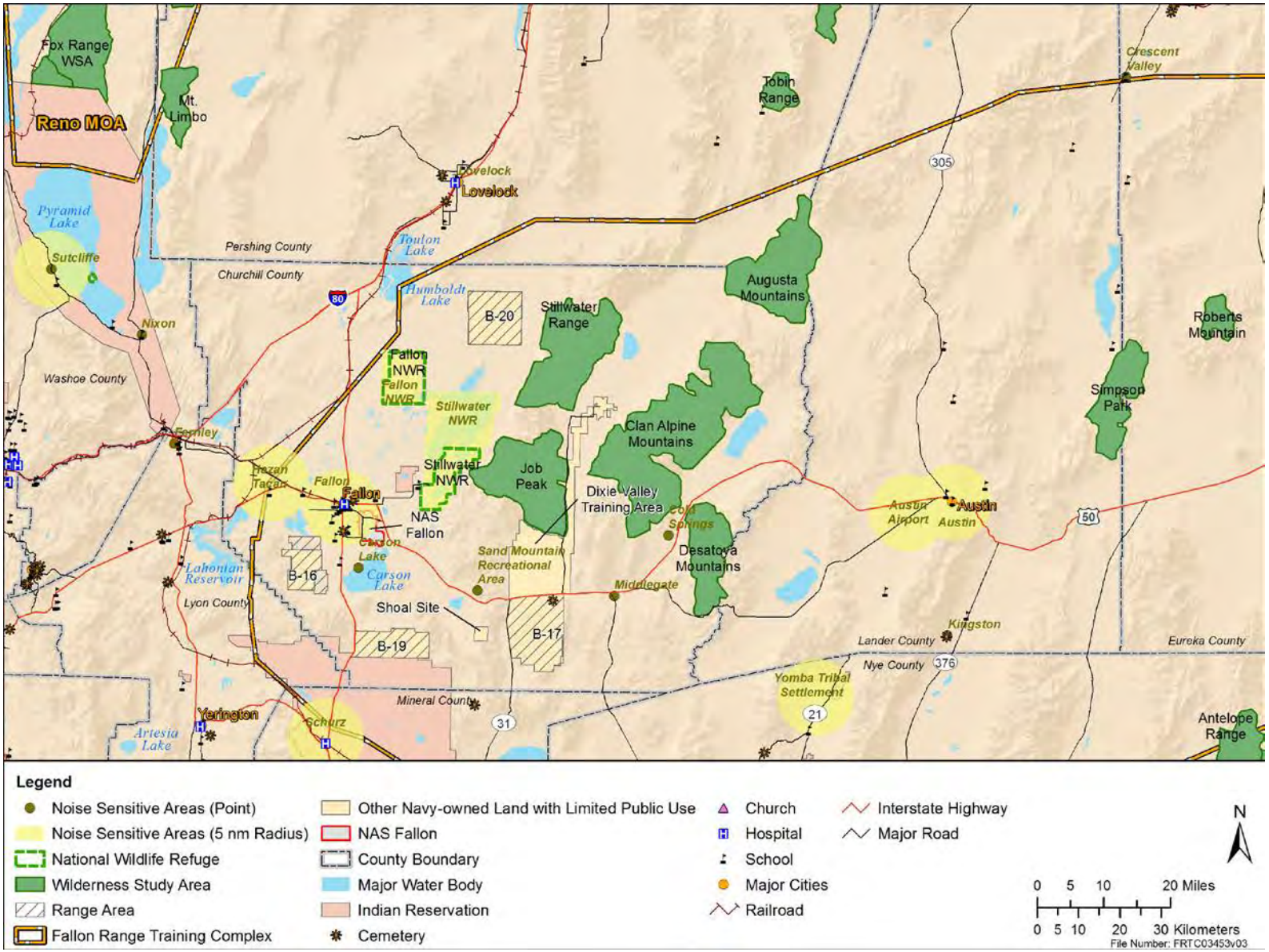


Figure 3.5-1: FRTC Study Area

3.5.2.1.2 Bravo-16

The central portion of Bravo-16 (B-16) (Figure 3.5-1) is occupied primarily by piedmont slope habitats surrounded by, and sometimes interspersed with, sandy habitats on the eastern and western portions of the training range. The piedmont slope habitats include a narrow band of badlands bordered on the east by a wide band of gravelly loam slopes vegetated with desert shrub habitat that is dominated by Bailey greasewood. Bailey greasewood, fourwing saltbush (*Atriplex canescens*), and Indian ricegrass (*Achnatherum hymenoides*) are the dominant plant species in the sandy habitats on the western portion of B-16. Sodic sands and stable dunes dominated by greasewood are the prevalent sandy habitats in the eastern portion of B-16.

The northern part of B-16 is comprised primarily of two distinct vegetation types, rabbitbrush (*Chrysothamnus* spp.) and Bailey's greasewood. The southern part of B-16 is predominantly covered by unvegetated playas. The dominant vegetation type away from the playas is a mixture of greasewood-Bailey's greasewood-seepweed (*Suaeda moquinii*).

3.5.2.1.3 Bravo-17

Bravo 17 (B-17) (Figure 3.5-1) has a high diversity of distinct plant communities, with 52 vegetation types. More than half of the range is covered by Bailey's greasewood either as the sole dominant or in combination with as many as 14 other species, including 3 perennial grasses. The most widely distributed vegetation consists of Bailey's greasewood-spiny hopsage (*Grayia spinosa*)-shadscale (*Atriplex conterfolia*).

The predominant habitats on B-17 are classified as piedmont slope habitats. There is a large playa in the northwestern portion of the range bordered on the east side by a small area of basin floor habitat. The basin floor habitat at this site is a sodic flat characterized by greasewood and alkali seepweed. Sandy habitat that supports fourwing saltbush and Indian ricegrass is intermixed with piedmont slope habitats on the western half of B-17. The piedmont slope habitats are lower in elevation on the western side of the training range and gradually increase in elevation toward the east, where B-17 is bordered by Fairview Peak. The piedmont slope habitats are vegetated with a mosaic of desert shrub communities that may be dominated by Bailey greasewood, shadscale, seepweed, or a combination of these (U.S. Department of Navy 2006a). Indian ricegrass is common in the grass and forb layer of the lower piedmont slopes on B-17. Sagebrush dominated habitats are present in higher elevations along the eastern portion of B-17. These habitats are dominated by black sagebrush (*Artemisia nova*) or Wyoming big sagebrush (*Artemisia tridentata var. wyomingensis*).

3.5.2.1.4 Bravo-19

Sandy habitats, including large areas of unvegetated dunes, are prevalent on this site. There is a large playa surrounded by a moist saline flat area in the southwestern portion of Bravo-19 (B-19) (Figure 3.5-1). Within the moist saline flat area, iodinebush (*Allenrolfea occidentalis*), seepweed, and greasewood are the dominant shrubs, with inland saltgrass present in the understory. The sandy habitats include sodic sands, sodic dunes, stable dunes, and sandy range sites, all of which have fourwing saltbush as dominant or co-dominant in the shrub layer. Bailey greasewood, greasewood, seepweed, and horsebrush (*Tetradymia tetrameres*) are also present in varying amounts. Indian ricegrass is prevalent in most of the sandy habitats. Small localized piedmont slope habitats are interspersed with the sandy habitats throughout B-19. These are low elevation slopes with rocky or gravelly soils, and Bailey greasewood is the dominant shrub. One area classified as badlands is present in the south-southeast portion of B-19.

3.5.2.1.5 Bravo-20

B-20 (Figure 3.5-1) is situated in a large playa. Near the center of the training range is Lone Rock, a volcanic outcrop surrounded by a zone of dune habitat (U.S. Department of the Navy 1998) in the center of the range. The dune habitat on B-20 is vegetated with desert shrubs, primarily greasewood and seepweed.

3.5.2.1.6 Dixie Valley Training Area

Dixie Valley (Figure 3.5-1) is composed of a mosaic of vegetation communities. A significant portion of the valley is composed of remnant livestock and agricultural farmland with abandoned outbuildings. Basin habitats within the valley floor are characterized by greasewood, Torrey quail bush (*Atriplex lentiformis*), Great Basin wild rye (*Leymus cinereus*), and seepweed. South Dixie Valley includes numerous wetlands associated with flowing wells, and isolated areas of sandy habitats. These wetlands are typically streams and washes that are mostly unvegetated (U.S. Department of Navy 2008).

There are several invasive plant species in Dixie Valley, such as tamarisk (*Tamarix* spp.), whitetop (*Lepidium latifolium*), cheatgrass (*Bromus tectorum*), knapweeds, and Russian olives (*Elaeagnus angustifolius*). The Navy has implemented a control program for the invasive plants in Dixie Valley and has removed hundreds of tamarisk and Russian olives. Approximately 500 acres (ac.) of Russian knapweed (*Acroptilon repens*) and whitetop are being treated with herbicides and monitored for continued treatment.

Horse Creek Ranch

Piedmont slope habitats are present on the western side of the parcel and grade into sagebrush-dominated habitats on the east side. Horse Creek flows from the Clan Alpine Mountains to Dixie Valley and is the only perennial stream on Navy lands. At least half of the western portion of the property was historically used for agriculture and abandoned when the Navy took ownership in 1986. The remaining piedmont slope habitat is vegetated with desert shrubs dominated by Bailey greasewood. An area classified as sagebush-dominated habitat occurs on the alluvial terrace bordering Horse Creek and is actually dominated by light-gray rabbitbrush and other shrub species indicative of past disturbance. Environmental conditions are such that a return to sagebrush dominance would be expected eventually, hence the classification. The vegetation grades into Wyoming big sagebrush and Bailey greasewood on the upper slopes. Riparian woodland and wetlands communities are associated with Horse Creek itself. The wetlands habitats include vegetation such as yellow willow (*Salix lutea*), coyote willow (*Salix exigua*), and salt cedar (*Tamarix ramosissima*) (U.S. Department of Navy 2008).

South Dixie Valley, Kyle Lane (Dearing) Property

The northern half of this property is piedmont slope habitat dominated by winterfat (*Krascheninnikovia lanata*) and Indian ricegrass, with Bailey greasewood scattered in the shrub layer. The southern half of this property is classified as inactive agricultural, which is land that was previously used for agricultural purposes but is not currently in use.

South Dixie Valley, Cattle Road

The majority of this property is classified as inactive agricultural. Natural habitats that remain include sandy habitats and a small area of basin floor habitat in the southwest corner of the site. The sandy habitats support desert shrubs such as greasewood, alkali seepweed, and fourwing saltbush. The basin floor habitat is characterized by greasewood, Torrey quailbush, and seepweed.

South Dixie Valley, Settlement Road

All of the properties included in this area are primarily basin floor habitats interspersed with numerous wetlands associated with flowing wells, and isolated areas of sandy habitats. The wetlands habitats include vegetation such as southern cattail (*Typha dominguensis),* common three-square bulrush (*Scirpus pungens*)*,* and red willow (*Salix laevigata*) (U.S. Department of Navy 2008).The basin floor habitats are dominated by greasewood. The sandy habitats are sodic dunes with high shrub cover dominated by greasewood.

Dixie Meadows

Large portions of these properties are occupied by wetlands fed by springs flowing hot water at some locations and cold water at other locations. The wetlands are seasonally flooded and have a dense cover of bulrushes (*Scirpus spp.*), cattails (*Typha spp.*), and Baltic rush (*Juncus balticus*). Interspersed with the wetlands are areas of basin floor and piedmont slope habitats. The basin floor habitats in the central parcel are sodic fans vegetated with greasewood, Torrey quailbush, and basin wildrye. The basin floor habitats on the northern and southern parcels are sodic flats with greasewood as the dominant shrub and saltgrass present in the understory. The piedmont slope habitats are similar, with Bailey greasewood as the dominant shrub and grasses and forbs sparse in the understory.

North Dixie Valley, Bar A-3 Ranch (Boneck Property)

The majority of this property is classified inactive agricultural, with basin floor and piedmont slope habitats present at the eastern portion. The basin floor habitat is a sodic fan vegetated with greasewood, Torrey quailbush, and Great Basin wildrye. The small area of piedmont slope habitat is dominated by Bailey greasewood, with shadscale and Indian ricegrass also common.

North Dixie Valley (Boyer, Goeringer, Brinkerhoff)

This site includes inactive agricultural, disturbed, piedmont slope, sandy, and wetland habitats. The sandy habitats are sodic sands dominated by greasewood with alkali seepweed, fourwing saltbush, and Indian ricegrass sometimes present. The piedmont slope habitats on the eastern and western parcels are vegetated with Bailey greasewood, shadscale, and Indian ricegrass. The piedmont slope habitat in the central parcel is valley wash, in which the vegetation is affected by frequent flooding. Species that occur in the valley wash habitat include both successional species and species commonly found in adjacent, more stable, habitats and may include littleleaf horsebrush (*Tetradymia glabrata*), rubber rabbitbrush (*Chrysothamnus nauseosus*), hopsage, Indian ricegrass, bottlebrush squirreltail (*Elymus elymoides*), greasewood, and Bailey greasewood. The vegetation varies spatially within the area designated as valley wash due to the presence of channels and intervening, less recently flooded areas.

3.5.2.1.7 Special Status Plant Species

Per the USFWS Information, Planning, and Conservation System, and the Integrated Natural Resources Management Plan for FTRC, there are no Federally listed plant species known to exist on Navy-administered lands of the FRTC (U.S. Department of the Navy 2014).

3.5.2.2 Mammals

3.5.2.2.1 Overview

Common mammals observed on NAS Fallon or within habitats nearby include desert woodrat (*Neotoma lepida*), deer mouse (*Peromyscus maniculatus*), pocket gophers (*Thomomys* spp.), cottontail rabbits (Sylvilagus spp.), jackrabbits (*Lepus* spp.), coyote (*Canis latrans*), and mule deer (*Odocoileus hemionus*). Common bats include the California myotis (*Myotis californicus*), small-footed myotis (*Myotis leibii*),

long-eared myotis (*Myotis evotis*), Brazillian free-tailed bat (*Tadarida brasiliensis*), and the big brown bat (*Eptesicus fuscus*) (U.S. Department of the Navy 2013). Table 3.5-1 shows mammal species that are known to occur or potentially occur at FRTC based on ecological surveys of the complex (U.S. Department of the Navy 2006a, 2008, 2014).

Table 3.5-1: Mammal Species Known to Occur or Potentially Occurring at Fallon Range Training Complex

Species Name		Conservation Status	Habitat and Occurrence							
Common	Scientific		BF	PL	PS	SN	SG	WT	AG	LS
badger	*Taxidea taxus*		X		X		X	X		
beaver	*Castor canadensis*	FM						X	X	
big brown bat	*Eptesicus fuscus*							X	X	X
bighorn sheep	*Ovis canadensis*	GM			X			X		
black-tailed hare	*Lepus californicus*		X		X		X		X	
bobcat	*Lynx rufus*	FM	X		X					
Brazillian free-tailed bat	*Tadarida basilliensis*	PM	X		X			X	X	
burro	*Equus asinus*				X		X	X		
bushytail woodrat	*Neotoma cinerea*				X		X		X	X
California myotis	*Myotis californicus*							X	X	X
canyon mouse	*Peromyscus crinitus*				X		X		X	
cattle	*Bos taurus*		X		X		X	X	X	
cave myotis	*Myotis velifer*				X					
coyote	*Canis latrans*		X		X			X	X	X
dark kangaroo mouse	*Microdipodops megacephalus*	PM	X			X				
deer mouse	*Peromyscus maniculatus*				X		X		X	X
desert cottontail	*Sylvilagus audubonii*	GM	X					X	X	
desert kit fox	*Vulpes macrotis*	FM	X				X			X
desert woodrat	*Neotoma lepida*						X		X	
fringed myotis	*Myotis thysanodes*	PM			X		X			
golden-mantled squirrel	*Cittelus lateralis*				X					
gopher	*Thomomys talpoides*		X						X	
Great Basin kangaroo rat	*Dipodomys microps*		X			X	X			
Great Basin pocket mouse	*Perognathus parvus*		X						X	
hairy winged myotis	*Myotis volans*							X		
hoary bat	*Lasiurus cinereus*							X	X	
horse	*Equus caballus*		X		X		X	X	X	
least chipmunk	*Eutamius minimus*				X					

Table 3.5-1: Mammal Species Known to Occur or Potentially Occurring at Fallon Range Training Complex (continued)

Species Name		Conservation Status	Habitat and Occurrence							
Common	Scientific		BF	PL	PS	SN	SG	WT	AG	LS
little brown bat (myotis)	*Myotis lucifugus*							X	X	
long-eared myotis	*Myotis evotis*		X				X			
longtail vole	*Microtus longicaudus*						X		X	X
longtail weasel	*Mustela frenata*						X	X	X	
long-tailed pocket mouse	*Perognathus formosus*				X		X			
Merriam shrew	*Sorex merriami*							X	X	
Merriam's kangaroo rat	*Dipodomys merriami*				X	X	X		X	X
mountain cottontail	*Sylvilagus nuttalli*				X			X		
mountain lion	*Felis concolor*	GM			X					
mule deer	*Odocoileus hemionus*	GM	X		X			X		
muskrat	*Ondatra zibethica*	FM						X	X	
northern grasshopper mouse	*Onychomys leucogaster*				X		X		X	
Ord kangaroo rat	*Dipodomys ordi*				X					X
pale kangaroo mouse	*Microdipodops pallidus*	PM				X				
pallid bat	*Antrozous pallidus*	PM			X					
panamint kangaroo rat	*Dipodomys panamintinus*		X			X			X	
pinyon mouse	*Peromyscus truei*				X		X			
porcupine	*Erethizon dorsatum*				X					
pronghorn antelope	*Antilocapra americana*	GM	X				X			
pygmy rabbit	*Brachylagus idahoensis*	GM			X		X			
raccoon	*Procyon lotor*							X	X	
red bat	*Lasiurus blossevillii*	SM						X	X	
red fox	*Vulpes fulva*	FM	X		X		X	X	X	
sagebrush vole	*Lagurus curtatus*						X		X	X
shorttail weasel	*Mustela erminea*						X	X	X	
silver-haired bat	*Lasionycteris noctivagans*							X	X	
southern grasshopper mouse	*Onychomys torridus*						X		X	
spotted bat	*Euderma maculatum*	TM			X					
spotted skunk	*Spilogale putorius*		X			X	X		X	
striped skunk	*Mephitis mephitis*		X					X	X	X
Townsend big eared bat	*Corynorhinus townsendii townsendii*	SM	X		X					

Table 3.5-1: Mammal Species Known to Occur or Potentially Occurring at Fallon Range Training Complex (continued)

Species Name		Conservation Status	Habitat and Occurrence							
Common	Scientific		BF	PL	PS	SN	SG	WT	AG	LS
Townsend's ground squirrel	*Cittelus townsendi*				X				X	
vagrant shrew	*Sorex vagrans*							X	X	
valley pocket gopher	*Thomomys bottae*		X						X	
western harvest mouse	*Reithrodontomys megalotis*								X	X
western pipistrelle	*Pipistrellus hesperus*				X					
Western small-footed myotis	*Myotis cilioabrum*				X					
white-tailed antelope ground squirrel	*Ammospermophilus leucurus*		X		X	X	X		X	
yellowbelly marmot	*Marmota flaviventris*				X					
Yuma myotis	*Myotis yumanensis*							X		

Notes: AG = Agricultural, BF = Basin Floor Habitat, FM = Nevada State Fur-Bearing Mammal, GM = Nevada State Game Mammal, LS = Landscaped, PL = Playa Habitat, PM = Nevada State Protected Mammal, PS = Piedmont Slope habitat, SG = Sagebrush Habitat, SM = Nevada State Sensitive Mammal, SN = Sandy Habitat, TM = Nevada State Threatened Mammal, WT = WetlandSource: U.S. Department of the Navy 2008, U.S. Department of the Navy 2006a

3.5.2.2.2 Special Status Mammal Species

Table 3.5-1 provides a list of special status mammal species that potentially occur at FRTC, as well as information about habitat use and occurrence. The State of Nevada identifies mammal species as threatened, endangered, protected, sensitive, or game/fur-bearing. Game and fur-bearing mammals are identified in Table 3.5-1 but are not described further, as these species are part of active harvesting activities. Descriptions of special status mammal species are provided in the following sections.

Pallid Bat

The pallid bat (*Antrozous pallidus*) is listed as a protected mammal under the Nevada Species of Conservation Priority. It is found year round in a variety of habitats, such as the low desert, brushy terrain, pinyon-juniper, blackbrush, creosote, sagebrush, salt desert scrub habitats, coniferous forest, and non-coniferous woodlands. The pallid bat hibernates during the winter but periodically arouses to forage and drink water. Threats to the pallid bat include recreational caving, closure of mines for reclamation, renewed mining, and water impoundments. Its range is throughout western North America, from British Columbia's southern interior, south to Queretaro and Jalisco, and east to Texas (Bradley et al. 2006). The pallid bat is found throughout the state of Nevada, primarily in the low and middle elevations (1,800 meters [m]), but has been found to occur at over 3,100 m. Population trend data is lacking for pallid bats; however, roosting and habitat requirements are limiting factors for populations (Western Bat Working Group 2005).

Townsend's big-eared bat

The Townsend's big-eared bat (*Corynorhinus townsendii*) is listed as a sensitive mammal under the Nevada Species of Conservation Priority. It is found throughout Nevada from the low desert to high mountain habitats and is concentrated in areas with caves or mines as roosting sites. It ranges from Western Canada and the western United States, to southern Mexico, and there are a few populations in the eastern United States. It is not known to migrate long distances. The Townsend's big-eared bat has

had large population declines in the past 40 years in parts of the western states, and roost size reductions have been documented in Nevada (Nevada Department of Wildlife 2012a). Primary threats to Townsend's big-eared bat include disturbance and destruction of roost sties, recreational caving, closure of mines for reclamation, renewed mining, frequent or repeated surveys during hibernation and maternity seasons, water impoundments, loss of building roost, and bridge replacement (Bradley et al. 2006).

Spotted Bat

The spotted bat (*Euderma maculatum*) is listed as a threatened mammal under the Nevada Species of Conservation Priority. Its habitats include low elevation desert scrub to high elevation coniferous forests including pinyon-juniper, sagebrush, riparian, and urban high-rises. Range extends from British Colombia south through the western United States and Mexico. The spotted bat is scattered in distribution throughout Nevada. The patchy distribution is linked to availability of cliff roosting-habitat. As little is known about the population sizes and needs of spotted bats, their rare and patchy distribution, along with habitat loss, collection, recreational rock climbing, water impoundments, grazing, mining operations, and pesticide use are all reasons for the listing of spotted bats as Nevada Species of Conservation Priority (Nevada Department of Wildlife 2012b).

Western Red Bat

The western red bat (*Lasiurus blossevillii*) is listed as a sensitive mammal under the Nevada Species of Conservation Priority. It is found primarily in wooded habitats, including mesquite bosque, cottonwood, and willow riparian areas. The western red bat occurs from southern British Columbia, through the western United States, Mexico, Central Mexico, and possibly to South America (Dudek 2012). Threats to the western red bat include loss and degradation of riparian habitats, agricultural spraying, water impoundments, fire, predation, and collection by humans to be pets. The western red bat is extremely rare in Nevada and has been found in only two locations, one of which was in the Fallon area, another in Dyer (Bradley et al. 2006).

Dark Kangaroo Mouse

The dark kangaroo mouse (*Microdipodops megacephalus*) is listed as a protected mammal under the Species of Conservation Priority in Nevada. The dark kangaroo mouse is a bipedal rodent that moves around by hopping along on its hind legs, much like a kangaroo. It is restricted to the Great Basin Desert, and its distribution is centered in Nevada, although populations extend into neighbor states of California, Oregon, and Utah. The dark kangaroo mouse inhabits stabilized dunes, sandy soils, fine gravelly soils, valley bottoms, and alluvial fans that are dominated by big sagebrush (*Artemesia tridentata*), rabbitbrush, and horsebrush (*Tetradymia*). There are currently 13 known subspecies of the dark kangaroo mouse, 2 of which are of conservation concern, the Owyhee River kangaroo mouse (*M. m. atrirelictus*) and the Izenhood kangaroo mouse (*M. m. nexus*). The Owyhee River kangaroo mouse is highly distinctive and an isolated population in southern Idaho. The Izenhood kangaroo mouse has an extremely limited distribution in north-central Nevada. There are no current threats to the dark kangaroo mouse; however, their habitat-restricted populations and isolated distributions leave the species vulnerable to habitat alteration. Possible threats to the dark kangaroo mouse populations include the introduction of weedy grasses, cultivation of dry sinks by irrigation, and other human-related habitat changes (Hafner et al. 1998).

Pale Kangaroo Mouse

The pale kangaroo mouse (*Microdipodops pallidus*) is listed as a protected mammal under the Nevada Species of Conservation Priority list. It has a narrower range than the dark kangaroo mouse, lower

elevations of Nevada and California in the immediate rain-shadow of the Sierra Nevada, and is mostly confined to the Great Basin of Nevada and parts of surrounding California, Oregon, Idaho, and Utah. The distribution in Nevada is concentrated in the west-central portion of the state. The pale kangaroo mouse prefers valley bottoms containing stabilized dunes with fine wind-blown sand. It ranges from elevations of 1,188 to 1,737 m and in zones dominated by big sagebrush, saltbush, and greasewood. There are five subspecies known and one of conservation concern, *M. p. restrictus*. Like the dark kangaroo mouse, threats to the pale kangaroo mouse population include human-related habitat change, and natural shifts in vegetative zones (Hafner et al. 1998).

Fringed myotis

The fringed myotis (*Myotis thysanodes*) is a bat that is listed as a protected mammal under the Nevada Species of Conservation Priority list. The fringed myotis ranges through much of western North America, from southern British Columbia, Canada; to Chiapas, Mexico; Santa Cruz Island, California; and east to the South Dakota Black Hills. The distribution of the species is patchy, and is more commonly found in drier woodlands, as well as desert scrub, mesic coniferous forest, grassland, and sage-grass steppe (Weller et al. 2005). It is known to occur in central and southern Nevada and may also occur in northern Nevada. The species is state protected in Nevada, and is widely distributed but rare in the state. There have been reports of an increase in numbers or area occupied in southern Nevada. Threats to the fringed myotis include recreational caving, mine reclamation, renewed mining, water impoundments, building demolition, pest control, timber harvest, bridge replacement, and other causes of roost disturbance (Bradley et al. 2006).

Brazilian free-tailed bat

The Brazilian free-tailed bat is listed as a protected mammal under the Nevada Species of Conservation Priority list. The species was added to the list in 2012 because of its habit of roosting in large colonies and its vulnerability to decline due to alternative energy development. The species is found in a wide variety of habitats, from the low desert to high mountains. The bats migrate out of Nevada in the winter but may be year-round residents in warmer parts of southern Nevada. The species is found throughout Nevada; however, two large colonies make up the majority of the population. The species is threatened by human disturbance and habitat destruction. As the Brazilian free-tailed bat tends to roost in large colonies, a single disturbance can have very significant impacts to the whole species. The species appears to be stable statewide in Nevada; however, localized population declines have been observed (Nevada Wildlife Action Plan Team 2012).

3.5.2.2.3 Horses and Burros

The BLM Carson City District Clan Alpine Herd Management Area overlaps with the eastern portion of the Dixie Valley Training Area (DVTA). The Lahontan Rangeland Program Summary of 1985 (Bureau of Land Management 1985) set management objectives for each wild horse Herd Management Area. The Summary calls for a periodic census of the wild horse population and for additional monitoring to determine areas of use, seasonal movement patterns, sex ratios, and other facets of population dynamics to determine if management objectives are being met. Management objectives also include maintaining and enhancing habitat to provide forage for a specified number of horses. The plan for each Herd Management Area calls for maintaining the wild horses in good or excellent physical condition, maintain the free-roaming nature of the wild horses, maintaining the wild horses within the Herd Management Area, and minimizing adverse effects on individual wild horses and on the population as a whole that could be caused by round-ups.

Per the Wild Free-Roaming Horse and Burro Act, there are several horse and burro Herd Management Areas in the vicinity of FTRC Study Area. However, only the Clan Alpine Herd Management Area (Figure 3.5-1) overlaps with DVTA. During the 2007 surveys many free roaming horses were observed in Dixie Valley settlement, although these appeared to be domestic animals. No free roaming burros were observed (U.S. Department of Navy 2008).

3.5.2.3 Birds

3.5.2.3.1 Overview

NAS Fallon is in the Lahontan Valley of the Great Basin Region. The Stillwater National Wildlife Refuge is 8 miles (mi.) northeast of NAS Fallon, and the Carson Lake Wetlands are 3 mi. south of NAS Fallon. This area is located on the Pacific Flyaway, which extends from the coast to western Utah, and each year 250,000 shorebirds migrate through this valley. The diverse wetlands attract more than a million waterfowl, as well as over 20,000 other water birds, including pelicans, egrets, herons, ibis, gulls, and terns. The irrigated agricultural lands provide important songbird habitat for migrants and breeding birds. There is a great diversity of habitats in the valley, such as freshwater marshes, riparian areas, alkali playas, desert shrublands, and irrigated farmlands. There are over 250 species of birds that have been observed on NAS Fallon-administered lands. An ecological survey conducted by the Navy in 1997 of NAS Fallon and its environs recorded 126 species (U.S. Department of the Navy 1997). Lahontan Valley wetlands are recognized as some of the most significant in the western United States by the Western Hemispheric Shorebird Reserve Network and were named a Globally Important Bird Area by the American Bird Conservancy. Moreover, Carson Lake has been designated as a site of international importance and is part of the Western Hemispheric Shorebird Reserve Network. Avian species typically known to occur within the FRTC Study Area are presented in Table 3.5-2.

Waterfowl begin arriving in this area in February with shorebirds following in March. By April, there are thousands of avocets, stilts, sandpipers, dowitchers, and other shorebird species. Songbirds begin arriving in April and peak in early May, when wrens, blackbirds, buntings, swallows, grosbeaks, and orioles begin breeding. By early May herons and egrets have returned to the area. By late summer large numbers of American white pelicans (*Pelecanus erythrorhynchos*) are feeding on the fish in the irrigation reservoirs and drains.

In August the fall migration gets underway. Landbird migrants including warblers, flycatchers, and vireos, start departing mid-August through late September. In September thousands of waterfowl will stopover in the valley on their migration south. October brings large numbers of white-crowned sparrows (*Zonotrichia leucophris*), nuthatches, and chickadees into the valley. The first winter freeze pushes all but the hardiest migrants out of the areaand winter residents including bald eagles (*Haliaeetus leucocephalus*), rough-legged hawks (*Buteo lagopus*), and northern shrikes (*Lanius excubitor*) arrive. During mild winters, fair numbers of ibis, egrets, herons, and shorebirds may stay in the valley.

Several bird species that are found in this region are not native to the Great Basin and are associated with developed areas. These species can displace native bird species and harm other native wildlife by monopolizing food sources or breeding sites. These include the house sparrow and European starling.

Game bird species include chukars (*Alectoris chukar*), mourning doves (*Zenaida macroura*), and waterfowl. Small game guzzlers have been installed for chukars and mourning doves in the Sand Springs Range, Cocoon Mountains, Clan Alpine Mountains, and Lauderback Hills. Many waterfowl game species are found at Sheckler Reservoir north of B-16. These include species such as the mallard (*Anas platyrhynchos*), northern pintail (*Anas acuta*), and Canada goose (*Branta canadensis*).

While the analysis in this EIS addresses all birds in a broad context, additional emphasis is placed on species of concern or special status species in accordance with the DoD and USFWS Memorandum of Understanding to Promote the Conservation of Migratory Birds.

Table 3.5-2: Avian Species Known to Occur or Potentially Occurring at Fallon Range Training Complex

Species Name		Conservation Status	Habitat and Occurrence							
Common	Scientific		BF	PL	PS	SN	SG	WT	AG	LS
American avocet	*Recurvirostra americana*			X				X	X	
American coot	*Fulica americana*							X	X	
American crow	*Corvus brachyrhynchos*	GB	X						X	
American goldfinch	*Carduelis tristis*		X						X	X
American green-winged teal	*Anas crecca*		X					X	X	
American kestrel	*Falco sparverius*		X		X			X	X	
American pipit	*Anthus rubescens*							X	X	
American robin	*Turdus migratorius*		X						X	X
American white pelican	*Pelecanus erythrorhynchos*							X	X	
American widgeon	*Anas americana*		X					X	X	
ash-throated flycatcher	*Myiarchus cinerascens*						X		X	
Audubon's warbler	*Dendroica coronata*								X	X
bald eagle	*Haliaeetus leucocephalus*	BCC	X		X			X	X	
barn swallow	*Hirundo rustica*							X	X	X
belted kingfisher	*Ceryle alcyon*							X	X	
Bewick's wren	*Troglodytes bewickii*		X				X		X	X
black tern	*Chlidonias niger*							X		
black-billed magpie	*Pica pica*		X				X		X	X
black-chinned hummingbird	*Archilochus alexandri*		X		X				X	X
black-crowned night heron	*Nycticorax nycticorax*							X	X	
black-throated sparrow	*Amphispiza bilineata*		X		X					
black-necked stilt	*Himantopus mexicanus*			X				X		
Blue-gray gnatcatcher	*Polioptila caerulea*						X	X		
Blue-winged teal	*Anas discors*							X		
Brewer's blackbird	*Euphagus cyanocephalus*								X	X
brewer's sparrow	*Spizella breweri*	BCC					X		X	
broad-tailed hummingbird	*Selasphorous platycercus*								X	X
brown-headed cowbird	*Molothrus ater*								X	
bufflehead	*Brucephala albeola*							X	X	
Bullock's oriole	*Icterus bullockii*						X	X	X	X
Burrowing owl	*Athene cunicularia*		X		X	X	X		X	
Bushtit	*Psaltriparus minimus*							X		
California gull	*Larus californicus*			X				X	X	
California quail	*Callipepla californica*	GB	X				X		X	X
Calliope hummingbird	*Stellyl calliope*	BCC			X			X		X
Canada goose	*Branta canadensis*		X					X	X	
Cassin's finch	*Carpodacus cassinii*		X				X			

Table 3.5-2: Avian Species Known to Occur or Potentially Occurring at Fallon Range Training Complex (continued)

Species Name		Conservation Status	Habitat and Occurrence							
Common	Scientific		BF	PL	PS	SN	SG	WT	AG	LS
Canvasback	*Aythya valisineria*							X		
cedar waxwing	*Bombycilla cedrorum*		X					X	X	
Chukar	*Alectoris chukar*	GB			X		X			
cinnamon teal	*Anas cyanoptera*		X					X	X	
cliff swallow	*Hirundo pyrrhonota*							X	X	X
common barn owl	*Tyto alba*		X					X	X	
common moorhen	*Gallinula chloropu*							X	X	
common nighthawk	*Chordeiles minor*		X					X	X	X
common raven	*Corvus corax*		X		X		X		X	
common snipe	*Gallinago gallinago*			X				X	X	
common yellowthroat	*Geothlypis trichas*							X	X	X
cooper hawk	*Accipiter cooperii*				X		X		X	
Dark-eyed junco	*Junco hyemalis*		X		X				X	X
double-crested cormorant	*Phalacrocorax auritus*							X	X	
downy woodpecker	*Picoides pubescens*				X				X	X
eared grebe	*Podiceps nigricollis*	BCC						X		
European starling	*Sturnus vulgaris*		X						X	X
ferruginous hawk	*Buteo regalis*	BCC			X		X		X	
Forster's tern	*Sterna forsteri*							X	X	
fox sparrow	*Passerella iliaca*				X		X	X	X	
Gadwall	*Anas strepera*							X		
Gamble's white-crowned sparrow	*Zonotrichia leucophrys gamheli*		X						X	
golden eagle	*Aquila chrysaetos*	BCC	X		X	X	X		X	
Gray flycatcher	*Empidomax wrightii*				X		X			
great blue heron	*Ardea herodias*		X					X	X	
great egret	*Casmerodius albus*		X					X	X	
great horned owl	*Bubo virginianus*		X						X	
great-tailed grackle	*Quiscalus mexicanus*								X	X
Greater sage grouse	*Centrocercus urophasianus*	PT/BCC, GB					X			
green-backed heron	*Butorides striatus*		X					X	X	
Green-tailed towhee	*Pipilo chlorurus*	BCC			X		X			
hermit thrush	*Catharus guttatus*				X				X	
Hooded merganser	*Lophodytes cucullatus*							X		
horned lark	*Eremophila alpestris*		X	X	X				X	X
house finch	*Carpodacus mexicanus*		X						X	X
house sparrow	*Passer domesticus*								X	X
house wren	*Troglodytes aedon*						X		X	X
Juniper titmouse	*Baeolophus ridgwayi*				X			X		
killdeer	*Charadrius vociferus*			X				X	X	X
lark bunting	*Calamospiza melanocorys*		X		X					
lark sparrow	*Chondestes grammacus*								X	X
lazuli bunting	*Passerina amoena*		X		X			X	X	
lesser goldfinch	*Carduelis psaltria*				X				X	X
lesser scaup	*Aythya affinis*		X					X	X	

Table 3.5-2: Avian Species Known to Occur or Potentially Occurring at Fallon Range Training Complex (continued)

Species Name		Conservation Status	Habitat and Occurrence							
Common	Scientific		BF	PL	PS	SN	SG	WT	AG	LS
Lewis' woodpecker	*Melanerpes lewis*	BCC			X				X	X
Lincoln sparrow	*Melospiza lincolnii*							X	X	X
loggerhead shrike	*Lanius ludovicianus*	BCC	X		X		X		X	X
long-billed curlew	*Numenius americanus*	BCC	X					X		
Long-eared owl	*Asio otus*		X		X			X	X	
MacGillivray's warbler	*Oporornis tolmiei*				X		X			
mallard	*Anas platyrhynchos*		X					X	X	
marsh wren	*Cistothorus palustris*							X	X	
merlin	*Falco columbarius*				X				X	
mountain bluebird	*Sialia currucoides*		X		X				X	
mountain chickadee	*Parus gambeli*		X		X				X	
mourning dove	*Zenaida macroura*		X					X	X	X
Nashville warbler	*Vermivora ruficapilla*		X					X	X	
Northern flicker	*Colaptes auratus*		X					X	X	
northern harrier	*Circus cyaneus*		X						X	
northern mockingbird	*Mimus polyglottos*		X						X	X
Northern pintail	*Anas acuta*							X		
Northern shoveler	*Anas clypeata*		X					X		
northern rough-winged swallow	*Stelgidopteryx serripennis*							X	X	X
northern shrike	*Lanius excubitor*		X						X	X
Oregon junco	*Junco hyemalis spp.*		X		X				X	X
Orange-crowned warbler	*Vermivora celata*		X						X	X
osprey	*Pandion haliaetus*							X		
Phainopepla	*Phainopepla nitens*		X					X		
pied-billed grebe	*Podilymbus podiceps*							X		
pine siskin	*Carduelis pinus*				X					
pinyon jay	*Gymnorhinus cyanocephalus*	BCC	X		X					
Plumbeous vireo	*Vireo plumbeus*				X				X	
prairie falcon	*Falco mexicanus*				X				X	
red-breasted nuthatch	*Sitta canadensis*				X					
redhead	*Aythya americana*							X	X	
red-naped sapsucker	*Sphyrapicus nuchalis*				X		X			
red-shafted flicker	*Colaptes auratus*				X				X	X
red-tailed hawk	*Buteo jamaicensis*				X		X	X	X	
red-winged blackbird	*Agelaius phoeniceus*							X	X	X
ring-billed gull	*Larus delawarensis*							X	X	
ring-necked pheasant	*Phasianus colchicus*	GB							X	
rock pigeon	*Columba livia*								X	X
rock wren	*Salpinctes obsoletus*				X		X			
Rough-legged hawk	*Buteo lagopus*				X			X	X	
ruby-crowned kinglet	*Regulus calendula*				X		X			
ruddy duck	*Oxyura jamaicensis*		X					X	X	
sage sparrow	*Amphispiza belli*	BCC		X	X		X			
sage thrasher	*Oreoscoptes montanus*	BCC	X				X			

Table 3.5-2: Avian Species Known to Occur or Potentially Occurring at Fallon Range Training Complex (continued)

Species Name		Conservation Status	Habitat and Occurrence							
Common	Scientific		BF	PL	PS	SN	SG	WT	AG	LS
savannah sparrow	*Passerculus sandwichensis*								X	X
Say's pheobe	*Sayornis saya*							X	X	
sharp-shinned hawk	*Accipiter striatus*				X		X		X	
short-eared owl	*Asio flammeus*		X					X	X	
Snow bunting	*Plectrophenax nivalis*				X				X	
snowy egret	*Egrretta thula*							X	X	
song sparrow	*Melospiza melodia*						X	X		
sora	*Porzana carolina*							X	X	
spotted towhee	*Pipilo maculatus*						X	X		
Swainson's hawk	*Buteo swainsoni*				X		X		X	
tree swallow	*Tachycineta bicolor*							X	X	X
turkey vulture	*Cathartes aura*		X		X		X		X	
Vesper sparrow	*Pooeceteds gramineus*		X						X	
violet-green swallow	*Tachycineta thalassina*				X			X	X	
Virginia rail	*Rallus limicola*							X	X	
Virginia's warbler	*Vermivora virginiae*	BCC			X				X	X
Warbling vireo	*Vireo gilvus*		X		X			X		
western grebe	*Aechmophorus occidentalis*							X	X	
western kingbird	*Tyrannus verticalis*		X					X	X	X
western meadowlark	*Sternella neglecta*		X						X	
Western scrub-jay	*Aphelocoma californica*		X		X			X	X	
western tanager	*Piranga ludoviciana*				X					
western wood-pewee	*Contopus sordidulus*				X			X	X	
White-crowned sparrow	*Zonotrichia leucophris*		X						X	X
white-faced ibis	*Plegadis chihi*							X	X	
white-throated swift	*Aeronautes saxatalis*							X	X	X
wild turkey	*Meleagris gallopavo*	GB							X	
willow flycatcher	*Empidonax trallii*							X	X	
Wilson's snipe	*Gallinago delicate*			X				X		
Wilson's warbler	*Wilsonia pusilla*		X						X	X
winter wren	*Troglodytes troglodytes*				X			X		
wood duck	*Aix sponsa*							X	X	
yellow warbler	*Dendroica petechia*		X					X	X	X
Yellow-breasted chat	*Icteria virens*		X					X		
yellow-headed blackbird	*Xanthocephalus xanthocephalus*							X	X	
Yellowlegs	*Tringa sp.*							X		
Yellow-rumped warbler	*Dendroica coronate*		X		X			X	X	

Notes: AG = Agricultural, BCC = bird of conservation concern in Bird Conservation Region 9, BF = Basin Floor Habitat, GB = Nevada State Game Bird, LS = Landscaped, PL = Playa Habitat, PS = Piedmont Slope habitat, PT = Proposed Threatened,
SG = Sagebrush Habitat, SN = Sandy Habitat, sp. =species, WT = Wetland
Source: U.S. Department of the Navy 2008, U.S. Department of the Navy 2006a

3.5.2.3.2 Endangered Species Act-Listed Bird Species

Greater Sage-grouse

Status, Population Trends, and Threats. The greater sage-grouse is a Candidate Species for listing under the ESA, a bird of conservation concern in Bird Conservation Region 9, and a Nevada State Game Bird. The Bi-State Distinct Population Segment (DPS) is proposed to be listed as threatened under the ESA, with a special rule in addition to the proposed listing. This DPS Includes only greater sage-grouse in Carson City, Douglas, Lyon, Mineral, and Esmeralda Counties in Nevada; and in Alpine, Mono, and Inyo Counties in California. The extended rule states that the USFWS has proposed to designate critical habitat for the Bi-State DPS of greater sage-grouse under ESA. Approximately 755,960 hectares (ha) (1,868,017 ac.) are proposed as critical habitat and fall within the boundaries of Carson City, Lyon, Douglas, Mineral, and Esmeralda Counties, Nevada; and Alpine, Mono, and Inyo Counties, California. This proposal was made on October 28, 2013 (50 C.F.R. Part 17), and the public commenting period was reopened until September 4, 2014. The primary threats to the Bi-State DPS of greater sage-grouse are urbanization and habitat conversion, infrastructure, mining, renewable energy development and associated infrastructure, non-native and native invasive species (e.g., cheatgrass, pinyon-juniper encroachment), wildfires and altered fire regime, and small population size and population structure. Other threats impacting the Bi-State DPS include climate change including drought, recreation, disease and predation, and inadequacy of existing regulatory mechanisms (U.S. Fish and Wildlife Service 2013b).

General Description and Habitat. The greater sage-grouse is an omnivore that eats mainly sagebrush, other soft plants, and insects. Their average lifespan is 1–1.5 years; however, they have been found to survive up to 10 years in the wild. Growing to about 30 inches (in.) (76.2 centimeters [cm]) in length, and up to 2 feet (ft.) (0.61 m) tall, the males of the species can weigh more than 4–5 pounds (lb.) (1.8–2.26 kilograms [kg]) and hens can weigh in around 2–3 lb. (0.9–1.4 kg). This species cannot exist in habitats that do not contain sagebrush. They are found at elevations ranging from 4,000 to over 9,000 ft. (1,219.2 to over 2,743.2 m) (U.S. Fish and Wildlife Service 2013b).

Distribution. Historically, the greater sage-grouse has been found ranging from Washington, Oregon, California, Nevada, Idaho, Montana, Wyoming, Colorado, Utah, South Dakota, North Dakota, Kansas, Oklahoma, Nebraska, New Mexico, Arizona, and the Canadian provinces of British Columbia, Alberta, and Saskatchewan. The greater sage-grouse has apparently disappeared from Nebraska, Kansas, Oklahoma, New Mexico, Arizona, British Columbia, and Saskatchewan. The population of greater sage-grouse that occur in the Bi-State area of eastern California and west central Nevada are sometimes referred to as the Mono Basin Area population of greater sage-grouse. The Bi-State population of greater sage-grouse range includes portions of Carson City, Lyon, Mineral, Esmeralda, and Douglas Counties in Nevada and portions of Alpine and Inyo Counties, and most of Mono County in California. Bi-State DPS of greater sage-grouse occur in small, local populations that are relatively isolated from each other. Several studies documented that the greater sage-grouse in the Bi-State area are genetically unique populations when compared to greater sage-grouse elsewhere in the species range (U.S. Fish and Wildlife Service 2013b).

Occurrence in the Study Area. Bi-State DPS of greater sage-grouse may occur in the southwest portions of the Study Area that overlap with Lyon and Mineral County, Nevada. These counties are part of the proposed critical habitat for the Bi-State DPS; however, installation ranges do not occur in these portions of the Study Area. The only activities that may overlap with the Bi-State greater sage-grouse DPS would be aircraft overflights. Greater sage-grouse populations that are not a part of the Bi-State DPS may also occur in the Study Area.

3.5.2.3.3 Other Special Status Bird Species

Table 3.5-2 provides a list of special status bird species that potentially occur at FRTC, as well as information about habitat use, occurrence, breeding status, and regional population information. The USFWS identifies species of migratory non-game birds that are likely to become candidates for listing under the ESA as Birds of Conservation Concern. Of the 28 Birds of Conservation Concern (U.S. Fish and Wildlife Service 2008), 14 have been recorded on Navy-administered lands of FRTC. Descriptions of special status bird species are provided in the following sections.

Bald Eagle

The bald eagle is a Bird of Conservation Concern in Bird Conservation Region 9 and is also a Nevada Species of Conservation Priority. The bald eagle is most associated with open water areas with forested shorelines. The breeding population of bald eagles in Nevada consists of three to five nesting pairs, and the winter population is estimated at 120 birds. Their population trend has been increasing, with the population scattered throughout the state. There has been a recent increase in winter numbers of bald eagles in Carson Valley (Nevada Wildlife Action Plan Team 2012). Bald eagles have been observed during the winter as they briefly use or transit the NAS Fallon-administered lands (U.S. Department of the Navy 2008). Bald eagles are vulnerable to habitat loss, disturbance by humans, a decreasing food supply, illegal shooting, and poisoning (Nevada Wildlife Action Plan Team 2012).

Brewers Sparrow

The Brewer's sparrow (*Spizella breweri*) is a Bird of Conservation Concern in Bird Conservation Region 9 and is also a Nevada Species of Conservation Priority. The Partners in Flight population estimate for the Brewer's Sparrow in the Bird Conservation Region 9 is 5,000,000 individuals. The Brewer's sparrow is a sagebrush obligate that is often the most abundant songbird in sagebrush shrub steppe habitats in some regions. It prefers to nest in large, living sagebrush and primarily forages on the ground for insects during the summer and seeds in the winter. Brewer's sparrow is concentrated in the Great Basin, breeding across portions of western Canada and southwestern North Dakota, south to southern California, southern Nevada, central Arizona, and northwestern New Mexico. The Brewer's sparrow is expected to occur at the FRTC Study Area from April through September and has been observed at Settlement and Horse Creek areas of Dixie Valley (U.S. Department of the Navy 2008). The Brewer's sparrow breeds throughout northern Nevada, and there is a year-round population in southwest Nevada, with a winter resident in the extreme southeast portion of the state. They have experienced a significant Nevada and range-wide decline in population. The Brewer's sparrow is threatened by habitat loss, degradation, fragmentation of high-quality sagebrush and montane sagebrush shrubland due to fire, invasive plants, expansion of pinyon-juniper woodland into sagebrush, unsustainable livestock grazing, and excessive off-highway vehicle use (Nevada Wildlife Action Plan Team 2012).

Calliope Hummingbird

The calliope hummingbird (*Stellula calliope*) is a Bird of Conservation Concern in Bird Conservation Region 9 and is also a Nevada Species of Conservation Priority. Calliope hummingbirds are most associated with a montane mosaic of deciduous woodland, blooming understory, and forest edges and openings. They are fairly common in mixed forests of the Carson Range and Jarbidge Mountains and also occur in smaller numbers throughout the state. During ecological surveys in 2007, calliope hummingbirds were observed in the Horse Creek portion of Dixie Valley (U.S. Department of the Navy 2008). Population trends and size are unknown for the calliope hummingbird in Nevada, and threats to their population include climate change altering blooming and loss of specific habitat needs, but threats are not well understood (Great Basin Bird Observatory 2010).

Eared Grebe

The eared grebe (*Podiceps nigricollis*) is a bird on the Nevada Species of Conservation Priority list. Eared grebes are colonial breeders that are numerous in large marshes in northern Nevada, although present in smaller ones as well. These birds feed primarily on invertebrates and are strongly associated with saline/alkaline wetlands in the non-breeding season. After breeding season, most eared grebes from Nevada and the surrounding areas will congregate in large numbers in Mono Lake or Great Salt Lake to feed on brine shrimp prior to their fall migration. Many of the birds are year-round residents of Nevada and do not migrate. Historically there have been recorded 600 breeding birds at Ruby Lake in 1983 and several hundred nests annually at both Carson Lake and Stillwater National Wildlife Refuge during wet years in the mid-1990s. The migrant population in Nevada is much larger than the breeding population; however, it has not been quantified (Great Basin Bird Observatory 2010). During ecological surveys of 2007, eared grebes were observed in the Settlement Area of Dixie Valley (U.S. Department of the Navy 2008). Recent population trends are stable or increasing. Threats to the eared grebe include loss or degradation of marshes (especially alkaline marshes) due to water diversion, declines in water quality, or development (Great Basin Bird Observatory 2010).

Ferruginous Hawk

The ferruginous hawk (*Buteo regalis*) is a Bird of Conservation Concern in Bird Conservation Region 9 and is a Nevada Conservation Priority Species. The Partners in Flight population estimate for the ferruginous hawk in the Bird Conservation Region 9 is 5,000 individuals. The ferruginous hawk occupies arid and open grassland, shrub steppe, and desert in the western half of North America. Breeding occurs from Alberta, Manitoba, and Saskatchewan south to New Mexico and Arizona, west to eastern California and Oregon, and east into the Dakotas, Nebraska, and Kansas. Primary wintering grounds are in the southwestern United States and northern Mexico. Ferruginous hawks in Nevada are found in highest densities in relatively remote valleys where native vegetation is mostly intact and where human activities are minimal. There were declines in the bird's population in the 1980s, and research shows that the current population may be declining as well. The ferruginous hawk is sensitive to factors that negatively affect their prey populations, including invasive plants, habitat fragmentation, fire, and development. Threats to the ferruginous hawk include nest site disturbances, loss of nesting trees at the shrubland-woodland interface, and illegal taking of eggs or nestlings (Great Basin Bird Observatory 2010). Ferruginous hawks are expected to forage throughout the FRTC Study Area in canyons, foothills, and high mountain areas beneath the SUA.

Golden Eagle

The golden eagle (*Aquila chrysaetos*) is a Bird of Conservation Concern in Bird Conservation Region 9 and is a Nevada Conservation Priority Species. The Partners in Flight population estimate for the golden eagle in the Bird Conservation Region 9 is 12,000 individuals. The golden eagle typically occupies open canyon land, desert, grassland, and shrub habitat where their preferred prey, small mammals, can be found. Nest sites are most often on cliffs or bluffs, less often in trees, and occasionally on the ground. The species is most numerous in winter in the Rocky Mountain states, Great Basin, and western edge of the Great Plains (NatureServe 2012). The highest density of golden eagles in Nevada has been observed in long stretches of cliff located along river systems. Recent population trend data suggests that the population is declining regionally and in Nevada. Threats to the golden eagle include reduction in prey populations due to degradation or loss of rangelands, large-scale wind/solar energy developments in rangelands that reduce prey densities and hunting opportunities, electrocution, vehicle strikes, human-caused nest disturbance, nest abandonment, shooting, and poisoning (Great Basin Bird Observatory 2010). Golden eagles are expected to forage throughout the FRTC Study Area in canyons, foothills, and high mountain areas beneath the SUA. During ecological surveys in 2007, golden eagles were observed

in the Horse Creek and Settlement Area portions of Dixie Valley, and B-17 (U.S. Department of the Navy 2008).

Green-tailed towhee

The green-tailed towhee (*Pipilo chlorurus*) is a Bird of Conservation Concern in Bird Conservation Region 9 and is a Nevada Conservation Priority Species. The Partners in Flight population estimate for the green-tailed towhee in the Bird Conservation Region 9 is 500,000 individuals. The species is widespread and relatively common in Nevada. About one-fifth of the global breeding population is in Nevada. Although historically the population was in decline, more recent population trends have been stable. The Green-tailed Towhee is nearly always found within dense shrub cover in montane settings, especially in transitional zones that feature high shrub species diversity, interspersed trees, and a high proportion of edge habitat. Current threats to the towhee are not well studied. However, historically they have been threatened by the loss of shrublands, and current threats may include fire return interval changes or heavy grazing and browsing that reduces shrub cover or diversity (Great Basin Bird Observatory 2010). During ecological surveys in 2007, green-tailed towhees were observed in the Horse Creek and Settlement Area portions of Dixie Valley, and B-17 (U.S. Department of the Navy 2008). The towhee is expected to occur within the FRTC Study Area in the spring and summer, and occasionally during the winter in appropriate habitats.

Lewis's Woodpecker

The Lewis's woodpecker (*Melanerpes lewis*) is a Bird of Conservation Concern in Bird Conservation Region 9 and is also a Nevada Species of Conservation Priority. The Partners in Flight population estimate for the Lewis's woodpecker in the Bird Conservation Region 9 is 6,000 individuals. Key factors for the Lewis's woodpecker habitat include the presence of large, partly decayed snags, an open forest for aerial foraging, and a well-developed shrub or native herbaceous layer that would promote populations of flying insects. The woodpecker is no longer known to breed in the valley-bottom riparian woodlands such as the Lahontan Valley where they are thought to historically have bred. The majority of observations occur during migration windows, in May and September–October. The Lewis's woodpecker was observed in Horse Creek, Dixie Valley (U.S. Department of the Navy 2008). There is annual variation in the Lewis's woodpecker numbers in Nevada and patchy breeding distribution within the state that make it difficult to account for population trends there. However, historically the population was declining range wide and may still be in decline. Threats to the Lewis's woodpecker include loss or degradation of aspen stands and associated understory due to livestock grazing, conifer invasion, aspen decline (due to pathogens, drought, stream flow reductions, climate change, etc.), and degradation of deciduous montane riparian habitat and associated understory from improper livestock grazing (Great Basin Bird Observatory 2010).

Loggerhead Shrike

The loggerhead shrike (*Lanius ludovicianus*) is a Bird of Conservation Concern in Bird Conservation Region 9 and is also a Nevada Species of Conservation Priority. The Partners in Flight population estimate for the loggerhead shrike in the Bird Conservation Region 9 is 300,000 individuals. The loggerhead shrike occurs in desert shrubland, juniper or pinyon-juniper woodland, mountain mahogany stand, and around the outskirts of ranches and towns. Loggerhead shrikes occur throughout North America and are widely distributed from Alberta, Canada, south to the Isthmus of Tehuantepec in southern Mexico. The species migrates from northern areas in the winter; however, some individuals remain as far north as northern Nevada. Population trends are not well documented, but past data suggests that there was a negative trend in much of the western population with seasonal increases in the south during winter. Threats to the loggerhead shrike population include changes in human land-use

practices, the spraying of biocides, and competition with species that are more tolerant of human-induced changes (Campbell 1998). Within the FRTC, the loggerhead shrike is a common summer resident, and present, though less common, in the winter. During ecological surveys of 2007, loggerhead shrikes were observed or heard around the Dixie Valley Settlement area, Dixie Meadows, and on the dunes of Bravo-19.

Long-billed Curlew

The long-billed curlew (*Numenius americanus*) is a Bird of Conservation Concern in Bird Conservation Region 9 and a Nevada Species of Conservation Priority. The long-billed curlew is considered a Priority species in Nevada by Partners In Flight. The Atlas of the Breeding Birds of Nevada recorded breeding in the Lahontan Valley. Curlews were found in wetlands, grasslands, and agricultural areas. Current population trends show that the population has been stable or increasing. Curlews breed in northern Nevada, but concentrate in the northeast quadrant. Curlews breed and forage in open habitats with moderate grass or other ground cover, and they generally avoid areas with trees, high shrub densities, and tall dense grass. Threats to long-billed curlews include loss of wet meadows to water diversions, groundwater pumping, or development; the loss of flood-irrigated agricultural fields to habitat conversion; and heavy livestock grazing, haying, or dragging that causes nest losses (Great Basin Bird Observatory 2010). The long-billed curlew is expected to be seen in the agricultural fields around the Station and possibly in the wet fields around the ponds in the Dixie Valley Settlement Area.

Pinyon Jay

The pinyon jay (*Gymnorhinus cyanocephalus*) is a Bird of Conservation Concern in Bird Conservation Region 9 and a Nevada Species of Conservation Priority. The Partners in Flight population estimate for the pinyon jay in the Bird Conservation Region 9 is 200,000 individuals. Although what researchers thought was the preferred habitat for pinyon jays, a pinyon-juniper woodland, has been expanding in Nevada, the population of pinyon jays has been on the decline. Another study found that pinyon jays prefer a habitat that is a mixed-age mosaic of woodland transitioning into, or interspersed with, sagebrush shrubland. The pinyon jay is also dependent on the pinyon pine nut, and another possible factor in their decline may be pinyon nut production. Threats to the pinyon jay may include the substantial increases in closed-canopy woodland with poor shrub understories, along with a loss of the mixed-age woodland mosaics that have openings and a complex shrubland edge. The changes to habitat have been largely the result of altered fire regimes, but may also be caused by grazing pressure, and invasive plants (Great Basin Bird Observatory 2010). The pinyon jay is considered a permanent resident within the FRTC, breeds within the Stillwater mountain range and is most often associated with pine-juniper habitats. During ecological survey of 2007, the pinyon jay was observed flying off NAS Fallon, Horse Creek, and B-17 (U.S. Department of the Navy 2008).

Sage Sparrow

The sage sparrow (*Amphispiza belli*) is a Bird of Conservation Concern in Bird Conservation Region 9 and a Nevada Species of Conservation Priority. The Partners in Flight population estimate for the sage sparrow in the Bird Conservation Region 9 is 2,000,000 individuals. Sage sparrows are restricted to open shrublands and grasslands. They can be found foraging in small flocks starting in late June. Most of their foraging takes place on the ground. Nevada has one of the highest known breeding densities for the sage sparrow and has approximately one-half of the species' global breeding population. Individuals spend the winter in southern Nevada instead of migrating, usually in sagebrush or Mojave scrub shrublands, or honey mesquite stands. Recent population trends are close to stable or stable for the sage sparrow. Because sage sparrows preferentially inhabit large expanses of intact shrubland, they are negatively affected by factors that fragment their habitat such as fire, cheatgrass invasion, heavy

livestock use, expansion of pinyon-juniper woodland into shrubland, and heavy off-highway vehicle use (Great Basin Bird Observatory 2010). The sage sparrow is a common summer resident and an uncommon winter resident in the Lahontan Valley (Chisholm and Neel 2002). During ecological surveys of 2007, sage sparrows were observed in appropriate habitats throughout the FRTC Study Area (U.S. Department of the Navy 2008).

Sage Thrasher

The sage thrasher (*Oreoscoptes montanus*) is a Bird of Conservation Concern in Bird Conservation Region 9. The Partners in Flight population estimate for the sage thrasher in the Bird Conservation Region 9 is 2,000,000 individuals. The sage thrasher is a sagebrush steppe obligate that relies on large expanses of sagebrush steppe for successful breeding. It prefers sagebrush habitats on flat to gently rolling hills and has been observed on B-16 and Settlement Area during 2007 ecological surveys. Its summer breeding range includes isolated areas in Canada and large portions of most western states. This species winters primarily in the southwestern United States and Mexico (Buseck et al. 2004). Approximately one-fifth of the global population of sage thrashers is located in Nevada. In Nevada sage thrashers prefer to inhabit sagebrush valleys, but they can also be found breeding in salt desert and montane shrubland. The trend for the population of sage thrashers in Nevada is a slight decline; however, they are not declining to the same degree as other sagebrush-associated songbirds. Threats to sage thrasher populations include loss, degradation, or fragmentation of high-quality sagebrush shrubland due to fire, invasive plants (such as cheatgrass), the expansion of pinyon-juniper woodland into sagebrush, heavy livestock grazing, and heavy off-highway vehicle use (Great Basin Bird Observatory 2010).

Virginia's warbler

The Virginia's warbler (*Oreothlypis virginiae*) is a Bird of Conservation Concern in Bird Conservation Region 9 and a Nevada Species of Conservation Priority. The Partners in Flight population estimate for the Virginia's warbler in the Bird Conservation Region 9 is 14,000 individuals. Virginia's Warbler is most often described as a breeder in pinyon-juniper and oak woodlands. The warbler tends to occur at the interface of basins and foothills, but not in valley bottoms. In Nevada, the Virginia's warbler also has an affinity for mountain mahogany stands. These warblers occur in breeding grounds through late April and early May, and are patchily distributed throughout most of their range. Due to their patchy distribution, population trends are not well documented. However, limited information suggests that there is a stable trend rangewide, but is less certain for the population in Nevada. Threats to the Virginia's warbler may include impacts to their habitats such as grazing by livestock or wild horses and burros, fire, invasive plants, and residential development especially in southern Nevada (Great Basin Bird Observatory 2010). Virginia's warbler is expected in the southern reaches of Churchill County in the spring and summer to breed. The Virginia's warbler was observed on agricultural and landscaped areas of the FRTC Study Area during ecological surveys in 1997 but not during 2007 survey efforts (U.S. Department of the Navy 2008, 2006a).

3.5.2.4 Fish

3.5.2.4.1 Overview

Three species of fish in the Study Area are listed under Federal ESA protection. One is listed as Endangered (Cui-ui]), and the other two are threatened (Lahontan cutthroat trout and Railroad Valley Springfish); all three are discussed below. Other fish that may occur in the area are presented in Table 3.5-3 (U.S. Department of the Navy 2006a). A reproducing population of brook trout (introduced species) is present on Horse Creek Ranch in Dixie Valley (U.S. Department of the Navy 2006a).

Table 3.5-3: Fish Species Known to Occur or Potentially Occurring at Fallon Range Training Complex

Species Name		Conservation Status	Habitat and Occurrence							
Common	Scientific		BF	PL	PS	SN	SG	WT	AG	LS
Sacramento perch	*Archoplides interruptus*	GF						X		
green sunfish	*Lepomis cyanellus*							X		
bluegill	*Lepomis macrochirus*	GF						X		
smallmouth bass	*Micropterus dolomieui*	GF						X		
largemouth bass	*Micropterus salmoides*	GF						X		
white crappie	*Pomoxis annularis*	GF						X		
black crappie	*Pomoxis nigromaculatus*	GF						X		
goldfish	*Carassius auratus*							X	X	
common carp	*Cyprinus carpio*							X	X	
Cui-ui	*Chasmistes cujus*	E, EF						X		
Dixie Valley tui chub	*Gila bicolor spp.*							X		
Sacramento blackfish	*Orthodon microlepidotus*							X		
fathead minnow	*Pimephales promelas*							X		
Lahontan cutthroat trout	*Onchoryhncus clarkia henshawi*	T, GF						X		
Lahontan speckled dace	*Rhinichthys osculusrobustusrobustus*							X		
Lahontan red shiner	*Richarsonius egregius*							X		
white catfish	*Ictalurus catus*							X		
black bullhead	*Ictalurus melas*							X	X	
brown bullhead	*Ictalurus nebulosus*							X	X	
channel catfish	*Ictalurus punctatus*	GF						X		
white bass	*Morone chrysops*	GF						X		
Railroad Valley Springfish	*Crenichtys nevadae*	T, TF						X		
striped bass	*Morone saxitalis*							X		
yellow perch	*Perca flavescens*	GF						X		
walleye	*Stizostedion vitreum*							X		
mosquitofish	*Gambusia affinis*							X	X	
brook trout	*Salvelinus fortinalis*	GF						X		

Notes: AG = Agricultural, BF = Basin Floor Habitat, E = Endangered, EF = Nevada State Endangered Fish, GF= Nevada State Game Fish, LS = Landscaped, PL = Playa Habitat, PS = Piedmont Slope habitat, SG = Sagebrush Habitat, SN = Sandy Habitat, spp = sub-species, T = Threatened, TF = Nevada State Threatened Fish, WT = Wetland
Source: U.S. Department of the Navy 2008, U.S. Department of the Navy 2006a

Ponds at NAS Fallon are located in Dixie Valley and vary in size, shape and shoreline condition. Marshes and meadows from groundwater eruptions are present year-around in several Dixie Valley locations. Prior to settlement in the area, it is unlikely fish existed in these shallow bodies of water; however, early settlers built holding ponds to use water resources, and stocked fish.

3.5.2.4.2 Endangered Species Act-Listed Fish Species

Lahontan Cutthroat Trout

Status, Population Trends, and Threats. Lahontan cutthroat trout was listed as endangered on October 13, 1970 and reclassified as threatened in 1975. In 2008 there was a petition to remove the Lahontan

cutthroat trout from the Federal List of Threatened and Endangered Wildlife under ESA; however, the petition was found lacking in enough information to warrant their removal. No critical habitat has been designated for the Lahontan cutthroat trout. Threats to the population of Lahontan cutthroat trout include isolation of subpopulations because of physical and biological fragmentation, which decreases migration rates, causes local extirpation that may become permanent, and moves the entire population closer to extinction. Maintaining a connected network of populations is critical to providing the Lahontan cutthroat trout the ability to recover. Although the presence of nonnative species has also dramatically altered aquatic ecosystems, hybridization and competitive interaction between lake dwelling Lahontan cutthroat trout and nonnative species is not well known (Nevada Fish and Wildlife Office 2012).

General Description and Habitat. The Lahontan cutthroat trout feeds on terrestrial and aquatic insects, as well as smaller fish. This species contains two varieties, stream dwellers and lake dwellers. Stream dwellers on average are 10 in. (25.4 cm) in length and live for less than 5 years, while lake dwellers grow to 50 in. (127 cm) and on average live between 5 and 14 years. Sexual maturity for females is reached between the ages of 3 and 4, while males mature at 2–3 years of age. Similar to other cutthroat trout species, Lahontan cutthroat trout are stream spawners, and spawn between February and July. Spawning timing depends upon other external factors such as stream flow, elevation, and water temperature (Nevada Fish and Wildlife Office 2012). Cutthroat trout have the most extensive range of any inland trout species of western North America, and occur in anadromous, non-anadromous, fluvial, and lacustrine populations.

Distribution. The Lahontan cutthroat trout is found in a wide variety of cold-water habitats, including large terminal alkaline lakes, such as Pyramid Lake, alpine lakes like Lake Tahoe, slow meandering rivers such as Humboldt River, mountain rivers such as Carson, Truckee, Walker, and Mary's Rivers, and in small headwater tributary streams such as the Donner and Prosser Creeks. In general, Lahontan cutthroat trout occur in cool flowing water with available cover of vegetated stream banks, in areas where there are stream velocity breaks, and in relatively silt free rocky riffle-run areas. The trout is endemic or native, to the Lahontan basin of northern Nevada, eastern California, and southern Oregon. Currently, Lahontan cutthroat trout occupy between 123 to 129 streams within the Lahontan basin, and 32 to 34 streams outside of the basin, which totals about 482 mi. (775.5 km) of occupied habitat. The species is also found in five lakes, including two small populations in Summit and Independence Lakes (Nevada Fish and Wildlife Office 2012).

Occurrence in the Study Area. The Lahontan cutthroat trout may occur in the Study Area, in rivers such as Truckee, streams, tributaries, and lakes such as Pyramid Lake. They would be more likely to be found in the northwestern portion of the Study Area (underneath the Reno Military Operating Area [MOA]). Activities utilizing the Reno MOA (as indicated in Table 2-4 of Chapter 2) are limited to Air Combat Maneuvers.

Aircraft overflights have the potential to affect surface waters and, therefore, to expose fish occupying those upper portions of the water column to noise. However, it is important to note that the lower altitude of the Reno MOA is 13,000 ft. above ground level (AGL) and the ceiling is 18,000 ft. AGL. At these altitudes, very little of the noise produced by the aircraft would propagate to the water surface, and even less would be transmitted through the air-water interface due to reflection off the water surface. Because of the minimal energy being transmitted into the water from air combat maneuvers above 13,000 ft. AGL, it is unlikely that fish would even detect the noise of the aircraft overflight.

Therefore, cutthroat trout are not anticipated to be affected by activities in the FRTC, and are not carried forward for detailed analysis.

Cui-ui

Status, Population Trends, and Threats. The cui-ui is listed as endangered under the ESA wherever it is found. No critical habitat has been designated for this species. Threats to the cui-ui include habitat modification and degradation induced by extreme reduction of river flow and lake volume; loss of riparian habitat, which degraded the water quality in the Truckee River; and reduction of river flows due to substantial diversions on the river, which degraded the river's channel morphology and function (U.S. Fish and Wildlife Service 2009a). Migrating adults require deep pools and other cover, which are generally not available in the lower Truckee River below Marble Bluff Dam. These conditions can promote stress during spawning runs (U.S. Fish and Wildlife Service 2013c).

General Description and Habitat. Cui-ui are robust suckers with large heads and small eyes. Both sexes have grayish dorsal bodies that fade to white on their ventral or belly side. Their scales are coarse, and females live longer and grow larger than males of the species. Their lifespan can be over 40 years, and they grow up to 27.5 in. (69.9 cm). The cui-ui feed on zooplankton, filamentous algae, and aquatic insects. They migrate up the lower Truckee River to spawn between March and June each year, and return to Pyramid Lake after spawning. Migrating for spawning depends on the river water temperature and flow characteristics. Spawning occurs over gravel, no nests are built, and the eggs hatch 1–2 weeks after spawning. Then the larval cui-ui drifts downstream to Pyramid Lake shortly after hatching. Cui-ui typically is adults who enter the spawning run at 8–10 years of age, but may enter as early as 5 years of age (U.S. Fish and Wildlife Service 2013c).

Distribution. The cui-ui have a very restricted distribution, and occur only in Pyramid Lake, western Nevada. They were extirpated in nearby Lake Winnemucca, which dried up in the late 1930s after the diversions of the Truckee River. The Cui-ui also occupy the lower Truckee River during spawning season. Historical spawning runs went as far upriver as Reno, Nevada; however, currently most cui-ui migrate only as far as 9.3–12.4 mi. (15–20 km) upriver. The cui-ui are benthic fish and occupy habitat near the bottom of the lake (Pyramid Lake). Although some have been captured deeper, most are found at depths of less than 75 ft. (23 m) (U.S. Fish and Wildlife Service 2013c).

Occurrence in the Study Area. Pyramid Lake is located in the northwest portion of the Study Area. Because cui-ui are only found in Pyramid Lake and Truckee River, they may be found in the portions of the Study Area that overlap aircraft overflights. As discussed for the Lahontan trout, aircraft overflights have the potential to affect surface waters and, therefore, to expose fish occupying those upper portions of the water column to noise. However, it is important to note that the lower altitude of the Reno MOA is 13,000 ft. AGL and the ceiling is 18,000 ft. AGL. At these altitudes, very little of the noise produced by the aircraft would propagate to the water surface, and even less would be transmitted through the air-water interface due to reflection off the water surface. Because of the minimal energy being transmitted into the water from air combat maneuvers above 13,000 ft. AGL, it is unlikely that fish would even detect the noise of the aircraft overflight. Therefore, cui-ui are not anticipated to be affected by activities in the FRTC Study Area and are not carried forward for detailed analysis.

Railroad Valley Springfish

Status, Population Trends, and Threats. The Railroad Valley springfish is listed as threatened wherever it is found under ESA. An initiation of a 5-Year Review of the fish species was begun on April 1, 2013 (78 FR 19510–19514). Threats to the Railroad Valley springfish include nonnative species, potential

groundwater withdrawal, water diversions, oil pumping, and isolated livestock impacts (U.S. Fish and Wildlife Service 2009c). Critical habitat was designated for this species at the time of its listing on March 31, 1986 (51 FR 10857, Service 1986). Six historical spring habitats are designated as critical habitat: the Big Warm Spring, Little Warm Spring, Hay Corral Spring, Big Spring, Reynolds Spring, and North Spring. The Railroad Valley springfish is not listed as a DPS, nor is there relevant information that suggests it should be listed as a DPS. There are no recent population estimates for the species by occupied spring system or range-wide systems (U.S. Fish and Wildlife Service 2009b).

General Description and Habitat. Endemic to Nevada, the Railroad Valley springfish has distinct coloration from other species of springfish, because of a single row of lateral dark spots along its sides. The average length of the Railroad Valley springfish varies from 0.9 and 1.5 in. (22.9 and 38.1 millimeters [mm]). Depending on the population, individuals may attain a total length that exceeds 2.8 in. (71.1 mm). Historically this species is from six spring systems in two areas of Nye County, Nevada. As indiscriminant and opportunistic feeders, Railroad Valley springfish change food sources from season to season. In the spring, they primarily are herbivorous, consuming filamentous algae, and in the summer, they have animal-based foods. They are also uniquely adapted to survive in an environment of high water temperatures and low dissolved oxygen content. They typically spawn from spring through summer and into early fall, and because they can tolerate a wide range of water temperatures and are omnivorous, they can inhabit a range of habitats within spring pools and outflow channels (U.S. Fish and Wildlife Service 2009b).

Distribution. Railroad valley springfish were historically found in six spring systems distributed in two areas of Nye County, Nevada. Big Warm Spring and Little Warm Spring are located on the Duckwater Shoshone Indian Reservation in Nye County; south of the Reservation, Big Spring, Hay Corral Spring, North Spring, and Reynolds Spring originate on Lockes Ranch. The Railroad Valley springfish was extirpated from Big Warm Spring by 2003 due to the introduction of the red-bellied tilapia (*Oreochromis zillii*). They were later restored to the Big Warm Spring in 2007 after a Safe Harbor Agreement between the USFWS and Tribe. Railroad valley springfish persist at Little Warm Spring. However, the population is fragmented due to in-stream barriers. Four populations of springfish at Lockes Ranch persist as well, but the abundance in Hay Corral Spring declined significantly due to habitat manipulation in 2001. North Spring, Big Spring, and Reynolds Spring have relatively stable habitat conditions, and distributions of springfish in these systems seem to be relatively stable (U.S. Fish and Wildlife Service 2009b).

Occurrence in the Study Area. The Railroad Valley springfish occurs within specific springs located in Nye County. This includes Big Warm Spring, Little Warm Spring, Big Spring, Hay Corral Spring, North Spring, and Reynolds Spring. The springfish would be found exclusively in the water that occurs in these springs, and possible their outlets. These locations are outside of the FRTC Study Area and would not be subjected to aircraft overflight noise or other activities in the Study Area. However, undocumented populations of the Railroad Valley Springfish may occur in portions of the FRTC Study Area subject to aircraft overflights. Aircraft overflights associated with activities at FTRC have the potential to affect surface waters and, therefore, to expose fish occupying those upper portions of the water column to noise. However, it is important to note that the lower altitude of the Reno MOA is 13,000 ft. AGL and the ceiling is 18,000 ft. AGL. At these altitudes, very little of the noise produced by the aircraft would propagate to the water surface, and even less would be transmitted through the air-water interface due to reflection off the water surface. Because of the minimal energy being transmitted into the water from air combat maneuvers above 13,000 ft. AGL, it is unlikely that fish would even detect the noise of the aircraft overflight. Therefore, Railroad Valley springfish are not anticipated to be affected by activities in the FRTC, and are not carried forward for detailed analysis.

3.5.2.5 Amphibians and Reptiles

3.5.2.5.1 Overview

These desert habitats on NAS Fallon usually have a wide variety of lizards and snakes adapted to the hot, dry conditions (Table 3.5-4). The 1997 ecological survey recorded 23 reptile and 4 amphibian species (U.S. Department of the Navy 2006a). Amphibian and reptile species common in the region include bull frogs (*Lithobates catesbeiana*), western fence lizard (*Sceloporus occidentalis*), gopher snake (*Pituophis melanoleucus deserticola*), and Great Basin rattlesnake (*Crotalus oreganos lutosus*). Reptiles were not surveyed for the ecological inventory, but the following species are likely to occur in sandy habitats: red coachwhip (*Coluber flagellum piceus*), gopher snake, and western patch-nosed snake (*Salvadora hexalepis*). Amphibians expected in riparian and wetland habitats within the NAS Fallon-administered lands include western toad (*Bufo boreas boreas*), Great Basin spadefoot (*Spea intermontana*), and bullfrog. Indeed, a 2007 survey of Dixie Valley sites confirmed the presence of these expected species (U.S. Department of the Navy 2008).

Table 3.5-4: Reptile and Amphibian Species Known to Occur or Potentially Occurring at Fallon Range Training Complex

Species Name		Conservation Status	Habitat and Occurrence							
Common	Scientific		BF	PL	PS	SN	SG	WT	AG	LS
American bullfrog	*Lithobates catesbeiana*							X	X	
California king snake	*Lampropeltis getulus californiae*					X			X	X
Columbia spotted frog	*Rana luteiventris*	C, PA						X		
common zebra-tailed lizard	*Callisaurus draconoides draconoides*		X		X	X	X		X	
desert spiny lizard	*Sceloporus magister*		X		X	X	X		X	
Great Basin collared lizard	*Crotaphytus bicinctores*		X		X	X	X		X	
Great Basin gopher snake	*Pituophis melanoleucus deserticola*					X			X	X
Great Basin rattlesnake	*Crotalus oreganos lutosus*		X		X	X	X		X	X
Great Basin spadefoot	*Spea intermontana*							X	X	
Great Basin whiptail	*Aspidoscelis tigris tigris*		X		X	X	X		X	
large-spotted leopard lizard	*Gambelia wislizenii wislizenii*		X		X	X	X		X	
long-nosed leopard lizard	*Gambelia wislizenii*		X		X	X	X		X	
long-nosed snake	*Rhinocheilus lecontei*		X			X			X	
Nevada side-blotched lizard	*Uta stansburiana nevadensis*		X		X	X	X		X	
night snake	*Hypsiglena torquata*					X			X	X
northern desert horned lizard	*Phrynosoma platyrhinos platyrhinos*		X		X	X	X		X	
northern leopard frog	*Rana pipens*	PA						X	X	
red coachwhip	*Coluber flagellum piceus*				X					

Table 3.5-4: Reptile and Amphibian Species Known to Occur or Potentially Occurring at Fallon Range Training Complex (continued)

Species Name		Conservation Status	Habitat and Occurrence							
Common	Scientific		BF	PL	PS	SN	SG	WT	AG	LS
rubber boa	*Charina bottae*							X	X	
sagebrush lizard	*Sceloporus graciosus*		X		X	X	X		X	
striped whipsnake	*Masticophis taeniatus*					X			X	
western fence lizard	*Sceloporus occidentalis*		X		X	X	X		X	
western patch-nosed snake	*Salvadora hexalepis*					X			X	
western terrestrial garter snake	*Thamnophis elegans*							X	X	X
western toad	*Bufo boreas boreas*							X	X	
yellow-backed spiny lizard	*Sceloporus magister uniformis*		X		X	X	X		X	

Notes: AG = Agricultural, BF = Basin Floor Habitat, C = Candidate, LS = Landscaped, PA = Nevada State Protected Amphibian, PL = Playa Habitat, PS = Piedmont Slope Habitat, SG = Sagebrush Habitat, SN = Sandy Habitat, WT = Wetland
Source: U.S. Department of the Navy 2008, U.S. Department of the Navy 2006a

3.5.2.5.2 Special Status Amphibian and Reptilian Species

Columbia Spotted Frog

Status, Population Trends, and Threats. The Columbia spotted frog is a Candidate Species for listing under ESA and as a Protected Amphibian under the Nevada Species of Conservation Priority. As stated previously, the Great Basin population of Columbia spotted frogs in Nevada is geographically separated into three subpopulations: Jarbidge-Independence Range, Ruby Mountains, and Toiyabe Mountains. The largest of Nevada's three subpopulation areas is the Jarbidge-Independence Range in Elko and Eureka Counties (U.S. Fish and Wildlife Service 2014). This subpopulation area is formed by the headwaters of streams in two major hydrographic basins. Threats that affect this species include degradation and loss of breeding and overwintering habitats, disease (e.g., Chytridiomycosis), predation by introduced aquatic animals, and limited habitat connectivity due to loss of quality riparian and wetland habitats. Causes of these threats include environmental factors such as climate change and drought, current and historical land uses, and the introduction of nonnative plant or animal species (U.S. Fish and Wildlife Service 2009d). Declines of Columbia spotted frog populations in Nevada have been recorded since 1962, when it was observed that in many Elko County localities where Columbia spotted frogs were once numerous, the species was nearly extirpated. The lack of standardized and extensive monitoring and routine surveying has prevented dependable determinations of frog population numbers or trends across Nevada. However, since the signing of the Candidate Conservation Agreements in 2003, long-term monitoring plans aimed at standardizing monitoring locations and protocols have been developed and implemented for both the Toiyabe Mountains and Northeast subpopulations (U.S. Fish and Wildlife Service 2012).

General Description and Habitat. Adult Columbia spotted frogs grow to between 2 and 4 in. (5 and 10 cm) from snout to vent, with the females being larger than males. The dorsal or top part of their bodies are colored and patterned with light brown, dark brown, or gray, and small spots. The belly or ventral coloration can differ among geographic populations units and may range from yellow to a pinkish salmon. However, young Columbia spotted frogs are very pale, almost white on their ventral belly surfaces. The head of the frog may have a dark mask with a light stripe on the upper jaw, and the

eyes turned upward. The adult male frogs have swollen thumbs with darkened bases. Columbia spotted frogs are found closely associated with clear, slow-moving, or ponded surface waters, with little shade, and a relatively constant water temperature. Other reproducing populations have been found by springs, floating vegetation, and larger bodies of pooled water. A deep silt or muck substrate may be required for hibernation and torpor that usually occurs during colder months. They can overwinter underneath ice-covered ponds; however, they also will use areas where water does not freeze such as spring heads and undercut stream banks with overhanging vegetation (U.S. Fish and Wildlife Service 2014).

Distribution. In Nevada, Columbia spotted frogs are found in the central (Nye County) and northeastern (Elko and Eureka Counties) parts of the State and at elevations between 5,600 and 8,700 ft. (1,700 and 2,650 m). They have been recorded historically to cover a broader range that includes Lander County in central Nevada and Humboldt County in Northwest Nevada. The Great Basin population of the Columbia spotted frogs in Nevada is geographically separated into three subpopulations: Jarbidge-Independence Range, Ruby Mountains, and Toiyabe Mountains. In the Toiyabe Mountains, Columbia spotted frogs are found in seven drainages in Nye County, Nevada. The Reese River (Upper and Lower), Cow and Ledbetter Canyons, and Cloverdale, Stewart, Illinois, and Indian Valley Creeks are the drainages that the Toiyabe Mountains Columbia spotted frogs occur in. The Toiyabe Mountains subpopulation is geographically isolated from the Ruby Mountains and Jarbidge-Independence Range subpopulations by a large gap in suitable habitat and represents the southern-most extremity of the species' range. The Columbia spotted frog also occurs in Idaho and Oregon (U.S. Fish and Wildlife Service 2012). While the Columbia spotted frogs show strong site fidelity, individuals are capable of traveling distances of 3.1 mi. (5 km) or even further if adequate habitat is available (U.S. Fish and Wildlife Service 2014).

Occurrence in the Study Area. Columbia spotted frogs may be found in the Study Area, especially around pools of standing water, in the Eureka and Nye County; however, their occurrence in this area is rare (U.S. Department of the Navy 2008). Columbia spotted frogs are more likely to be found in the eastern portion of the Study Area (underneath the Smokie, Duckwater, Diamond, and Zircon Air Traffic Control Assigned Airspace [ATCAAs]). There are no ground ranges in these regions, and therefore the frogs may only be exposed to intermittent aircraft overflight noise. Training activities that could occur in the region of overlap are restricted to aircraft activities at altitudes above 18,000 feet AGL. Similar to the Reno MOA previously discussed for ESA-listed fish species, minimal acoustic energy will reach the ground location. Because of the vertical separation between training activities and the ground, the Navy believes no direct or indirect stressor would overlap with the Columbian spotted frog.

Northern Leopard Frog

The northern leopard frog (*Rana pipiens*) is listed as a Protected Amphibian under the Species of Conservation Priority for the Nevada Wildlife Action Plan (WAP) Revision (2012). Many habitats are required for all of the northern leopard frog's life stages and it breeds in a variety of aquatic habitats. These habitats include both slow-moving or still water, as well as human-constructed habitats. Subadult northern leopard frogs migrate to feeding sites along the borders of more permanent bodies of water. The northern leopard frog is considered uncommon in a large portion of its range in the western United States, where declines of the species have been documented. The western population extends into Canadian provinces and 19 western U.S. states. Threats to the northern leopard frog include habitat loss, disease, non-native species, and pollution and climate change (Nevada Fish and Wildlife Office 2014).

3.5.2.6 Current Requirements and Management Practices

Following is a summary of current requirements and practices applicable to vegetation and wildlife at FRTC.

- Current requirements and management practices applicable to wildlife and vegetation at the FRTC are described in the *Integrated Natural Resource Management Plan and Environmental Assessment for Naval Air Station Fallon, Nevada* (U.S. Department of the Navy 2014) Actions focus on minimizing disturbance, controlling invasive plants, and restoring native habitats.
- As part of its Bird/Aircraft Strike Hazard (BASH)-oriented wildlife management program to reduce or eliminate wildlife attractants near runways and taxiways, NAS Fallon implements various habitat management and modification techniques including, but not limited to removing food sources, mowing tall grasses, relocating perching and nesting structures, controlling weeds to minimize seeds and bird attractants, and preventing standing water in areas near the flightline. The BASH program manages risk by addressing specific aviation safety hazards associated with wildlife near airfields through coordination among all the entities supporting the aviation mission (U.S. Department of Defense 2010).

3.5.3 ENVIRONMENTAL CONSEQUENCES

This section evaluates how and to what degree the activities described in Chapter 2 (Description of Proposed Action and Alternatives) could impact biological resources (vegetation, mammals, birds, fish, amphibians/reptiles) within the Study Area. The analysis focuses on potential impacts and overall changes as they relate to biological resources associated with implementation of all current and proposed military readiness activities and proposed range enhancements at the FRTC. Table 2-4 presents the baseline and proposed training activities for each alternative. Each stressor is introduced and analyzed by alternative. Table 3.0-1 shows the warfare areas and associated stressors that were considered for analysis. The stressors vary in intensity, frequency, duration, and location within the Study Area. The following primary stressors are applicable to biological resources in the Study Area and are analyzed:

- Noise (Aircraft Noise [including sonic booms], Ordnance Noise, Weapons Firing and Explosion/Impact Noise)
- Energy (Electromagnetic Radiation, Lasers)
- Physical Disturbance (Aircraft and Aerial Target Strike, Military Expended Material Strike, Other Ground-Disturbing Activities [Training Activities and Range Enhancements])
- Secondary Stressors (Soil Quality, Water Quality, Air Quality)

3.5.3.1 Noise

Section 3.4 (Noise [Airborne]) describes baseline noise conditions for the Study Area, noise levels associated with training and testing activities, and the potential effects of noise on human receptors. In addition, Section 3.4 (Noise [Airborne]) provides a general introduction to sound and noise, including the various noise descriptors (noise metrics) and methods used to predict noise levels in this EIS. This section analyzes the potential effects of noise on wildlife.

Wildlife in the FRTC Study Area would continue to be exposed to noise associated with the following:

- Fixed-wing aircraft overflights (including sonic booms)
- Helicopter overflights
- Unmanned Autonomous System (UAS) overflights
- Small and large arms firing

- Live and non-explosive practice munitions striking a target or the ground
- Vehicle and equipment operations
- Occasional explosive munitions disposal

The training activities that have the greatest impact on vegetation within the impact areas of the FRTC Study Area are those that result in habitat alteration associated with ground disturbance from explosive munitions or ground-based training. Therefore, an analysis on vegetation is not provided for acoustic stressors.

3.5.3.1.1 Overview of Wildlife Responses to Noise

Numerous studies have documented that wild animals respond to human-made noise (National Park Service 1994, Bowles et al. 1995, Larkin 1996). The manner in which animals respond to noise depends on several factors including life history characteristics of the species, characteristics of the noise source, loudness, onset rate, distance from the noise source, presence/absence of associated visual stimuli, and previous exposure. Noise may cause physiological or behavioral responses that reduce the animals' fitness or ability to grow, survive, and reproduce successfully. The potential effects of noise on wildlife can take many forms, including changing habitat use and activity patterns, increasing stress response, decreasing immune response, reducing reproductive success, increasing predation risk, degrading communication, and damaging hearing if the sound is sufficiently loud (Larkin 1996).

Behavioral responses are the most commonly used endpoints when studying the effects of noise on wildlife. This is largely based on practical considerations and the difficulty in measuring animal fitness or physiological and ecological endpoints. Researchers have documented a range of behavioral responses to noise, ranging from indifference to extreme panic. Common behavioral responses include alert behavior, startle response, flying or running away, and increased vocalizations (National Park Service 1994, Bowles et al. 1995, Larkin 1996). In some instances, behavioral responses could interfere with breeding, raising young, foraging, habitat use, and physiological energy budgets, particularly when an animal continues to respond to repeated exposures.

While difficult to measure in the field, all behavioral responses are accompanied by some form of physiological response such as increased heart rate or a startle response. A startle is a rapid, primitive reflex that is characterized by rapid increase in heart rate, shutdown of nonessential functions, and mobilization of glucose reserves. Animals can learn to control the behavioral reactions associated with a startle response and often become habituated to noise (National Park Service 1994, Bowles et al. 1995, Larkin 1996). Habituation keeps animals from expending energy and attention on harmless stimuli, but the physiological component might not habituate completely (Bowles et al. 1995). Therefore, animal fitness could still be affected when an animal has habituated to noise (Barber et al. 2009). Gill et al. (2001) described theoretical circumstances when habituation to or tolerance of a stressor could be more detrimental to a population than a strong avoidance reaction. Nonetheless, what appears to be habituation has been observed in many studies and is well-demonstrated in studies evaluating bird control devices (e.g., noise cannons, pyrotechnics, and recorded sounds), which are used to scare birds away from airfields and agricultural areas (Larkin 1996). Larkin (1996) describes one example where red-winged blackbirds began resting on the noise cannon that was intended to scare them away. The birds learned to fly a short distance away when they heard the click of the mechanism that released the gas and signaled an impending explosion.

Likewise, a strong and consistent behavioral or physiological response is not necessarily indicative of negative consequences to individuals or to populations (National Park Service 1994, Bowles et al. 1995,

Larkin 1996). For example, many of the reported behavioral and physiological responses to noise are within the range of normal adaptive responses to external stimuli, such as predation, that wild animals face on a regular basis. In many cases, individuals would return to homeostasis or a stable equilibrium almost immediately after exposure. The individual's overall metabolism and energy budgets would not be affected assuming it had time to recover before being exposed again. If the individual does not recover before being exposed again, physiological responses could be cumulative and lead to reduced fitness. However, it is also possible that an individual would have an avoidance reaction (i.e., move away from the noise source) to repeated exposure or habituate to the noise when repeatedly exposed.

While the effects of noise on wildlife have been addressed in numerous studies, research is hampered by a preponderance of small, disconnected, anecdotal or correlational studies as opposed to coherent programs of controlled experiments (Larkin 1996). These factors, coupled with differences between species, individuals of the same species, and other factors such as habitat, make it difficult to definitively predict how wildlife populations will respond to noise under a specific exposure scenario. Though the literature is sparse, studies on effects of noise on wildlife have been reviewed and, as noted in detail in the sections below, are used to inform the impact analysis.

3.5.3.1.2 Hearing Loss

A familiar effect of exposure to high intensity sound is hearing loss, meaning an increase in the hearing threshold. This phenomenon is called a noise-induced threshold shift, or simply a threshold shift (Miller 1974). The distinction between permanent threshold shift (PTS) and temporary threshold shift (TTS) is based on whether there is complete recovery of a threshold shift following a sound exposure. If the threshold shift eventually returns to zero (the threshold returns to the pre-exposure value), TTS has occurred. The recovery time is related to the exposure duration, sound exposure level (SEL), and the magnitude of the threshold shift, with larger threshold shifts and longer exposure durations requiring longer recovery times (Finneran et al. 2005; Mooney et al. 2009). If the threshold shift does not return to zero but leaves some finite amount of threshold shift, then that remaining threshold shift is a PTS. In general, a threshold shift is more likely when repeated exposures occur over a short duration.

Long-term effects on wildlife that might experience a threshold shift would depend on whether the shift was temporary or permanent, the severity of the shift, the hearing frequencies affected by the shift, and the time required to recover from a TTS. Individual animals with impaired hearing could be more susceptible to predation and would be expected to expend more time and energy trying to detect predators via visual cues rather than auditory cues (e.g., listening for sounds made by an approaching predator or alarm calls of other animals). This could lead to decreased foraging success and decreased fitness. Recovery from a TTS can take a few minutes to a few days depending on the severity of the initial shift. Threshold shifts do not necessarily affect all hearing frequencies equally, so some threshold shifts may not interfere with an animal hearing biologically relevant sound. Consequently, a threshold shift would not necessarily result in long-term effects on the individual.

Continuous or repetitive loud noise appears to cause stress and vascular alteration (including structural damage) in the ear and could be harmful when animals are already under metabolic stress such as starvation. Sound levels over 85 A-weighted decibels (dBA) are considered harmful to inner ear hair cells; 95 dBA is considered unsafe for prolonged periods; and extreme damage occurs as a result of brief exposure to 140 dBA (Hamby 2004). Hearing loss in birds is difficult to characterize because birds, unlike mammals, regenerate inner ear hair cells, even after substantial loss (Corwin and Cotanche 1988; Stone and Rubel 2000). Recovery from metabolic ear stress can often occur after 10 hours (mammals) post loud impulse noise, even before ear structures are fully recovered. Repeated trauma may prolong the

course of hearing sensitivity recovery; however, longer-term recovery from hearing loss is generally expected in birds due to cell regeneration. Lifelong hearing loss (threshold shifts) can occur in birds; about half the duration of noise is needed to produce a threshold shift in birds as opposed to mammals.

Severe noise, even if the noise is short in duration, can result in tympanum rupture, bone fracture, other damage to the ear, and deterioration of brain cells. These impulse noises can cause physical damage at lower intensity than continuous or rapidly repeating noises due to the ear reflex mechanism. For example, common canaries (*Serinus canaria*) exposed to continuous loud noises experienced changes in hearing thresholds, especially at high frequencies (Larkin 1996). While a study with parakeets (*Melopsittacus undulates*) indicated that a PTS (lifelong hearing loss) was experienced at low frequencies only and nearly absent at higher frequencies (Larkin 1996). Many birds appear to tolerate noise that can cause pain in humans; for example, seabirds at airports, wild turkeys (*Meleagris gallopavo*) near a rocket testing plant in Florida, and ospreys (*Pandion haliaetus*) at the Naval Surface Warfare Center, Dahlgren (Larkin 1996). Hamernik et al. (1987) observed varying degrees of TTS and PTS in chinchillas (burrowing rodents) exposed to 1, 10, or 100 noise impulses (one every 3 seconds) having peak intensities of 131, 135, 139, or 147 unweighted decibels (dBP). Damage to the cochlear sensory epithelia was also observed for some exposures.

3.5.3.1.3 Behavioral Responses, Physiological Stress, and Habituation

Numerous studies have documented that wild animals respond to human-made noise, including low-altitude aircraft overflights (Larkin 1996, National Park Service 1994). The manner in which animals respond to overflights depends on several factors including life-history characteristics of the species, characteristics of the noise source, loudness, how suddenly the sound occurs (onset rate), distance from the noise source, the presence or absence of associated visual stimuli, and previous exposure to the sound. A primary concern is that low-altitude overflights may cause physiological or behavioral responses that reduce the animals' fitness or ability to survive. High-noise events (like a low-altitude aircraft overflight or sudden sonic boom) may cause animals to startle or engage in escape or avoidance behaviors, such as flushing or running away. These activities impose an energy cost that, over the long term, may affect survival or growth. In addition, the animals may spend less time engaged in necessary activities like feeding, foraging, or caring for their young because they spend time in noise-avoidance activity.

Researchers have documented a range of behavioral responses to overflights, ranging from indifference to avoidance. Behavioral responses could interfere with raising young, habitat use, and physiological energy budgets. While difficult to measure in the field, some behavioral responses are likely accompanied by physiological responses, such as increased heart rate, or stress. Chronic stress can compromise the general health of animals, but stress is not necessarily indicative of negative consequences to individuals or to populations (Larkin 1996, National Park Service 1994). Unless repeatedly exposed to loud noises or simultaneously exposed to synergistic stressors, it is possible that individuals would return to homeostasis almost immediately after exposure and the individual's overall metabolism and energy budgets would not be affected. However, most of the effects of noise are mild enough that they may never be detectable as changes in population size or population growth against the background of normal variation (Bowles 1995). Many other environmental variables (e.g., predators, weather, changing prey base, ground-based human disturbance) may influence reproductive success and confound the ability to identify the ultimate factor in limiting productivity of a certain nest, area, or region.

For instance, a 3-year study by Bowles et al. (1995) focused on chronic military aircraft exposure. The study was conducted in south-central Arizona characterized by creosote and mixed Sonoran Desert scrub. The sites were exposed to low-altitude flights of more than 20,000 sound events in excess of 80 dB, with 115.5 dB being the highest A-weighted single event level recorded. The control sites received noise levels at least an order of magnitude lower, with an average of 51.3 dB and none over 100 dB. The control area event rate was approximately one flight per day. Numerous kangaroo rat and pocket mouse species and the white-throated wood rat were included in the study. Populations' densities, body weight, reproductive activity, recruitment by immigration and reproduction, and survival rate month to month were measured. Overall, the outcome of the study suggested the effects of lifetime exposure to intermittent aircraft noise on animal demography are likely to be small and difficult to detect, if they exist at all.

Based on information presented above and literature summarized for the other species (National Park Service 1994, Bowles et al. 1995, Larkin 1996), wildlife in the FRTC Study Area could exhibit a range of behavioral and physiological responses to noise depending on distance from the noise source (strength or intensity of behavioral or physiological response decreases with increasing distance from noise source). It is also likely that wildlife would habituate to some sound levels. Several studies indicate that there is a strong tendency for species to acclimate to noise disturbances (Grubb and King 1991; Ellis et al. 1991; Manci et al. 1988; Black et al. 1984). Both field and laboratory data indicate that in mammals (e.g., pronghorn, bighorn sheep, elk, and mule deer) effects are transient and of short duration and suggest that the animals appear to habituate to noise through repeated exposure without long-term discernible negative effects (Workman et al. 1992; Krausman et al. 1998; Weisenberger et al. 1996).

High sound levels and any associated visual or other cues (e.g., vehicle and equipment movement, other human activity, vibration, or projectile impacting the ground nearby) would likely be perceived as a threat and species may exhibit defense behavior. With repeated exposure over a short time frame, such responses have the potential to reduce an animal's fitness by limiting foraging time, increasing energy expenditure, inducing a stress response, and interfering with breeding. Various studies have indicated that some animals respond to repeated loud noises by temporarily or permanently abandoning habitat (National Park Service 1994, Bowles et al. 1995, Larkin 1996). However, the majority of studies have reported short-term or negligible impacts on wildlife.

3.5.3.1.4 No Action Alternative

Aircraft Noise

Fixed-wing aircraft overflights take place at various altitudes and airspeeds throughout the SUA (Figure 2-1) and most occur during the daytime (Table 2-6). The number of times an individual animal could be exposed to aircraft noise during a specific time period (e.g., day, month, year) would be highly variable based on factors such as specific training schedules, flight tracks, altitudes, number of participating aircraft, and biological factors such as local animal movements and seasonal migrations. Figures 3.4-9 through 3.4-12 of Chapter 3.4 (Noise [Airborne]) show average day-night sound level (DNL) noise contours for all aircraft under the No Action Alternative. Community noise levels are generated mostly from fixed-wing operations, as the vast majority of aircraft sorties under the No Action Alternative (approximately 96 percent) are of the fixed-wing type. While the DNL metric and contours are intended to help describe potential impacts on humans, they also indicate where wildlife exposure to noise from overflights would be most frequent. The DNL contours indicate that wildlife would be exposed to aircraft noise most frequently around the Bravo Training Ranges, ingress and egress routes, and staging areas for larger scale adversarial events.

Typically, only low-altitude flights are a concern from a wildlife exposure perspective because aircraft flying above 3,000 ft. (914.4 m) above ground level are not expected to produce a meaningful response in most wildlife based on wildlife responses described in the literature (e.g., National Park Service 1994, Bowles 1995, Larkin 1996). For discussion purposes here, low-altitude flights generally occur below 3,000 ft. (914.4 m) AGL and as low as 200 ft. (30.5 m) AGL for brief periods. Under the No Action Alternative, approximately 85 percent of flights are at altitudes above 3,000 ft. (914.4 m) and approximately 34 percent occur during nighttime hours (Table 2-6).Sound exposure levels at the surface from most air combat maneuver overflights will vary depending on the altitude of the aircraft as well as the type of the aircraft. For reference, at a distance of 200 ft. (60.9 m), the received sound exposure level from a FA-18E/F is approximately 122 dBA; at 1,000 ft. (304.8 m), the received level drops to 113 dBA; and at 5,000 ft. (1,524 m.), the received sound exposure level is approximately 102 dBA (U.S. Department of the Navy 2013b). Exposure to fixed-wing aircraft noise would be brief (seconds) as an aircraft quickly passes overhead.

Fixed-wing aircraft that are flying supersonically (faster than the speed of sound) during portions of training activities not only create overflight noise, but they also create sonic booms that may propagate to the surface. Most supersonic flights occur during adversarial training simulating air-to-air combat situations during anti-air warfare (AAW) and Large Force Exercises. An estimated 458 supersonic events would occur during the busiest month under the No Action Alternative. The response to sonic booms or other sudden disturbances is similar among many wildlife species—sudden and unfamiliar sounds usually act as an alarm and trigger a “fight or flight” startle reaction. The startling effect of a sonic boom can be stressful to an animal. This reaction to stress causes physiological changes in the neural and endocrine systems, including increased blood pressure and higher levels of available glucose and corticosteroids in the bloodstream (Blickley et al. 2012). Continued disturbances and prolonged exposure to severe stress could deplete nutrients available to the animal. However, sonic booms are not expected to cause more than a temporary startle-response because the “pursuit” would not be present. Studies suggest that the intensities and durations of a startle response decrease with the number and frequency of exposures. Several studies indicate that there is a strong tendency for species to acclimate to noise disturbances (Grubb and King 1991; Ellis et al. 1991; Manci et al. 1988; Black et al. 1984).

Although physiological habituation could occur, it is still possible that sonic booms would elicit a brief behavioral response. For example, the response of seven species of raptors of different life stages to sonic booms while nesting was investigated through the use of simulated booms in natural conditions (Ellis et al. 1991). The simulated sonic booms were equivalent to impulse noises expected by supersonic jets operating between 2,000 and 3,000 m. Response to sonic boom was fairly minimal; most responses were negligible, but adult response to the sonic boom usually resulted in flushing from the nest, although incubating or brooding adults never left the nesting area.

Helicopter overflights take place below 3,000 ft. (914.4 m) above ground level throughout the SUA, but most helicopter activity occurs directly over the Bravo ranges within the FRTC. About 1,402 annual helicopter sorties would take place under the No Action Alternative, each with a typical flight duration of 1.5 hours. Approximately 48 percent of the flight hours would occur at night (Table 2-6). Representative helicopter flight altitudes are less than 3,000 ft. (914 m) above ground level during training exercises. Sound exposure levels at the surface from most helicopter overflights will vary depending on the altitude of the aircraft, though they are typically much lower than that of fixed-wing aircraft. For reference, at a distance of 200 ft. (60.9 m), the received sound exposure level from an H-60 is approximately 95 dBA; at 500 ft. (152.4 m), the received level drops to 89 dBA (U.S. Department of the Navy 2006a). Some exercises might include hovering approximately 20 ft. (6.1 m) off the ground for

several minutes. The duration of exposure to noise from a helicopter would be longer than a fixed-wing aircraft overflight because helicopters fly at slower airspeed, though most exposures would still be brief (seconds to minutes).

Most helicopter activity that takes place within the FRTC Study Area airspace is less dispersed compared to fixed-wing aircraft overflights. Therefore, repeated exposure of an individual animal to helicopter noise during a given exercise is more likely than that of a fixed-wing aircraft overflight. However, the onset rate for helicopter noise is lower than that of a fixed-wing aircraft, reducing the occurrence of a sudden-onset stimulus.

UAS overflights take place at various altitudes and airspeeds throughout the SUA. About 80 percent occur during the daytime and typically fly below 3,000 ft. (914.4 m) above ground level (Table 2-6). UAS are estimated to be significantly quieter than the manned fighter jets, and their noise contribution to the overall aircraft noise is negligible. For reference, at a distance of 28 ft. (8.5 m), the received level from a Shadow UAS is approximately 108 dBA; at 204 ft. (62.2 m), the received level drops to 85 dBA. Once the UAS reaches approximately 3,000 ft. (914.4 m) AGL, the Shadow would no longer be heard on the ground (Army National Guard 2008).

Given the historical use of the airspace, and the persistence of aircraft operations and wildlife populations, wildlife within the MOAs are likely habituated to aircraft overflights and associated noise (e.g., sonic booms). Many of the above-listed behavioral and physiological responses to noise are within the range of normal adaptive responses to external stimuli, such as predation, that wild animals face on a regular basis. In many cases, individuals would return to homeostasis or a stable equilibrium almost immediately after exposure. The individual's overall metabolism and energy budgets would not be affected, assuming it had time to recover before being exposed again.

Wildlife exposed to low-altitude aircraft overflights under the No Action Alternative could exhibit short-term behavioral or physiological responses, but not to the extent where the general health of individuals or populations would be compromised. Aircraft overflights are not expected to result in chronic stress based on the short duration and infrequency of exposure.

Weapons Firing and Explosive / Impact Noise

Weapons Firing

Small and medium caliber arms firing is currently conducted on all Bravo training ranges at FRTC. Therefore, wildlife in the vicinity of these activities could be exposed to intermittent small and medium caliber arms noise. At a distance of 50 ft. (15.2 m), the measured sound level of a 0.50-caliber machine gun is approximately 98 dBA. Sound level intensity decreases with increased distance from the firing location and increased angle from the line of fire (Pater & Shea 1981). Multiple, rapid gun firings would occur from a single firing point toward a target area. Acoustic impacts from weapons firing would often be concentrated in space and duration, as presented in Table 2-5. When the firing sources are airborne (such as during gunnery exercises [GUNEX], Close Air Support [CAS], or Large Force Exercises), the amount of noise that would reach the ground would depend on how high the noise source is above the ground. For example, the approximate sound level of a 0.50-caliber machine gun at 400 ft. from the source would be 18 dB less than the sound level at 50 ft. from the source. This attenuation would occur for ground-based firing positions as well.

The potential for animals to be exposed to noise from weapons firing or explosions depends on several factors, including the presence of animals near the detonation, location of the detonation, size of the

explosive, and distance from the detonation. Detonations create blast waves and acoustic waves in air and are also transmitted through the ground. Some of the sound could be attenuated by surrounding vegetation. Noise can result from direct munitions impacts (one object striking another), blasts (explosions that result in shock waves), bow shock waves (pressure waves from projectiles flying through the air), and substrate vibrations (combinations of explosion, recoil, or vehicle motion with the ground). Noise may be continuous (i.e., lasting for a long time without interruption) or impulse (i.e., short duration). Continuous impulses (e.g., bursts from rapid-fire weapons) represent an intermediate type of sound and, when repeated rapidly, may resemble continuous noise. These types of sound are distinguished here as they differ in their effects. Continuous sounds can result in hearing damage while impulses typically elicit physiological or behavioral responses.

High-frequency sounds (or ultrasound) diminish very rapidly in air with distance from the source, and terrestrial animals close enough to be adversely affected by the ultrasound produced by military training are likely close enough to be adversely affected by shrapnel, flying rock, or direct strikes. Therefore, ultrasound receives little attention in the terrestrial environment and it should be assumed that if an animal (e.g., a bat) was close enough to experience impacts from ultrasound, the animal would also likely be impacted directly by the actual munitions (U.S. Fish and Wildlife Service 2010). Infrasound (present in blast and helicopter noise, but not heard by humans) attenuates less in air than audible sound, which means these noises can affect wildlife at longer distances. Birds may use infrasound for communication; however, the extent to which birds are affected by infrasound is speculative. Infrasound can result in damage to the ears, which may affect the species' ability to hear and may also mask biologically meaningful infrasonic communication between individuals.

Wildlife in close proximity of ground based firing positions would likely exhibit behavioral responses. The behavioral effects of military-related noise to wildlife have been investigated numerous times with mixed results (VanderWerf 2000); noise can produce a variety of physiological impacts and behavioral responses in wildlife. The response to noise not only affects an individual but can affect the overall population. Hearing impairment, both temporary and permanent, can decrease viability or reproductive success, particularly when mate attraction and territory protection depend on calling or singing normally. Hearing impairment can also decrease the ability to detect and warn others of predators. Behavioral responses (startle response, alert or alarm response, and flushing) to noise are often examined as these response actions result in: expending excess energy that is not directed toward reproduction; nest/young exposure increasing the risk of predation; nest cooling or nest heating, which can result in egg and juvenile mortality; or accidently kicking eggs or juveniles out of the nest. Wildlife response to noise may also be more intense at night, if the species rely more on auditory cues than visual cues at night. Additionally, young animals may be more susceptible to hearing loss from noise exposure than adults; however, an experiment with common canaries did not show a differential response with age (Larkin 1996).

These varied responses are often attributed to habituation, where after a period of exposure to a stimulus, an animal stops responding to the stimulus. In general, a species can often habituate to human-generated noise when the noise is not followed by an adverse impact. Even when a species appears to be habituated to a noise, the noise may produce a metabolic or stress response (increased heart rate results in increased energy expenditure), although the response may or may not lead to changes in overall energy balance.

However, it is important to note that it is unlikely that wildlife would remain in the immediate vicinity of personnel preparing or engaging in training activities. The natural tendency of wildlife to avoid human

interaction would also serve to minimize the potential for species to be in close proximity to firing locations. Wildlife exposed to small and medium caliber firing noise under the No Action Alternative could exhibit short-term behavioral or physiological responses, but not to the extent where the general health of individuals or populations would be compromised. Small and medium caliber firing noise are not expected to result in chronic stress based on the short duration and infrequency of exposure.

Explosive/Impact Noise

Explosive detonations during training are associated with high-explosive munitions, including bombs, missiles, naval gun shells, grenades, mortar rounds, and demolition charges. Some detonations would occur in the air or at the ground surface. The estimated number of munitions proposed under each alternative is shown in Table 2-5. Air-to-Ground (A-G) Bombing Exercises (BOMBEXs) at the FRTC Study Area involve dropping various live and non-explosive practice bombs from fixed-wing aircraft within target areas of the Bravo training ranges (Table 2-4). Additionally, under the No Action Alternative, approximately 78 land demolitions or Explosive Ordnance Disposal (EOD) events would occur on the Bravo training ranges (Table 2-4). The potential for animals to be exposed to explosions depends on several factors, including the presence of animals near the detonation, location of the detonation, size of the explosive, and distance from the detonation. Detonations create blast waves and acoustic waves in air and are also transmitted through the ground. Some of the sound could be attenuated by surrounding vegetation. Noise can result from direct munitions impacts (one object striking another), blasts (explosions that result in shock waves), bow shock waves (pressure waves from projectiles flying through the air), and substrate vibrations (combinations of explosion, recoil, or vehicle motion with the ground).

Noise is associated with munitions use and a noise event often occurs prior to weapons firing. For example, pilots fly over the target area to make safety checks before dropping or firing munitions during A-G bombing and GUNEX. Some wildlife species might flee the immediate area or take cover underground in response to the fly over, reducing the likelihood of a strike. In addition, munitions training takes place in a deliberate progression, with target placement being followed by a few initial shots, after which feedback is obtained before firing the next series of shots. Again, the likelihood of a strike might be reduced by wildlife responding to the initial stages of an exercise.

Studies focusing on responses of birds on land to explosive noise show varied reactions ranging from no response to behavioral (e.g., flushing, cessation of foraging) and physiological responses (e.g., increased heart and respiration rates). Red-cockaded woodpeckers (*Picoides borealis*) successfully raised young near an active bombing range in Mississippi, while other birds at other sites did not. Oahu elepaio (*Chasiempis sandwichensis ibidis*) did not respond in statistically significant or biologically meaningful ways to noise generated by training with 155 and 105 mm howitzers, 60 and 81 mm mortars, hand grenades, and demolition of unexploded ordinance (VanderWerf 2000). Prairie falcons (*Falco mexicanus*) responded to blasts from ongoing civilian construction where the nests sites were not normally exposed to blasting; however, one northern harrier (*Circus cyaneus*) appeared to preferentially hunt near a location where 24 lb. bombing occurred. Anecdotal observations indicate the burrowing owl (*Athene cunicularia floridana*) persists at Eglin Air Force Base (AFB) on a bombing range where a variety of inert munitions (rockets, missiles, and bombs including a 21,700 lb. massive air blast bomb) has been used over the last 24 years (U.S. Fish and Wildlife Service 2010).

Behavioral responses (startle response, alert or alarm response, and flushing) to noise are often examined as these response actions result in animals expending excess energy not directed toward reproduction; nest exposure increasing the risk of predation, nest cooling or nest heating, which can

result in egg and juvenile mortality; or accidently kicking eggs or juveniles out of the nest. Behavioral responses can also include lower breeding densities in suitable habitats that are subject to noise; therefore, suitable habitat may become otherwise unsuitable due to noise.

Special Status Species

Under the No Action Alternative, special status avian and mammal species at training ranges of the FRTC would continue to be exposed to aircraft noise (including sonic booms), munitions noise, and noise from explosions. Areas that would experience the highest noise levels are in the immediate vicinity of the Bravo training ranges. Exposure to aircraft noise could also occur in other areas of potentially suitable habitat under the SUA, as shown in Figures 3.4-9 through 3.4-12. Exposure would be intermittent, and representative SELs are expected to be less than 85 dBA for fixed-wing aircraft and less than 100 dBA for helicopters. Avian and mammal species occurring underneath the SUA could also be exposed to noise from munitions firing and other military readiness activities.

Aircraft overflights and noise from munitions are not expected to affect special status avian and mammal species hearing based on the expected noise levels. Masking is not expected to be an issue because noise would be intermittent and noise events would be brief. Based on responses of animals to noise reported in the literature (National Park Service 1994, Bowles et al. 1995, Larkin 1996), it is likely that at least some aircraft overflights and munitions noise would elicit physiological and behavioral responses (strength or intensity of behavioral and physiological response decreases with increasing distance from noise source). Given the historical usage of the FRTC Study Area, it is possible that animals have habituated to aircraft overflights and noise from munitions at FRTC. There is no evidence that suggests current levels of noise from aircraft overflights or other sources influence avian and mammal species dynamics at FRTC.

In summary, noise may elicit physiological and behavioral responses in avian and mammal species under the No Action Alternative. Exposed individuals would be expected to quickly recover from these responses and exposure would be intermittent and infrequent. The short-term behavioral responses are not expected to affect the fitness of individuals. Therefore, population-level effects would not occur. Noise under the No Action Alternative would have short-term minor effects on special status avian and mammal species, which would be widespread throughout the lands underneath the FRTC. Additionally, there would be no takes for bald and golden eagles from noise under the No Action Alternative.

3.5.3.1.5 Alternative 1

Aircraft Noise

As summarized in Table 2-6, the total number of aircraft sorties would increase by approximately 6 percent, from 43,186 under the No Action Alternative to 45,994 under Alternative 1. The number of fixed-wing aircraft sorties would increase from 41,615 to 44,321 per year and helicopter sorties would increase from 1,402 to 1,493 per year under Alternative 1. Wildlife would be exposed to aircraft noise more frequently based on the number of sorties, and lands beneath the proposed MOA would be exposed to noise from low-altitude overflights. Alternative 1 does not include an increase in AAW or Large Force Exercises; therefore, supersonic events are not expected to increase.

Figures 3.4-16 through 3.4-18 show average DNL noise contours for all aircraft under Alternative 1. Community noise levels are generated mostly from fixed-wing operations, as the vast majority of aircraft sorties under the No Action Alternative (approximately 96 percent) are of the fixed-wing type. While the DNL metric and contours are intended to help describe potential impacts on humans, they also indicate where wildlife exposure to noise from low-altitude overflights would be most frequent. The DNL

contours indicate that wildlife would be exposed to aircraft noise most frequently around the Bravo Training Ranges, ingress and egress routes, and staging areas for larger scale adversarial events. Given the historical use of the airspace, and the persistence of aircraft operations and wildlife populations, wildlife within the MOAs are likely habituated to aircraft overflights. Wildlife exposed to low-altitude aircraft overflights under the Alternative 1 could exhibit short-term behavioral or physiological responses, but not to the extent where the general health of individuals or populations would be compromised. Aircraft overflights are not expected to result in chronic stress based on the short duration and infrequency of exposure.

Weapons Firing and Explosive/Impact Noise

Weapons Firing

Under Alternative 1, small and medium caliber arms firing would be conducted on all Bravo training ranges at FRTC. On Bravo-16, munitions use would double in comparison to the No Action Alternative (Table 2-5). At Bravo-17 and Bravo-19, munitions would also increase, by approximately 33 and 8 percent, respectively. At Bravo-20, however, munitions usage would decrease by approximately 5 percent, in comparison to the No Action Alternative. Munitions use would continue to be performed during Tactical Ground Mobility, GUNEX, CAS, Large Force Exercises, EOD, and Marksmanship activities. When the firing sources are airborne (such as during GUNEX, CAS, or Large Force Exercises), the amount of noise that would reach the ground would depend on how high the noise source is above the ground. For example, the approximate sound level of a 0.50-caliber machine gun at 400 ft. from the source would be 18 dB less than the sound level at 50 ft. from the source. This attenuation would occur for ground based firing positions as well. Wildlife in close proximity of ground based firing positions would likely exhibit behavioral responses, with the likelihood of reactions decreasing with increasing distance from the noise source. It is important to note that it is unlikely that wildlife would remain in the immediate vicinity of personnel preparing or engaging in training activities. The natural tendency of wildlife to avoid human interaction would also serve to minimize the potential for species to be in close proximity to firing locations. Wildlife exposed to small and medium caliber firing noise under Alternative 1 could exhibit short-term behavioral or physiological responses, but not to the extent where the general health of individuals or populations would be compromised. Small and medium caliber firing noise are not expected to result in chronic stress based on the short duration and small area of influence.

Explosive/Impact Noise

Explosive detonations during training are associated with high-explosive munitions, including bombs, missiles, naval gun shells, grenades, mortar rounds, and demolition charges. Some detonations would occur in the air or at the ground surface. Similar to the No Action Alternative, the highest potential for impact results from the usage of live bombs and land detonations. Under Alternative 1, A-G BOMBEXs at FRTC involve dropping various live and non-explosive practice bombs from fixed-wing aircraft within target areas of the Bravo training ranges (Table 2-45). As presented in Table 2-5, under Alternative 1, the same number of bombs would be utilized at Bravo-16. At Bravo-17, the number of bombs utilized would decrease from 14,402 to 14,131. At Bravo-19 and Bravo-20, the number of bombs utilized would also decrease, from 4,039 to 3,928 at Bravo-19 and from 4,236 to 4,076 at Bravo-20. Additionally, under Alternative 1, approximately 78 land demolitions or EOD events would occur on the Bravo training ranges (Table 2-4), the same as under the No Action Alternative.

While the number of explosive detonations will decrease slightly under Alternative 1, the potential for animals to be exposed to explosions still exists and continues to depends on several factors, including the presence of animals near the detonation, location of the detonation, size of the explosive, and

distance from the detonation. Species in the immediate vicinity of a detonation would likely be impacted by noise associated with an explosive detonation, with level of potential impact decreasing with increasing distance from the noise source.

Similar to the No Action Alternative, noise is associated with munitions use, and a noise event often occurs prior to weapons firing. For example, pilots fly over the target area to make safety checks before dropping or firing munitions during A-G bombing and GUNEX. Some wildlife species might flee the immediate area or take cover underground in response to the fly over. In addition, munitions training takes place in a deliberate progression, with target placement being followed by a few initial shots, after which feedback is obtained before firing the next series of shots. Again, the likelihood of a strike might be reduced by wildlife responding to the initial stages of an exercise.

Wildlife exposed to explosive detonations during training under Alternative 1 could exhibit short-term behavioral or physiological responses, but not to the extent where the general health of individuals or populations would be compromised. Noise from explosive detonations during training are not expected to result in chronic stress based on the short duration and small area of influence.

Special Status Species

Under Alternative 1, special status avian and mammal species (Table 3.5-2) at training ranges of the FRTC would continue to be exposed to aircraft noise, munitions noise, and noise from explosions. Areas that would experience the highest noise levels are in the immediate vicinity of the Bravo training ranges. Exposure to aircraft noise could also occur in other areas of potentially suitable habitat under the SUA, as shown in Figures 3.4-9 through 3.4-12. Exposure would be intermittent, and representative SELs are expected to be less than 85 dBA for fixed-wing aircraft and less than 100 dBA for helicopters. Special status avian and mammal species occurring underneath the SUA could also be exposed to noise from munitions firing and other military readiness activities.

Aircraft overflights and noise from munitions are not expected to affect special status avian and mammal species hearing based on the expected noise levels. Masking is not expected to be an issue because noise would be intermittent and noise events would be brief. Based on responses of animals to noise reported in the literature (National Park Service 1994, Bowles et al. 1995, Larkin 1996), it is likely that at least some aircraft overflights and munitions noise would elicit physiological and behavioral responses (strength or intensity of behavioral and physiological response decreases with increasing distance from noise source). In addition, it is possible that birds have habituated to aircraft overflights and noise from munitions at FRTC. There is no evidence that suggests current levels of noise from aircraft overflights or other sources influence bird population dynamics at FRTC.

In summary, noise may elicit physiological and behavioral responses in avian and mammal species under Alternative 1. Exposed individuals would be expected to quickly recover from these responses and exposure would be intermittent and infrequent. The short-term behavioral responses are not expected to affect the fitness of individuals. Therefore, population-level effects would not occur. Noise under Alternative 1 would have short-term minor effects on special status avian and mammal species, which would be widespread throughout the lands underneath the FRTC. Additionally, there would be no takes for bald and golden eagles from noise under Alternative 1.

3.5.3.1.6 Alternative 2

Aircraft Noise

As summarized in Table 2-6, the total number of aircraft sorties would increase by approximately 17 percent, from 43,186 under the No Action Alternative to 50,590 under Alternative 2. The number of fixed-wing aircraft sorties would increase from 41,615 to 48,752 per year and helicopter sorties would increase from 1,402 to 1,642 per year under Alternative 2. Alternative 2 includes increases in AAW and Large Force Exercises; therefore, the annual number of supersonic events would increase proportionally. The total number of supersonic events would be expected to increase 10 percent under Alternative 2 relative to the No Action Alternative and Alternative 1.Wildlife would be exposed to aircraft noise more frequently based on the number of sorties, and lands beneath the SUA would be exposed to noise from low-altitude overflights.

Figures 3.4-16 to 3.4-18 show average DNL noise contours for all aircraft under Alternative 2. Community noise levels are generated mostly from fixed-wing operations, as the vast majority of aircraft sorties under Alternative 2 (approximately 96 percent) are of the fixed-wing type. While the DNL metric and contours are intended to help describe potential impacts on humans, they also indicate where wildlife exposure to noise from low-altitude overflights would be most frequent. The DNL contours indicate that wildlife would be exposed to aircraft noise most frequently around the Bravo Training Ranges, ingress and egress routes, and staging areas for larger scale adversarial events. Given the historical use of the airspace, and the persistence of aircraft operations and wildlife populations, wildlife within the MOAs are likely habituated to aircraft overflights. Wildlife exposed to low-altitude aircraft overflights under the Alternative 2 could exhibit short-term behavioral or physiological responses, but not to the extent where the general health of individuals or populations would be compromised. Aircraft overflights are not expected to result in chronic stress based on the short duration and infrequency of exposure.

Weapons Firing and Explosive/Impact Noise

Weapons Firing

Under Alternative 2, small and medium caliber arms firing would be conducted on all Bravo training ranges at FRTC. On Bravo-16, munitions use would increase approximately 120 percent in comparison to the No Action Alternative (Table 2-5). At Bravo-17 and Bravo-19, munitions would also increase, by approximately 46 and 19 percent, respectively. At Bravo-20, however, munitions usage would increase by approximately 4 percent, in comparison to the No Action Alternative. Munitions use would continue to be performed during Tactical Ground Mobility, GUNEX, CAS, Large Force Exercises, EOD, and Marksmanship activities. No new locations are proposed for munitions use under Alternative 2. The overall increase in munitions use at the Bravo training ranges will also increase the potential for impacts to wildlife. As discussed for the No Action Alternative, wildlife in close proximity of ground-based firing positions would likely exhibit behavioral responses, with the likelihood of reactions decreasing with increasing distance from the noise source. It is important to note that it is unlikely that wildlife would remain in the immediate vicinity of personnel preparing or engaging in training activities. The natural tendency of wildlife to avoid human interaction would also serve to minimize the potential for species to be in close proximity to firing locations. Wildlife exposed to small and medium caliber firing noise under Alternative 2 could exhibit short-term behavioral or physiological responses, but not to the extent where the general health of individuals or populations would be compromised. Small and medium caliber firing noise are not expected to result in chronic stress based on the short duration and small area of influence.

Explosive/Impact Noise

Explosive detonations during training are associated with high-explosive munitions, including bombs, missiles, naval gun shells, grenades, mortar rounds, and demolition charges. Some detonations would occur in the air or at the ground surface. Similar to the No Action Alternative, the highest potential for impact results from the usage of live bombs and land detonations. Under Alternative 1, A-G BOMBEXs at FRTC involve dropping various live and non-explosive practice bombs from fixed-wing aircraft within target areas of the Bravo training ranges (Table 2-5). As presented in Table 2-5, under Alternative 2, the number of bombs utilized at Bravo-16 would increase from 79 to 87 bombs used annually. At Bravo-17, the number of bombs utilized would increase from 14, 402 to 15,544. At Bravo-19 and Bravo-20, the number of bombs utilized would also increase, from 4,039 to 4,320 at Bravo-19 and from 4,236 to 4,484 at Bravo-20. Additionally, under Alternative 2, approximately 78 land demolitions or EOD events would occur on the Bravo training ranges (Table 2-4), the same as under the No Action Alternative.

As number of explosive detonations will increase slightly under Alternative 2, the potential for animals to be exposed to explosions also increases slightly and continues to depends on several factors, including the presence of animals near the detonation, location of the detonation, size of the explosive, and distance from the detonation. Species in the immediate vicinity of a detonation would likely be impacted by noise associated with an explosive detonation, with level of potential impact decreasing with increasing distance from the noise source.

Similar to the No Action Alternative, noise is associated with munitions use and a noise event often occurs prior to weapons firing. For example, pilots fly over the target area to make safety checks before dropping or firing munitions during A-G bombing and GUNEX. Some wildlife species might flee the immediate area or take cover underground in response to the fly over. In addition, munitions training takes place in a deliberate progression, with target placement being followed by a few initial shots, after which feedback is obtained before firing the next series of shots. Again, the likelihood of a strike might be reduced by wildlife responding to the initial stages of an exercise.

Wildlife exposed to explosive detonations during training under Alternative 2 could exhibit short-term behavioral or physiological responses, but not to the extent where the general health of individuals or populations would be compromised. Noise from explosive detonations during training are not expected to result in chronic stress based on the short duration and small area of influence.

Special Status Species

Under Alternative 2, special status avian and mammal species (Table 3.5-2) at training ranges of the FRTC would continue to be exposed to aircraft noise, munitions noise, and noise from explosions. Areas that would experience the highest noise levels are in the immediate vicinity of the Bravo training ranges. Exposure to aircraft noise could also occur in other areas of potentially suitable habitat under the SUA, as shown in Figures 3.4-9 through 3.4-12. Exposure would be intermittent, and representative SELs are expected to be less than 85 dBA for fixed-wing aircraft and less than 100 dBA for helicopters. Animals occurring underneath the SUA could also be exposed to noise from munitions firing and other military readiness activities.

Aircraft overflights and noise from munitions are not expected to affect special status avian and mammal hearing based on the expected noise levels. Masking is not expected to be an issue because noise would be intermittent and noise events would be brief. Based on responses of animals to noise reported in the literature (National Park Service 1994, Bowles et al. 1995, Larkin 1996), it is likely that at least some aircraft overflights and munitions noise would elicit physiological and behavioral responses

(strength or intensity of behavioral and physiological response decreases with increasing distance from noise source). In addition, it is possible that animals have habituated to aircraft overflights and noise from munitions at FRTC.

In summary, noise may elicit physiological and behavioral responses in avian and mammal species under Alternative 2. Exposed individuals would be expected to quickly recover from these responses and exposure would be intermittent and infrequent. The short-term behavioral responses are not expected to affect the fitness of individuals. Therefore, population-level effects would not occur. Noise under Alternative 2 would have short-term minor effects on special status avian and mammal species, which would be widespread throughout the lands underneath the FRTC. Additionally, there would be no takes for bald and golden eagles from noise under Alternative 2.

3.5.3.2 Energy Stressors

3.5.3.2.1 Electromagnetic radiation

Electromagnetic radiation is a form of environmental pollution that may impact wildlife in various ways depending on type of radiation, duration of exposure, and the species of the receiving animal. Effects on birds may include reduced nesting success (Fernie and Reynolds 2005, Balmori 2009) and various behavioral and physiological responses to electromagnetic fields (Fernie et al. 2000, Fernie and Bird 2001), such as disruption of normal sleep-wake cycles through interference with pineal gland and hormonal imbalance.

Experiments and field observations in these studies were based on continual and long-duration exposure. For instance, Balmori (2009) reports reduced bird activity (breeding and foraging) followed by extirpation within areas saturated with high microwave radiation (greater than 2 Volts/meter [V/m]). The same study reported anomalies in magpies (*Pica pica*), such as plumage deterioration, limps and deformities in limbs, and partial albinism. In another study by Balmori and Hallberg (2007), significant declines of house sparrow densities were observed in areas of high electromagnetic field strength. The study predicted that no sparrows would be expected in an electromagnetic field of greater than 4 V/m of long-term constant exposure.

Salford et al. (2003) and Marks et al. (1995) report various effects on mammals from electromagnetic exposure, including changes in alarm and aversion behavior, deterioration of health, reproductive problems, and changes in normal sleep wake patterns. Nishimura et al. (2010) reported response in lizards to low-frequency electromagnetic fields.

3.5.3.2.2 Lasers

Military uses of lasers include applications such as target designation and ranging, defensive countermeasures, communications, and directed energy weapons. Targeting and ranging lasers are the only laser applications used during training on the ground at the FRTC and within the airspace. These platforms and devices are described in Chapter 2 (Description of Proposed Action and Alternatives). Target designation and ranging laser types are relatively low-power lasers (compared to directed-energy lasers or lasers used for defensive countermeasures). A targeting laser is a low-power laser pointer used to indicate a target for a precision-guided munition, typically launched from an aircraft. The guided munition adjusts its flight-path to home in to the laser light reflected by the target, enabling great precision in aiming. The beam of the laser target designator is set to a pulse rate that matches that set on the guided munition to ensure that munitions strike their designated targets and do not follow other laser beams that may be in use in the area (Northrop-Grumman 2010). The laser designator can be

shone onto the target by an aircraft or ground-based personnel. Lasers used for this purpose are usually infrared lasers so the enemy cannot easily detect the guiding laser light. Vision damage is the primary concern for wildlife species for the lasers used at FRTC. Most studies of the effects of lasers on terrestrial animals involve birds because of the interest in developing deterrents to minimize bird-aircraft strike hazards at airports and wind developments (Baxter 2007, Burton et al. 2011). Fewer studies are available for other species groups, such as terrestrial mammals and reptiles, but the same range of responses (none to avoidance behavior) are expected.

Lustick (1973) conducted an experiment using pulsing light, which indicated that starlings and gulls were able to look directly into the laser beam and not change their behavior. A later study conducted through the National Wildlife Research Center's Mississippi Field Station demonstrated that there was no eye damage to double-crested cormorants (*Phalacrocorax auritus*) that had been exposed to a moderate-power red laser as close as 3 ft. (0.9 m) (Glahn et al. 2000). Furthermore, the bird eye is protected from thermal damage to retinal tissue associated with concentrated laser radiation (U.S. Department of Agriculture 2001).

For several decades, pulsing light has been used on aircraft, aircraft hangers, and high towers as a means of avian management or bird control. In 2001, the U.S. Department of Agriculture's National Wildlife Research Center conducted research on low- to moderate-power, long-wavelength lasers (630–650 nanometers) as an effective, environmentally safe means of dispersing specific bird species under low-light (sunset to dusk) conditions (Blackwell et al. 2002). Results of the U.S. Department of Agriculture research concluded that waterfowl species, wading birds, gulls, vultures, and American crows (*Corvus brachyrhynchos*) have all exhibited avoidance of laser beams during field trials (Blackwell et al. 2002, U.S. Department of Agriculture 2001). However, avoidance reaction times and duration are dependent upon context and species (Blackwell et al. 2002). In general, diurnal birds (active during the day and resting during the night) are not sensitive to extremely intense laser light and elicit a slow avoidance response to lasers. In contrast, nocturnal birds (active during the night and resting during the day) are more sensitive to light and react more quickly to avoid intense light (Blackwell et al. 2002). Blackwell and Bernhardt (2004) found that the avoidance response to pulsed white and wavelength-specific aircraft-mounted light was inconsistent across experiments with cowbirds (*Molothrus* spp.), and there was little or no avoidance behavior in experiments with other species. Also, some studies on the use of lasers for bird control have shown that birds may become habituated to light quickly, and there is a loss of effect as the distance increases from the bird and the laser (U.S. Department of Agriculture 2001).

3.5.3.2.3 No Action Alternative

Electromagnetic

Under the No Action Alternative, wildlife would be exposed to various forms of electromagnetic sources including radar, threat emitters, communications equipment, and electronic detection equipment, primarily during electronic combat training events. Typically, the maximum magnetic field generated would be approximately 23 gauss (G). This level of electromagnetic density is very low compared to magnetic fields generated by other everyday items. The magnetic field generated is between the levels of a refrigerator magnet (150–200 G) and a standard household can opener (up to 4 G at 4 in.). The strength of the electromagnetic field decreases quickly away from the source. The magnetic field generated at a distance of 13.12 ft. (4 m) from the source is comparable to the earth's magnetic field, which is approximately 0.5 G. The strength of the field at just under 26 ft. (8 m) is only 40 percent of the earth's field, and only 10 percent at 79 ft. (24 m). At a radius of 656 ft. (200 m), the magnetic field would be approximately 0.002 G (U.S. Department of the Navy 2005). Under the No Action Alternative, 4,025

electronic warfare operation events would occur. The effects of this radiation on wildlife cannot be quantified; however, the effects can be expected to be minor for the following reasons: (1) the sources of electromagnetic radiation discussed in this EIS do not expose wildlife species to constant radiation; in other words, no area under FRTC SUA is continuously saturated with electromagnetic fields; (2) the strength of the electromagnetic fields is similar or less than the electromagnetic fields generated by the earth); and (3) beams of electromagnetic radiation (e.g., from radars) may expose animals to increased levels of radiation; however, animals would typically be moving through the area (e.g., bird flight) and potentially out of the airspace of the main beam.

In summary, under the No Action Alternative animals could experience a detectable behavioral response to an electromagnetic field, but would quickly recover after the exposure. The fitness (physiological health and normal behavior) of individual animals would not be affected by electromagnetic fields generated from sources included under the No Action Alternative.

Lasers

Under the No Action Alternative, laser guided munitions are used during A-G BOMBEXs within the Bravo training ranges. There are 1,293 events of this type per year, and 3,521 laser guided bombs (both live and inert) are allocated for use (Tables 2-4 and 2-5). Lasers used in the FRTC Study Area would be similar to the moderate-powered lasers from the studies cited above, and therefore no damaging effects on vision would be anticipated. Furthermore, wildlife species may quickly and easily leave an area temporarily or avoid the visual stimulus when operations occur (e.g., when helicopters approach) and return when operations conclude. Further, because laser guided munitions would only be used within the Bravo training ranges, only wildlife species within this area would be potentially affected.

In summary, under the No Action Alternative, the intensity of effects of lasers on wildlife species may be considered minor, where the animal may experience a detectable response to a laser beam, but would recover after the exposure. The fitness (physiological health and normal behavior) of individual animals would not be affected by this temporary effect (the duration of the laser beam directly sighted on an animal's eyes) from lasers included under the No Action Alternative.

Special Status Species

Under the No Action Alternative, special status avian and mammal species at training ranges of the FRTC would continue to be exposed to energy stressors. As described above, under the No Action Alternative, the intensity of effects of energy stressors on avian and mammal species may be considered minor, where the animal may experience a detectable response to a laser beam, but would recover after the exposure. The short-term behavioral responses are not expected to affect the fitness of individuals. Therefore, population-level effects would not occur. Energy stressors under the No Action Alternative would have short-term minor effects on special status species, which would be widespread throughout the lands underneath the FRTC. Additionally, there would be no takes for bald and golden eagles from energy stressors under the No Action Alternative.

3.5.3.2.4 Alternative 1

Electromagnetic radiation

Under Alternative 1, wildlife would be exposed to various forms of electromagnetic sources, including radar, threat emitters, communications equipment, and electronic detection equipment, primarily during electronic combat training events. Similar to the No Action Alternative, 4,025 electronic warfare operation events would occur under Alternative 1. Similar to the No Action Alternative, the effects of this radiation on wildlife are expected to be minor for the following reasons: (1) the sources of

electromagnetic radiation discussed in this EIS do not expose wildlife species to constant radiation; in other words, no area under FRTC SUA is continuously saturated with electromagnetic fields; (2) the strength of the electromagnetic fields (as described in Section 3.5.3.2, Energy Stressors) is similar or less than the electromagnetic fields generated by the earth); and (3) beams of electromagnetic radiation (e.g., from radars) may expose birds in flight to increased levels of radiation; however, the birds in flight would be moving through the area and potentially out of the airspace of the main beam.

In summary, under Alternative 1, the intensity of electromagnetic effects on wildlife species may be considered minor, where the animal would experience a detectable response to an electromagnetic field, but would recover after the exposure. The fitness (physiological health and normal behavior) of individual animals would not be affected by electromagnetic fields generated from sources included under the No Action Alternative.

Lasers

Under Alternative 1, laser guided munitions are used during A-G BOMBEXs within the Bravo training ranges. There are 1,293 events of this type per year, and 3,680 laser guided bombs (1,427 live and 2,253 inert) are allocated for use (Tables 2-4 and 2-5). Additionally, Alternative 1 introduces the use of lasers during 378 ground laser training activities. Lasers used within the FRTC Study Area and in the airspace would be similar to the moderate-powered lasers from the studies cited above, and therefore no damaging effects on vision would be anticipated. Furthermore, wildlife species may quickly and easily leave an area temporarily or avoid the visual stimulus when operations occur (e.g., when helicopters approach or ground personnel approach) and return when operations conclude. Given the amount of available habitat in the areas surrounding these activities and ranges, if wildlife was to relocate as a result of disturbance, the potential impact to their overall energy budget would be expected to be low. Further, because laser guided munitions would only be used within the Bravo training ranges, Shoal Site, and the DVTA, only wildlife species within these areas would be potentially affected.

In summary, under Alternative 1, the intensity of effects of lasers on wildlife species may be considered minor, where the animal may experience a detectable behavioral response to a laser beam, but would recover after the exposure. The fitness (physiological health and normal behavior) of individual animals would not be affected by this temporary effect (the duration of the laser beam directly sighted on an animal's eyes) from lasers included under Alternative 1.

Special Status Species

Under Alternative 1, special status avian and mammal species at training ranges of the FRTC would continue to be exposed to energy stressors. As described above, under the No Action Alternative, the intensity of effects of energy stressors on avian and mammal species may be considered minor, where the animal may experience a detectable response to a laser beam, but would recover after the exposure. The short-term behavioral responses are not expected to affect the fitness of individuals. Therefore, population-level effects would not occur. Energy stressors under Alternative 1 would have short-term minor effects on special status species, which would be widespread throughout the lands underneath the FRTC. Additionally, there would be no takes for bald and golden eagles from energy stressors under Alternative 1.

3.5.3.2.5 Alternative 2

Electromagnetic Radiation

Under Alternative 2, wildlife would be exposed to various forms of electromagnetic sources including radar, threat emitters, communications equipment, and electronic detection equipment, primarily

during electronic combat training events. Under Alternative 2, 4,428 electronic warfare operation events would occur under Alternative 2. Similar to the No Action Alternative, the effects of this radiation on wildlife are expected to be minor for the following reasons: (1) the sources of electromagnetic radiation discussed in this EIS do not expose wildlife species to constant radiation; in other words, no area under FRTC SUA is continuously saturated with electromagnetic fields; (2) the strength of the electromagnetic fields (as described in Section 3.5.3.2, Energy Stressors) is similar or less than the electromagnetic fields generated by the earth); and (3) beams of electromagnetic radiation (e.g., from radars) may expose birds in flight to increased levels of radiation; however, the birds in flight would be moving through the area and potentially out of the airspace of the main beam.

In summary, under Alternative 2, the intensity of electromagnetic effects on wildlife species may be considered minor, where the animal would experience a detectable response to an electromagnetic field, but would recover after the exposure. The fitness (physiological health and normal behavior) of individual animals would not be affected by electromagnetic fields generated from sources included under the No Action Alternative.

Lasers

Under Alternative 2, laser guided munitions are used during A-G BOMBEXs within the Bravo training ranges. There are 1,422 events of this type per year, and 4,049 laser guided bombs (1,569 live and 2,480 inert) are allocated for use (Tables 2-4 and 2-5). Additionally, Alternative 2 introduces the use of lasers during 416 ground laser training activities as compared none under the No Action Alternative. Lasers used within the FRTC Study Area and in the airspace would be similar to the moderate-powered lasers from the studies cited above, and therefore no damaging effects on vision would be anticipated. Furthermore, wildlife species may quickly and easily leave an area temporarily or avoid the visual stimulus when operations occur (e.g., when helicopters approach or ground personnel approach) and return when operations conclude. Given the amount of available habitat in the areas surrounding these activities and ranges, if wildlife was to relocate as a result of disturbance, the potential impact to their overall energy budget would be expected to be low. Further, because laser guided munitions would only be used within the Bravo training ranges, Shoal Site, and the DVTA, only wildlife species within these areas would be potentially affected.

In summary, under Alternative 2, animals may experience a detectable behavioral response to a laser beam, but would quickly recover after the exposure. The fitness (physiological health and normal behavior) of individual animals would not be affected by this temporary effect (the duration of the laser beam directly sighted on an animal's eyes) from lasers included under Alternative 2.

Special Status Species

Under Alternative 2, special status avian and mammal species at training ranges of the FRTC would continue to be exposed to energy stressors. As described above, under Alternative 2, the short-term behavioral responses are not expected to affect the fitness of individuals. Therefore, population-level effects would not occur. Energy stressors under Alternative 2 would have short-term effects on special status avian and mammal species, which would be widespread throughout the lands underneath the FRTC. Additionally, there would be no takes for bald and golden eagles from energy stressors under Alternative 2.

3.5.3.3 Physical Disturbance and Strike Stressors

3.5.3.3.1 No Action Alternative

Aircraft and Aerial Targets

Wildlife-aircraft strikes are a major concern for the Navy because they can cause harm to aircrews, damage to equipment, and mortality to wildlife. The number of wildlife-aircraft strikes recorded Navywide ranged from 48 to 827 per year (mostly birds) from 1999 through 2009 (Naval Safety Center 2009). The number of wildlife-aircraft strikes recorded between 1999 and 2013 U.S. Air Force-wide reported ranged from 1,960 to 5,107. The majority of these strikes were birds, but approximately 5 percent of the reported strikes were bats. Bird and bat strikes may occur during any phase of flight, but are most likely during the take-off, initial climb, approach, and landing phases because of the greater numbers of animals in flight at lower levels. While all aircraft strikes are considered serious and dangerous events, the number of related mortalities is small considering Navywide aircraft activities. Although strikes can occur anywhere aircraft are operated, Navy and Air Force data indicate they occur more often over land (Naval Safety Center 2009; U.S. Department of Defense 2010). Potential for wildlife strike is greatest in foraging or resting areas, in migration corridors, and at low altitudes. For example, animals can be attracted to airports because they often provide foraging and nesting resources (U.S. Department of Defense 2010).

Approximately 95 percent of bird flight during migration occurs below 10,000 ft. (3,048 m), with the majority below 3,000 ft. (914.4 m) (Naval Safety Center 2009; U.S. Department of Defense 2010). Bird and aircraft encounters are more likely to occur during aircraft takeoffs and landings than when the aircraft is engaged in level flight. In a study that examined 38,961 bird and aircraft collisions, Dolbeer (2006) found that the majority (74 percent) of wildlife collisions occurred below 500 ft. (152.4 m). Therefore, low-altitude, fixed-wing aircraft overflights likely present the greatest risk of aircraft strikes in FRTC airspace. High-speed flight in a low-altitude environment places aircraft in airspace that may contain animals in flight. Further, animals may flush in response to approaching aircraft noise. Helicopter training also presents aircraft strike hazards, the vast majority (approximately 97 percent of sorties) occur below 3,000 ft. (914 m) above ground level.

Fixed-wing aircraft and helicopter overflights take place at various altitudes and airspeeds throughout the SUA (Figure 2-1), with most occurring during the daytime (Table 2-6). Part of aviation safety during training activities is the implementation of the BASH program. The BASH program manages risk by addressing specific aviation safety hazards associated with wildlife near airfields through coordination among all the entities supporting the aviation mission (U.S. Department of Defense 2010). The BASH program includes, identifying the bird/animal species involved and the location of the strikes to understand why the species is attracted to a particular area of the airfield or training route. By knowing the species involved, managers can understand the habitat and food habits of the species. A Wildlife Hazard Assessment identifies the areas of the airfield that are attractive to the wildlife and provides recommendations to remove or modify the attractive feature. Recommendations may include removal of unused airfield equipment to eliminate perch sites, placement of anti-perching devices, wiring of streams and ponds, removal of brush/trees, use of pyrotechnics, and modification of the grass mowing program (U.S. Department of Defense 2010). As part of its BASH-oriented wildlife management program to reduce or eliminate wildlife attractants near runways and taxiways, NAS Fallon implements various habitat management and modification techniques including, but not limited to, the removal of removing food sources, mowing tall grasses, relocating perching and nesting structures, controlling weeds to minimize seeds and bird attractants, and preventing standing water in areas near the flightline.

The potential for incidental mortality from aircraft strikes exists in the FRTC airspace. If they occur, aircraft strikes would be infrequent and a small number of individuals would be affected. No population-level effects would be expected based on the small number of individuals potentially affected. Aircraft strikes that might occur under the No Action Alternative would have minor localized effects on birds and are not expected to affect mammals, amphibians, or reptiles.

Military Expended Materials

Various types of munitions would continue to be fired at or dropped on targets in the Bravo training ranges (Table 2-5) under the No Action Alternative. Most projectiles would make contact with or near the designated target, with an occasional round landing within the larger surface or weapons danger zones. Wildlife species could be struck if they were at the point of physical impact at the time of projectile delivery. However, portions of the target areas are highly disturbed from decades of use. Wildlife species are less likely to use these highly disturbed areas, reducing the likelihood of a strike. Nonetheless, all wildlife groups potentially can use habitats in this area.

Noise is associated with munitions use and a noise event often occurs prior to weapons firing. For example, pilots fly over the target area to make safety checks before dropping or firing munitions during A-G bombing and GUNEX. Some wildlife species might flee the immediate area or take cover underground in response to the fly over, reducing the likelihood of a strike. In addition, munitions training takes place in a deliberate progression, with target placement being followed by a few initial shots, after which feedback is obtained before firing the next series of shots. Again, the likelihood of a strike might be reduced by wildlife responding to the initial stages of an exercise. Also, the likelihood of a relatively small projectile and an animal co-occurring in time and space within the target area is expected to be low. Based on these factors, while munitions may impact an individual, munitions are not expected to have population-level effects on wildlife species under the No Action Alternative.

Other Ground-Disturbing Activities

Under the No Action Alternative, the primary causes of ground disturbances would be target maintenance and munitions impacting the ground surface within the training ranges. Most projectiles would make contact with or near the designated target, with an occasional round landing within the larger surface or weapons danger zones. The vegetation in and around each of these targets must be maintained or removed for fire safety and to provide a viable visual cue to pilots. Additionally, the target areas have been subjected to similar maintenance and disturbance regimes for years. There are no new targets or new training ranges under the No Action Alternative, therefore ground disturbing activities under the No Action Alternative would not result in additional loss of vegetation communities or additional direct alteration of habitat over what has occurred over the historic use of the training ranges.

Ground vehicle traffic and personnel under the No Action Alternative would include Naval Special Warfare activities (convoy operations, tactical ground mobility, and ground maneuver tactics) at DVTA and B-16. With the exception of the free-maneuver areas designated in the B-16 Environmental Assessment (EA), ground vehicle traffic is restricted to existing roadways. Additional ground personnel would perform land demolitions at all Bravo training ranges, and marksmanship activities at the small-arms range on B-19. Wildlife species may quickly and easily leave an area temporarily or avoid the visual stimulus when operations occur (e.g., when vehicles approach or ground personnel approach) and return when operations conclude. As described above, wildlife species are more susceptible to avoidance behaviors when visual stimuli or encroachment is attached to other stimuli, such as the noise of approaching foot traffic or vehicles. However, given the amount of available habitat in the areas

surrounding these activities, if wildlife was to relocate as a result of disturbance, the potential impact to their overall energy budget would be expected to be low and not reach population-level impacts.

All activities within the FRTC Study Area comply with the FRTC Range Operations Manual, which include guidelines for the protection of natural resources (e.g., no cutting, injuring, or destruction of trees or shrubs). Given the restriction of vehicles to existing roadways and compliance with the FRTC Range Users Manual, it is unlikely that ground vehicle and personnel would cause population-level impacts to vegetation communities. The usage of the free-maneuver areas of B-16 are addressed in the B-16 EA, which concluded their use would have no significant impacts to vegetation communities or wildlife.

Vegetation communities on Navy-administered lands of the FRTC could be affected by invasive plants under the No Action Alternative. Ground-disturbing activities described above would indirectly affect native plant communities by creating favorable conditions for establishment of invasive plants and providing pathways for seed dispersal. The Navy and BLM manage lands for the control and removal of noxious weeds per their Integrated Pest Management Plans (IPMP), which are in accordance with *Invasive Species*, EO 13112 of 3 February 1999, and the Noxious Weed Act of 1974, 7 U.S.C. 7801. As part of the IPMP, the Navy and BLM evaluate the potential for noxious weed colonization prior to surface-disturbing activities. If there is a high potential for colonization, the site would be monitored post project, and weed control measures would be implemented if necessary. Further, after natural or significant human disturbance, the Navy and BLM would revegetate the area with native plants, where feasible. While training activities under the No Action Alternative would contribute to the invasive plant problems, continued implementation of the IPMP would help ensure that invasive plant issues specifically associated with training activities would have no significant impact on vegetation under the No Action Alternative.

Special Status Species

Under the No Action Alternative, special status avian and mammal species at training ranges of the FRTC would continue to be exposed to physical disturbance and strike stressors. As described above, under the No Action Alternative, the intensity of effects of disturbance and strike stressors on wildlife species may be considered minor. Though individual animals may be impacted by disturbance or strike, it is not anticipated under the No Action Alternative that population-level effects would occur. Additionally, there would be no takes for bald and golden eagles from physical disturbance and strike stressors under the No Action Alternative.

3.5.3.3.2 Alternative 1

Aircraft and Aerial Targets

As summarized in Table 2-6, the total number of aircraft sorties would increase by approximately 6 percent, from 43,186 to 45,994 under Alternative 1. Wildlife-aircraft strikes are a major concern for the Navy because they can cause harm to aircrews, damage to equipment, and mortality to wildlife. As discussed for the No Action Alternative, aircraft encounters are more likely to occur during aircraft takeoffs and landings than when the aircraft is engaged in level flight. Low-altitude, fixed-wing aircraft overflights likely present the greatest risk of aircraft strikes in FRTC airspace. High-speed flight in a low-altitude environment places aircraft in airspace that may contain animals in flight. Further, birds may flush in response to approaching aircraft noise and increase the strike potential. Helicopter training also presents aircraft strike hazards, as the vast majority (approximately 97 percent of sorties) occur below 3,000 ft. (914 m) above ground level.

The potential for incidental mortality from aircraft strikes exists in the FRTC airspace. Given the implementation of the BASH program, along with the majority of aircraft operation above 3,000 ft. (914 m), aircraft strikes would be infrequent and a small number of individuals would be affected. No population-level effects would be expected based on the small number of individuals potentially affected.

Military Expended Materials

Various types of munitions would continue to be fired at or dropped on targets in the Bravo training ranges (Table 2-5) under Alternative 1. Alternative 1 increases the total amount of munitions by approximately 62 percent in comparison with the No Action Alternative. However, this increase is comprised primarily of small arms munitions increases at B-16 and the DVTA (blanks only), both of which approximately double in their usage as compared to the No Action Alternative. Missile use increases at B-17 (752 under Alternative 1 compared to 240 under the No Action Alternative), B-19 (318 under Alternative 1 compared to 145 under the No Action Alternative), and B-20 (237 under Alternative 1 compared to 54 under the No Action Alternative). All other munitions remain similar to that used under the No Action Alternative.

Though the number of missiles increase, most projectiles would make contact with or near the designated target, with an occasional round landing within the larger surface or weapons danger zones. The target areas are highly disturbed from decades of use; while the amount of munitions increase, the same disturbed areas will continue to be targeted and used. As described for the No Action Alternative, wildlife species are less likely to use these highly disturbed areas, reducing the likelihood of a strike. Nonetheless, all wildlife groups potentially can use habitats in this area, and wildlife species could be struck if they were at the point of physical impact at the time of projectile delivery.

Noise is associated with munitions use and a noise event often occurs prior to weapons firing. For example, pilots fly over the target area to make safety checks before dropping or firing munitions during A-G bombing and GUNEX. Some wildlife species might flee the immediate area or take cover underground in response to the fly over, reducing the likelihood of a strike. In addition, munitions training takes place in a deliberate progression, with target placement being followed by a few initial shots, after which feedback is obtained before firing the next series of shots. Again, the likelihood of a strike might be reduced by wildlife responding (avoidance or burrowing) to the initial stages of an exercise. Also, the likelihood of a relatively small projectile and an animal co-occurring in time and space within the target area is expected to be low. Based on these factors, while munitions may impact individuals, they are not expected to have population-level effects on wildlife species under Alternative 1.

Other Ground-Disturbing Activities

Under Alternative 1, the primary causes of ground disturbances would be target maintenance and munitions impacting the ground surface within the training ranges. Most projectiles would make contact with or near the designated target, with an occasional round landing within the larger surface or weapons danger zones. As indicated above, missile use increases at B-17 (318 under Alternative 1 compared to 145 under the No Action Alternative) and B-19 (752 under Alternative 1 compared to 240 under the No Action Alternative). All other munitions remain similar to that used under the No Action Alternative. While the number of munitions increases, there are no new targets or new training ranges under Alternative 1. Additionally, the target areas and danger zones have been subjected to maintenance and disturbance regimes for years. Therefore, ground-disturbing activities from missiles

under Alternative 1 would not result in additional loss of vegetation communities or additional direct alteration of habitat over what has occurred over the historic use of the training ranges.

Ground vehicle traffic and personnel under Alternative 1 would continue to include Naval Special Warfare activities (convoy operations, tactical ground mobility, and ground maneuver tactics) at DVTA and B-16 at the same levels as the No Action Alternative. Alternative 1 would introduce two new activities, dismounted fire and maneuver training, and ground laser targeting training. Dismounted Fire and Maneuver Training consists of limited vehicle travel on existing roads to position personnel for dismounted maneuvers at B-17. Ground laser targeting training is conducted using lasers as aiming devices for small arms, as target scoring systems in lieu of live rounds, for range finding, to illuminate targets at night, and to mark targets for identification by aircraft. Under Alternative 1, this training activity could occur on Training Ranges B-16, B-17, and B-19 at the FRTC. Ground laser targeting training would be linked to Ground Maneuver Tactics Training classes. Ground personnel would perform the same number of land demolitions at all Bravo training ranges, and marksmanship activities would increase from 185 to 210 annual activities at the small-arms range on B-19.

With the exception of the free-maneuver areas designated in the B-16 EA, ground vehicle traffic is restricted to existing roadways. The usage of the free-maneuver areas of B-16 are addressed in the B-16 EA, which concluded their use would have no significant impacts to vegetation communities or wildlife. While dismounted ground maneuvers will increase, operations must still comply with standard operating procedures as listed in the FRTC Range Operations Manual, which include guidelines for the protection of natural resources (e.g., no cutting, injuring, or destruction of trees or shrubs). Given the restriction of vehicles to existing roadways and compliance with the FRTC Range Operations Manual, it is unlikely that ground vehicle and personnel would cause population-level impacts to vegetation communities.

Similar to the No Action Alternative, vegetation communities on Navy-administered lands of the FRTC could be affected by invasive plants under Alternative 1. Ground-disturbing activities described above would indirectly affect native plant communities by creating favorable conditions for establishment of invasive plants and providing pathways for seed dispersal. However, as part of the IPMP, the Navy and BLM evaluate the potential for noxious weed colonization prior to surface-disturbing activities. If there is a high potential for colonization, the site would be monitored post project, and weed control measures would be implemented if necessary. Further, after natural or significant human disturbance, the Navy and BLM would revegetate the area with native plants, where feasible. While training activities under Alternative 1 would contribute to the invasive plant problems, continued implementation of the IPMP would help ensure that invasive plant issues specifically associated with training activities would have no significant impact on vegetation under Alternative 1.

The additional ground activities have the potential to disturb wildlife species as animals may quickly and easily leave an area temporarily or avoid the visual stimulus when operations occur (e.g., when vehicles or aircraft approach or ground personnel approach) and return when operations conclude. As described above, wildlife species are more susceptible to avoidance behaviors when visual stimuli or encroachment is attached to other stimuli, such as the noise of approaching foot traffic or vehicles. However, given the amount of available habitat in the areas surrounding these activities, if wildlife was to relocate as a result of disturbance, the potential impact to their overall energy budget would be expected to be low and not reach population-level impacts.

Special Status Species

Under Alternative 1, special status avian and mammal species at training ranges of the FRTC would continue to be exposed to physical disturbance and strike stressors. As described above, under Alternative 1, though individual animals may be impacted by disturbance or strike, it is not anticipated that population-level effects would occur. Additionally, there would be no takes for bald and golden eagles from physical disturbance and strike stressors under Alternative 1.

3.5.3.3.3 Alternative 2

Aircraft and Aerial Targets

As summarized in Table 2-6, the total number of aircraft sorties would increase by approximately 17 percent, from 43,186 to 50,590 under Alternative 2. Wildlife-aircraft strikes are a major concern for the Navy because they can cause harm to aircrews, damage to equipment, and mortality to wildlife. As discussed for the No Action Alternative, aircraft encounters are more likely to occur during aircraft takeoffs and landings than when the aircraft is engaged in level flight. Low-altitude, fixed-wing aircraft overflights likely present the greatest risk of aircraft strikes in FRTC airspace. High-speed flight in a low-altitude environment places aircraft in airspace that may contain animals in flight. Further, birds or bats may flush in response to approaching aircraft noise and increase the strike potential. Helicopter training also presents aircraft strike hazards, as the vast majority (approximately 97 percent of sorties) occur below 3,000 ft. (914 m) above ground level.

The potential for incidental mortality from aircraft strikes exists in the FRTC airspace. Given the implementation of the BASH program, along with the majority of aircraft operation above 3,000 ft. (914 m), bird-aircraft strikes would be infrequent and a small number of individuals would be affected. No population-level effects would be expected based on the small number of individuals potentially affected.

Military Expended Materials

Various types of munitions would continue to be fired at or dropped on targets in the Bravo training ranges (Table 2-5) under Alternative 2. Alternative 2 increases the total amount of munitions by approximately 74 percent in comparison with the No Action Alternative. This increase is comprised primarily of small arms munitions increases at B-16 and the DVTA (blanks only), both of which more than double in their usage as compared to the No Action Alternative. Missile use increases at B-17 (827 under Alternative 2 compared to 240 under the No Action Alternative), B-19 (351 under Alternative 2 compared to 145 under the No Action Alternative), and B-20 (260 under Alternative 2 compared to 54 under the No Action Alternative). All other munitions increase approximately 10 percent to those used under the No Action Alternative.

Though the number of munitions increases, most projectiles would make contact with or near the designated target, with an occasional round landing within the larger surface or weapons danger zones. The target areas are highly disturbed from decades of use; while the amount of munitions increase, the same disturbed areas will continue to be targeted and used. As described for the No Action Alternative, wildlife species are less likely to use these highly disturbed areas, reducing the likelihood of a strike. Nonetheless, all wildlife groups potentially can use habitats in this area, and wildlife species could be struck if they were at the point of physical impact at the time of projectile delivery.

Noise is associated with munitions use, and a noise event often occurs prior to weapons firing. For example, pilots fly over the target area to make safety checks before dropping or firing munitions during A-G bombing and GUNEXs. Some wildlife species might flee the immediate area or take cover

underground in response to the fly over, reducing the likelihood of a strike. In addition, munitions training takes place in a deliberate progression, with target placement being followed by a few initial shots, after which feedback is obtained before firing the next series of shots. Again, the likelihood of a strike might be reduced by wildlife responding (avoidance or burrowing) to the initial stages of an exercise. Also, the likelihood of a relatively small projectile and an animal co-occurring in time and space within the target area is expected to be low. Based on these factors, while munitions may impact individuals, they are not expected to have population-level effects on wildlife species under Alternative 2.

Other Ground-Disturbing Activities

Under Alternative 2, the primary causes of ground disturbances include munitions impacting the ground surface within the training ranges and training by ground personnel and vehicles. Most projectiles would make contact with or near the designated target, with an occasional round landing within the larger surface or weapons danger zones. As detailed above, Alternative 2 increases the total amount of munitions by approximately 74 percent in comparison with the No Action Alternative. While the number of munitions increases, there are no new targets or new training ranges under Alternative 2. Additionally, the target areas and danger zones have been subjected to maintenance and disturbance regimes for years. Therefore, ground-disturbing activities from munitions impacting the ground on targets under Alternative 2 would not result in additional loss of vegetation communities or additional direct alteration of habitat over what has occurred over the historic use of the training ranges.

Ground vehicle traffic and personnel under Alternative 2 would continue to include Naval Special Warfare activities (convoy operations, tactical ground mobility, and ground maneuver tactics) at DVTA and B-16 at the same levels as the No Action Alternative. Alternative 2 would introduce two new activities, dismounted fire and maneuver training, and ground laser targeting training. Dismounted Fire and Maneuver Training consists of limited vehicle travel on existing roads to position personnel for dismounted maneuvers at B-17. Ground laser targeting training is conducted using lasers as aiming devices for small arms, as target scoring systems in lieu of live rounds, for range finding, to illuminate targets at night, and to mark targets for identification by aircraft. Under Alternative 2, this training activity could occur on Training Ranges B-16, B-17, and B-19 at the FRTC. Ground laser targeting training would be linked to Ground Maneuver Tactics Training classes. Ground personnel would perform the same number of land demolitions at all Bravo training ranges, and marksmanship activities would increase from 185 to 231 annual activities at the small-arms range on B-19.

With the exception of the free-maneuver areas designated in the B-16 EA, ground vehicle traffic is restricted to existing roadways. The usage of the free-maneuver areas of B-16 are addressed in the B-16 EA, which concluded their use would have no significant impacts to vegetation communities or wildlife. While dismounted ground maneuvers will increase, operations must still comply with standard operating procedures as listed in the FRTC Range Operations Manual, which include guidelines for the protection of natural resources (e.g., no cutting, injuring, or destruction of trees or shrubs). Given the restriction of vehicles to existing roadways and compliance with the FRTC Range Operations Manual, it is unlikely that ground vehicle and personnel would cause population-level impacts to vegetation communities.

Similar to the No Action Alternative, vegetation communities on Navy-administered lands of the FRTC could be affected by invasive plants under Alternative 2. Ground-disturbing activities described above would indirectly affect native plant communities by creating favorable conditions for establishment of invasive plants and providing pathways for seed dispersal. However, as part of the IPMP, the Navy and

BLM evaluate the potential for noxious weed colonization prior to surface-disturbing activities. If there is a high potential for colonization, the site would be monitored post project, and weed control measures would be implemented if necessary. Further, after natural or significant human disturbance, the Navy and BLM would revegetate the area with native plants, where feasible. While training activities under Alternative 1 would contribute to the invasive plant problems, continued implementation of the IPMP would help ensure that invasive plant issues specifically associated with training activities would have no significant impact on vegetation under Alternative 2.

The additional ground activities have the potential to disturb wildlife species as animals may quickly and easily leave an area temporarily or avoid the visual stimulus when operations occur (e.g., when vehicles or aircraft approach or ground personnel approach) and return when operations conclude. As described above, wildlife species are more susceptible to avoidance behaviors when visual stimuli or encroachment is attached to other stimuli, such as the noise of approaching foot traffic or vehicles. However, given the amount of available habitat in the areas surrounding these activities, if wildlife was to relocate as a result of disturbance, the potential impact to their overall energy budget would be expected to be low and not reach population-level impacts.

Special Status Species

Under Alternative 2, special status avian and mammal species at training ranges of the FRTC would continue to be exposed to physical disturbance and strike stressors. As described above, though individual animals may be impacted by disturbance or strike, it is not anticipated that population-level effects would occur from disturbance and strike stressors. Additionally, there would be no takes for bald and golden eagles from physical disturbance and strike stressors under Alternative 2.

3.5.3.4 Secondary Stressors

This section summarizes how secondary stressors (stressors that are not directly part of activities) can potentially impact terrestrial habitats and species. Specifically, this section addresses the potential of water quality stressors, soil stressors, and air quality stressors, to impact habitats and prey availability.

3.5.3.4.1 No Action Alternative

As described in Section 3.1.3.1.2 (Physical Disturbance), the effects of ground-disturbing activities on soils under the No Action Alternative would be long term and minor in the form of increased potential for soil erosion, compaction, and displacement. The direct effects would occur in previously disturbed areas along dirt roads and within the training ranges. Ground-disturbing activities would not result in significant impacts on soils under the No Action Alternative. Additionally, in no instance would military expended materials have a significant impact on surface or groundwater quality on the FRTC ranges.

As described in Section 3.2.3.1 (No Action Alternative), under the No Action Alternative, training activities and associated criteria or hazardous air pollutant emissions would not change. Air quality in air quality control regions would not change as a result of the No Action Alternative and would still be generally characterized as good. Criteria or hazardous air pollutant emissions associated with training activities would have a negligible effect on air quality under the No Action Alternative because changes to air quality would not be detectable and would be below or within historical or desired air quality conditions. Criteria and hazardous air pollutant emissions associated with the No Action Alternative would have no significant impact on air quality.

Therefore, implementation of the No Action Alternative would not adversely affect sediments, water, or air quality and, therefore, would not indirectly impact terrestrial species or habitats. Additionally, there would be no takes for bald and golden eagles from secondary stressors under the No Action Alternative.

3.5.3.4.2 Alternative 1

As described in Section 3.1.3.2.2 (Physical Disturbance), the effects of ground-disturbing activities on soils under Alternative 1 would be long term and minor in the form of increased potential for soil erosion, compaction, and displacement. The direct effects would occur in previously disturbed areas along dirt roads and within the training ranges. Ground-disturbing activities would not result in significant impacts on soils under Alternative 1. Additionally, in no instance would military expended materials have a significant impact on surface or groundwater quality on the FRTC ranges.

As described in Section 3.2.3.2 (Alternative 1), under Alternative 1, training activities and associated criteria or hazardous air pollutant emissions would not change. Air quality in air quality control regions would not change as a result of Alternative 1 and would still be generally characterized as good. Criteria or hazardous air pollutant emissions associated with training activities would have a negligible effect on air quality under Alternative 1 because changes to air quality would not be detectable and would be below or within historical or desired air quality conditions. Criteria and hazardous air pollutant emissions associated with Alternative 1 would have no significant impact on air quality.

Therefore, implementation of Alternative 1 would not adversely affect sediments, water, or air quality and, therefore, would not indirectly impact terrestrial species or habitats. Additionally, there would be no takes for bald and golden eagles from secondary stressors under Alternative 1.

3.5.3.4.3 Alternative 2

As described in Section 3.1.3.3.2 (Physical Disturbance), the effects of ground-disturbing activities on soils under Alternative 2 would be long term and minor in the form of increased potential for soil erosion, compaction, and displacement. The direct effects would occur in previously disturbed areas along dirt roads and within the training ranges. Ground-disturbing activities would not result in significant impacts on soils under Alternative 2. Additionally, in no instance would military expended materials have a significant impact on surface or groundwater quality on the FRTC ranges.

As described in Section 3.2.3.3 (Alternative 2), under Alternative 2, training activities and associated criteria or hazardous air pollutant emissions would not change. Air quality in air quality control regions would not change as a result of Alternative 2 and would still be generally characterized as good. Criteria or hazardous air pollutant emissions associated with training activities would have a negligible effect on air quality under Alternative 2 because changes to air quality would not be detectable and would be below or within historical or desired air quality conditions. Criteria and hazardous air pollutant emissions associated with Alternative 2 would have no significant impact on air quality.

Therefore, implementation of Alternative 2 would not adversely affect sediments, water, or air quality and, therefore, would not indirectly impact terrestrial species or habitats. Additionally, there would be no takes for bald and golden eagles from secondary stressors under Alternative 2.

3.5.3.5 Proposed Management Practices, Monitoring, and Mitigation Measures

The current management practices listed in Section 3.5.2.6 (Current Requirements and Management Practices) would continue to be implemented under Alternatives 1 and 2, and existing programs and plans would be updated to reflect new conditions.

3.5.3.5.1 Proposed Monitoring

No specific monitoring needs were identified for wildlife based on the analysis presented in Section 3.5.3 (Environmental Consequences).

3.5.3.5.2 Proposed Mitigation Measures

No specific mitigation needs were identified for wildlife based on the analysis presented in Section 3.5.3 (Environmental Consequences).

3.5.3.6 Summary of Effects and Conclusions

3.5.3.6.1 Special Status Species Conclusions

Special status avian and mammal species at training ranges of the FRTC would continue to be exposed to aircraft noise, munitions noise, and noise from explosions. Noise may elicit physiological and behavioral responses in special status avian and mammal species under the action alternatives. Exposed individuals would be expected to quickly recover from these responses, and exposure would be intermittent and infrequent. The short-term behavioral responses are not expected to affect the fitness of individuals. Therefore, population-level effects would not occur. Noise would have short-term effects on special status avian and mammal species, but would be widespread throughout the lands underneath the FRTC.

Under the action alternatives, special status avian and mammal species of the FRTC would continue to be exposed to energy stressors, physical disturbance and strike stressors, and secondary stressors. As described above, these stressors are expected to result in short-term behavioral responses which are not expected to affect the fitness of individuals. Therefore, population-level effects would not occur. Additionally, there would be no takes for bald and golden eagles under the action alternatives.

3.5.3.6.2 Migratory Bird Treaty Act Determinations

The MBTA prohibits the taking, killing, or possessing of migratory birds or the parts, nests, or eggs of such birds, unless permitted by regulation. The Final Rule authorizing DoD to take migratory birds during military readiness activities was published in the FR on 28 February 2007 (50 C.F.R. Part 21). The Final Rules authorizes incidental take of migratory birds during military training and testing activities that would be conducted under the Proposed Action, but does not authorize incidental take during “non-military readiness activities” such as range investments or routine maintenance of targets. Accordingly, conclusions regarding compliance with the MBTA are presented separately for military readiness activities and non-military readiness activities.

The Final Rule authorizing DoD to take migratory birds during military readiness activities provides that the Armed Forces must confer and cooperate with USFWS on the development and implementation of conservation measures to minimize or mitigate adverse effects of a military readiness activity if the DoD determines that such activity may have a “significant adverse effect” on a population of a migratory bird species. An activity has a significant adverse effect if, over a reasonable period of time, it diminishes the capacity of a population of a migratory bird species to maintain genetic diversity, to reproduce, and to function effectively in its native ecosystem. As used here, population means a group of distinct, coexisting, conspecific individuals (i.e., organisms of the same species), whose breeding site fidelity, migration routes, and wintering areas are temporally and spatially stable, sufficiently distinct geographically (at some time of the year), and adequately described so that the population can be effectively monitored to discern changes in its status.

The analysis presented in this section indicates that the combined effects of noise, general human disturbance, and reduced habitat quality associated with military readiness activities could result in reduced fitness of individual birds—in particular, species that may breed in habitats of the Bravo ranges. However, the analysis indicates that military readiness activities are not expected to have a significant adverse effect on a population of a migratory bird species.

Based on this conclusion, the conferencing requirements of the Final Rule authorizing DoD to take migratory birds during military readiness activities do not apply to the Proposed Action. In addition, continued implementation of the NAS Fallon INRMP would promote migratory bird conservation throughout the FRTC.

3.5.3.6.3 National Environmental Policy Act Conclusions

Table 3.5-5 lists each stressor analyzed for potential impacts at the FRTC. None of the alternatives would result in significant impacts on wildlife.

Table 3.5-5: Summary of Effects and Conclusions for Biological Resources

Stressor	Summary of Effects and National Environmental Policy Act Determinations
No Action Alternative	
Acoustic	• Noise may elicit physiological and behavioral responses in wildlife. Exposed individuals would be expected to quickly recover from these responses and exposure would be intermittent and infrequent. The short-term behavioral responses are not expected to affect the fitness of individuals. Therefore, population-level effects would not occur. • Noise would have short-term effects on wildlife, which would be widespread throughout the lands underneath the Fallon Range Training Complex (FRTC).
Energy	• Animals may respond to a laser beam, but exposed individuals would be expected to quickly recover from these responses and exposure would be intermittent and infrequent. The short-term behavioral responses are not expected to affect the fitness of individuals and population-level effects would not occur.
Physical Disturbance And Strike	• Aircraft strikes that might occur under the No Action Alternative would have minor localized effects on birds and bats and are not expected to affect other mammals, amphibians, or reptiles. • Munitions strikes are not expected to have population-level effects on wildlife species under the No Action Alternative. • Other ground disturbing activities under the No Action Alternative would not result in additional loss of vegetation communities or additional direct alteration of habitat.
Secondary	• Implementation of the No Action Alternative would not adversely affect sediments, water, or air quality and, therefore, would not indirectly impact terrestrial species or habitats.
Impact Conclusion	• **The No Action Alternative would not result in significant impacts on biological resources.**
Alternative 1	
Acoustic	• Noise may elicit physiological and behavioral responses in wildlife. Exposed individuals would be expected to quickly recover from these responses and exposure would be intermittent and infrequent. The short-term behavioral responses are not expected to affect the fitness of individuals. Therefore, population-level effects would not occur. • Noise would have short-term effects on wildlife, which would be widespread throughout the lands underneath the FRTC.
Energy	• Animals may respond to a laser beam, but exposed individuals would be expected to quickly recover from these responses and exposure would be intermittent and infrequent. The short-term behavioral responses are not expected to affect the fitness of individuals and population-level effects would not occur.

Table 3.5-5: Summary of Effects and Conclusions for Biological Resources (continued)

Stressor	Summary of Effects and National Environmental Policy Act Determinations
Physical Disturbance And Strike	• Aircraft strikes that might occur would have localized effects on and bats and are not expected to affect other mammals, amphibians, or reptiles. • Munition strikes are not expected to have population-level effects on wildlife species under Alternative 1. • Other ground disturbing activities under Alternative 1 would not result in additional loss of vegetation communities or additional direct alteration of habitat.
Secondary	• Implementation of Alternative 1 would not adversely affect sediments, water, or air quality and, therefore, would not indirectly impact terrestrial species or habitats.
Impact Conclusion	• **Alternative 1 would not result in significant impacts on biological resources.**
Alternative 2	
Acoustic	• Noise may elicit physiological and behavioral responses in wildlife. Exposed individuals would be expected to quickly recover from these responses and exposure would be intermittent and infrequent. The short-term behavioral responses are not expected to affect the fitness of individuals. Therefore, population-level effects would not occur. • Noise would have short-term effects on wildlife, which would be widespread throughout the lands underneath the FRTC.
Energy	• Animals may respond to a laser beam, but exposed individuals would be expected to quickly recover from these responses and exposure would be intermittent and infrequent. The short-term behavioral responses are not expected to affect the fitness of individuals and population-level effects would not occur.
Physical Disturbance And Strike	• Aircraft strikes that might occur would have localized effects on birds and bats and are not expected to affect other mammals, amphibians, or reptiles. • Munition strikes are not expected to have population-level effects on wildlife species under Alternative 2. • Other ground disturbing activities would not result in additional loss of vegetation communities or additional direct alteration of habitat.
Secondary	• Implementation of Alternative 2 would not adversely affect sediments, water, or air quality and, therefore, would not indirectly impact terrestrial species or habitats.
Impact Conclusion	• **Alternative 2 would not result in significant impacts on biological resources.**

3.6 LAND USE AND RECREATION

3.6.1 INTRODUCTION

3.6.1.1 Overview

Land use refers to the management and use of land by people. The attributes of land use include general land use patterns, land ownership, land management plans, and special use areas (e.g., parks, wildlife management areas, designated wilderness). General land use patterns characterize the types of uses within a particular area. Specific uses of land typically include residential, commercial, industrial, agricultural, military, public/institutional, and recreational. Land use also includes areas set aside for preservation or protection of natural resources, wildlife habitat, vegetation, or unique features. Management plans, policies, ordinances, and regulations determine the types of uses that are allowable, or the types of uses that protect specially designated or environmentally sensitive areas. Recreational uses, as used in the context of this chapter, refer to outdoor recreation activities in the area, which include hunting and trapping fur-bearing animals, camping, hiking, horseback riding, fishing, bird watching, and operating off-highway vehicles.

3.6.1.2 Regulatory Framework and Management Practices

Most land beneath the Fallon Range Training Complex (FRTC) airspace is managed by the Bureau of Land Management (BLM), but it also includes land managed by the United States (U.S.) Forest Service (USFS), the Bureau of Reclamation (BOR), the U.S. Fish and Wildlife Service (USFWS), the U.S. Department of the Navy (Navy), Native American tribes, and private land owners. Programs, policies, and local land use plans (cities with a population of 25,000 or more and all counties with a population of 40,000 or more are required to create a planning commission that shall prepare and adopt a comprehensive, long-term general plan for the physical development of the city, county, or region) for surrounding areas are discussed within this section.

In 2011, Navy prepared a Range Air Installations Compatible Use Zones (RAICUZ) study for the FRTC in accordance with Office of the Chief of Naval Operations Instruction (OPNAVINST) 3550.1A, *Range Air Installations Compatible Use Zones Programs*. The purpose of a RAICUZ study is to protect the public's health, safety, and welfare and to prevent encroachment from degrading the operational capabilities of Navy air-to-ground (A-G) ranges. The RAICUZ study is implemented in coordination with federal, state, and local officials. The study contains range safety and noise analysis as well as compatible land use recommendations. At the core of the RAICUZ program is a land use plan, which recommends land uses for areas exposed to different levels of potential weapons impact and noise.

3.6.1.3 Approach to Analysis

The impact analysis for land use considered possible changes to existing land uses and land use compatibility that could result from the Proposed Action or conflicts with future land use plans as adopted by the jurisdictions affected by the Proposed Action. Such changes could arise from proposed increases in training activities and proposed use of additional platforms and systems. Factors used in determining whether impacts on land use would be significant include the degree to which existing land uses would change, the extent to which noise and safety hazards associated with the Proposed Action would cause land use compatibility issues, and the extent to which public access and usability would be affected.

3.6.2 AFFECTED ENVIRONMENT

3.6.2.1 Regional Setting and Land Ownership

The FRTC is in the high desert in northern Nevada, approximately 65 miles east of the city of Reno. The FRTC airspace overlies approximately 10.4 million acres (ac.) (4.2 million hectares [ha]) of land, including large parts of Churchill, Lander, and Eureka Counties as well as small portions of Pershing County in the north, Nye County in the south, Mineral County in the southwest, and Lyon County in the west (see Figure 1-1). The city of Fallon, 6 miles (9.7 kilometers) northwest of Naval Air Station (NAS) Fallon, and the communities of Austin, Crescent Valley, and Gabbs are beneath the FRTC airspace. Highway 50 bisects the FRTC and is the main east-west transportation route through the complex. Approximately 94 percent of the lands beneath the FRTC airspace are federally managed public lands.

The Navy manages approximately 230,000 ac. (approximately 93,078 ha) of land beneath the FRTC airspace. These FRTC land assets are in Churchill County and comprise training ranges Bravo (B)-16, B-17, B-19, and B-20; the Dixie Valley Training Area (DVTA); and the Shoal Site. Management of the FRTC land assets occurs under several agency authorities, depending on whether the asset is acquired (purchased by the Navy), withdrawn, or a combination of acquired and withdrawn. Withdrawn land assets may be open or closed to public by various federal agencies, including the BLM, BOR, Department of Defense, and Department of Energy (Table 2-1).

3.6.2.2 Region of Influence

The region of influence for the land use and recreation analysis is the same as the FRTC Study Area depicted in Figure 2-1 and described in Section 2.2 (Description of the Fallon Range Training Complex Study Area).

3.6.2.3 Existing Land Use at the Fallon Range Training Complex

3.6.2.3.1 Churchill County

Churchill County covers approximately 3,144,320 ac. (1,272,463 ha) and accounts for approximately 4.4 percent of Nevada's total surface area. The federal government controls and manages 68 percent of the land in Churchill County. Of these federally managed public lands, approximately 2,059,268 ac. (833,357 ha) of Churchill County are managed by the BLM, 76,799 ac. (31,080 ha) are managed by the USFWS, and 8,347 ac. (3,378 ha) are managed by the BOR.

The Churchill County Master Plan, adopted by the Churchill County Board of Supervisors on September 2, 2010, provides the blueprint for land use development in unincorporated areas of Churchill County, Nevada. While the project area is located in Churchill County, the County has no land use jurisdiction over federally owned public lands. Unincorporated lands surrounding the FRTC ranges are primarily zoned RR-20, Rural Resource District, by Churchill County (Churchill County 2010a). Churchill County also designates a 3-mile (4.8-kilometer) Navy Notification Area around the FRTC ranges (Churchill County 2010b).

All FRTC training ranges are in Churchill County. Most of the existing land use on lands nearest B-17, B-19, and B-20 is classified by the county as "vacant" and is open space, with some parcels classified as irrigated agricultural land. Much of this land is managed by the BLM and includes permitted livestock grazing and recreational uses, including camping, hiking, horseback riding, and bird watching. Most recreation within the FRTC occurs in Dixie Valley and in the Horse Creek area. The irrigated lands are part of the BOR Newland's Irrigation Project.

The Lahontan Valley has served as the county's center for population growth and economic development since the late 19th century because of the natural fertility of this area, its ready access to other northern Nevada population centers, and the availability of water from the Carson River. Today, agriculture continues to be the predominant economic driver within Churchill County—the area known as the "Oasis of Nevada." Alfalfa, other dry hay, and wheat are the main crops in the county. Beef cattle, sheep, hogs, horses, and dairy cows are raised as well. Additional features of the valley include the Fallon Paiute-Shoshone Indian Reservation/Colony, Fallon National Wildlife Refuge, and Stillwater National Wildlife Refuge. The refuges are managed by the USFWS.

3.6.2.3.2 Lander County

Lander County covers approximately 3,597,440 ac. (1,455,835 ha) and accounts for nearly 5.1 percent of Nevada's total surface area. The federal government controls and manages 93 percent of the land in Lander County. Of these federally managed public lands, approximately 3,010,516 ac. (1,218,314 ha) are managed by the BLM, 296,107 ac. (119,830 ha) of the Toiyabe National Forest are managed by the USFS, and 29,884 ac. (12,094 ha) are managed by the BOR.

Lander County comprises vast uninhabited stretches of land spread across two of Nevada's 14 major watersheds. Interstate 80 traverses the county in an east-west fashion on the northern end, as does U.S. Highway 50 on the southern end. State Highway 305, which runs north-south, bisects the county, linking the cities of Battle Mountain and Austin. The town of Kingston is in the southern part of the county on Highway 376. Development is concentrated in the north along Interstate 80 and in the south along Highway 50.

While agriculture plays a significant role in the local economy, in recent years Lander County's economy has been dominated by mining, primarily gold and precious stones production. Over the years, agriculture's share of total jobs has declined, primarily due to the growth of the county's mining industry. Other industries and land uses include ranching, forestry, fishing and hunting, and educational, health, and social services.

3.6.2.3.3 Eureka County

Eureka County covers approximately 2,676,480 ac. (1,083,135 ha) and accounts for 3.8 percent of Nevada's total surface area. The federal government controls and manages 81 percent of the land in Eureka. Of these federally managed public lands, approximately 2,017,406 ac. (816,416 ha) are managed by the BLM and 144,139 ac. (58,331 ha) are managed by the USFS. The acreage managed by the USFS includes primarily lands of the Humboldt-Toiyabe National Forest (the largest U.S. national forest outside of Alaska) and lands within the northernmost end of the Monitor Range.

Eureka County is traversed by Interstate 80, Highway 50, and the mainline Union Pacific/Southern Pacific rail lines. Population nodes are concentrated around the unincorporated town of Eureka in the southeastern corner and in Crescent Valley and Beowawe in the north.

Eureka County is valued for its historical significance, mountain scenery, and rich natural resources. Its mild temperatures, along with the surrounding Alpine Mountains and Humboldt River, make it an attractive place for outdoor enthusiasts. In the northern portion along the Humboldt River Basin and the Carlin Trend, expansive geological formations of microscopic gold deposits have been found. In addition, commercial-quality geothermal, oil, and mineral resources can be found within Eureka County.

Eureka County has a strong history of mining that continues to support a stable economy with large-scale operations. Mining dominates all other industry sectors, including agriculture and ranching. Most of the mines along the Carlin Trend are in the northern part of the county, where there is limited infrastructure and housing; consequently, most of Eureka County's more than 4,000 mining workers live in nearby Elko County. Other industries and land uses include agriculture, forestry, and fishing and hunting.

3.6.2.3.4 Pershing, Nye, Mineral, and Lyon Counties

In addition to large parts of Churchill, Lander, and Eureka Counties, the FRTC Study Area encompasses small portions of Pershing County in the north, Nye County in the south, Mineral County in the southwest, and Lyon County in the west. Within the FRTC Study Area, most of the land area in these counties consists of vast open tracts of land with scattered parcels of irrigated agricultural land. No major population centers in Pershing, Nye, or Mineral Counties are within the FRTC Study Area.

3.6.2.3.5 Bureau of Land Management

The BLM, as designated by the Federal Land Policy and Management Act, is responsible for the stewardship of federal public lands for the American people for all times. Management strategies are based on the principles of multiple use and sustained yield resources, environmental responsibility, and scientific technology.

FRTC land assets are primarily withdrawn from public use under BLM management (see Table 2-1). Per the Military Lands withdrawal Act (Public Law 106-65), the Secretary of the Interior shall manage the FRTC land assets for the period of withdrawal in consultation with the secretary of the military. BLM management responsibilities for FRTC land assets are outlined in the 2001 Navy integrated natural resource management plan amendment to the BLM Lahontan resource management plan (U.S. Department of the Navy 2001). Management responsibilities outlined in the 2001 integrated natural resource management plan amendment include BLM management of organized recreation activities in consultation with the Navy; BLM management of livestock grazing on open withdrawn lands at B-19, portions of Dixie Valley, and the Shoal Site; BLM management of saleable minerals on Navy-owned and withdrawn lands in Dixie Valley; and inclusion of FRTC land assets into the BLM fire management plan. The BLM and the Navy jointly manage wildlife, wetland, and riparian resources in coordination with the Nevada Department of Wildlife.

Additionally, 7.6 million ac. (3.1 million ha) underlying FRTC airspace are managed by the BLM. Most BLM-administered land underlying FRTC airspace assets (excluding withdrawn FRTC land assets) are managed by the Carson City and Battle Mountain District Offices. These lands are managed in accordance with applicable BLM resource management plans for multiple uses, including recreation, livestock grazing, wildlife habitat, wild burros and horses, development of energy and mineral resources, and off-highway vehicle recreation uses.

Fourteen BLM-designated wilderness study areas totaling 995,994 ac. (403,065 ha) are wholly or partially within the FRTC Study Area (see Figure 4-1). BLM district offices manage these areas to preserve their suitability for potential designation as wilderness areas.

3.6.2.3.6 United States Forest Service

The USFS Austin and Tonopah Ranger Districts manage the 1.2 million ac. (0.5 million ha) of the Toiyabe National Forest that underlie the FRTC airspace for development of mineral resources, dispersed

recreation, and intensive wildlife uses. The Toiyabe National Forest includes three designated wilderness areas. The Arc Dome Wilderness Area and portions of the Alta-Toquima and Table Mountain Wilderness Areas are within the FRTC Study Area. Wilderness management, as outlined in Chapter 2320 of the Forest Service Manual (U.S. Department of Agriculture 2006), prohibits new mining, timber harvest and commercial uses. No roads are maintained in wilderness areas and, excluding administrative and emergency use, motorized transport is prohibited. Additionally, low-level flight within 2,000 feet of the ground surface is discouraged except in emergencies or for essential military missions.

3.6.2.3.7 Native American Tribes

Four Indian reservations (Walker River Indian Reservation, Fallon Paiute-Shoshone Reservation, Pyramid Lake Reservation, and Yomba Indian Reservation) partially or wholly underlie the FRTC airspace. A total of 345,515 ac. (139,825 ha) of reservation lands underlie FRTC airspace.

3.6.2.3.8 Bureau of Reclamation

The mission of the BOR is to “manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public” (Bureau of Reclamation 2003). The BOR Lahontan Basin Area Office has jurisdiction over a large portion of Nevada, including approximately 246,711 ac. (99,840 ha) adjacent to training ranges B-16 and B-20. Projects currently managed by the Lahontan Basin Area Office include the Newlands Project, Washoe Project, Truckee Storage Project, and Humboldt Project. The Newlands Project was authorized by the passage of the 1902 Reclamation Act and has been instrumental in the development of Churchill County.

3.6.2.3.9 United States Fish and Wildlife Service

The USFWS manages the Stillwater National Wildlife Refuge (80,000 ac. [32,375 ha]) and the Fallon National Wildlife Refuge (15,000 ac. [6,070 ha]) underlying FRTC airspace. The USFWS mission with regard to the refuges is to ensure that fish, wildlife, and plant resources endure and that their needs are prioritized first within the refuges. Both areas are open to the public and allow hunting (U.S. Fish and Wildlife Service 2002).

3.6.2.4 Recreational Interests

The vast expanses of undeveloped public lands within the FRTC Study Area support a variety of outdoor recreational activities. As discussed above, most of the public lands in the Study Area are managed for multiple uses, including outdoor recreation. Common recreational activities in the area include hunting and trapping fur-bearing animals, camping, hiking, horseback riding, fishing, bird watching, and operating off-highway vehicles. The Pony Express National Historic Trail runs parallel to Highway 50 within the FRTC. An annual trail ride along the Pony Express route takes place in June. The trail is part of the American Discovery Trail, a coast-to-coast hiking trail.

About 61 percent of the approximately 230,000 ac. (approximately 93,078 ha) of Navy-administered land within the FRTC is closed to the public to safeguard against potential hazards (Table 2-1). The remainder of the Navy-administered lands is open to the public. The BLM manages organized recreation activities in consultation with the Navy on open withdrawn lands.

3.6.2.5 Current Requirements and Management Practices

Current requirements and management practices applicable to land use within the FRTC Study Area are agency specific and are discussed in respective subsections in Section 3.6.2.3 (Existing Land Use at the Fallon Range Training Complex).

Based on the *Fallon Range Training Complex Range Air Installations Compatible Use Zones Study* (U.S. Department of the Navy 2011), land uses within the FRTC Study Area are compatible with current training activities. Land compatibility is based on Navy guidelines outlined in the joint Navy and U.S. Marine Corps instruction, OPNAVINST 3550.1A, *Range Air Installations Compatible Use Zones Program* (U.S. Department of the Navy 2008). The study includes training range safety and noise analyses and provides land use recommendations that are compatible with training range operations and the associated noise levels. Noise associated with training activities, as well as compatibility of noise levels with existing land use and sensitive noise receptors, is addressed further in Section 3.4 (Noise [Airborne]) of this Environmental Impact Statement (EIS). Safety associated with land use is of interest in areas proximate to B-16, B-17, B-19, and B-20, where A-G delivery of ordnance occurs. Accordingly, range compatibility zones are developed for all targets. Range compatibility zones translate aviation and ordnance delivery safety concerns into degrees of safety that can be reasonably attained on the ground.

3.6.3 ENVIRONMENTAL CONSEQUENCES

This section evaluates how and to what degree the activities described in Chapter 2 (Description of Proposed Action and Alternatives) could impact land use within the Study Area. The analysis focuses on potential impacts and overall changes as they relate to land use compatibility and public access. Table 2-4 presents the baseline and proposed training activities for each alternative.

3.6.3.1 No Action Alternative

3.6.3.1.1 Land Use Compatibility

Because training activities would continue at current levels and within established ranges, training areas, and airspace, there would be no changes to the current noise levels associated with these activities. Based on the *Fallon Range Training Complex RAICUZ Study* (U.S. Department of the Navy 2011), land uses within the FRTC Study Area are compatible with current training activities. The study includes training range safety and noise analyses and provides land use recommendations that are compatible with training range operations and the associated noise levels. Noise associated with training activities, as well as compatibility of noise levels with existing land use and sensitive noise receptors, is addressed further in Section 3.4 (Noise [Airborne]) of this EIS.

Safety associated with land use is of interest in areas proximate to B-16, B-17, B-19, and B-20, where A-G delivery of ordnance occurs. Under the current RAICUZ study land use designations, Range Compatibility Zone-I areas for B-16, B-17, B-19, and B-20 fall within the range boundaries on Navy-controlled lands, which is consistent with the requirements of the Navy RAICUZ Plan for the FRTC. Range Compatibility Zone-II in association with the No Action Alternative for B-17 and B-19 fall primarily over vacant open space land, with the exception of the southern edge of B-19, which extends into Walker River Paiute tribal land. The Range Compatibility Zone-II for B-20 overlaps parts of the Stillwater National Wildlife Refuge, the Fallon National Wildlife Refuge, and the Stillwater Wilderness Study Area, but these land uses are compatible based on overflight restrictions mandated by the Navy when operating in these areas. Range Compatibility Zone-III comprises the military operations areas around the training ranges. Lands falling under Range Compatibility Zone-III are mostly agricultural or open space land uses with a small amount of commercial and residential land uses. Based on current Navy guidelines, all of these land uses are compatible with operations in Range Compatibility Zone-III under the No Action Alternative.

Ground training would continue at current levels under the No Action Alternative (Table 2-4). Ground training activities include Convoy Operations, Tactical Ground Mobility, Ground Maneuver Tactics, and

Marksmanship on the small arms range at B-19. Insertion and Extraction and some Strike Warfare training activities such as Close Air Support and Combat Search and Rescue also include ground training components. Most ground training occurs on closed (primarily B-16) and open (DVTA, Shoal Site, and portions of B-16) Navy-administered lands, but on occasion and with prior approval, BLM lands may be used for some types of ground training.

All ground training on Navy-administered lands is scheduled through the Naval Strike and Air Warfare Center (NSAWC) Range Office, and standard range safety policies and procedures apply. Ground training on closed Navy-administered lands does not present land use compatibility concerns because the training activities and any associated hazards are contained within the fenced range boundary.

Open Navy-administered lands available for ground training include DVTA, Shoal Site, and portions of B-16. Ground training is not authorized on portions of the open lands at B-16 and all of the open lands at B-19. Open Navy-administered lands are joint use and open to public access for recreational, livestock grazing, and other purposes. Training activities on open lands are restricted because of the limited amount of land available, public safety, and environmental concerns. Land use conflicts on open lands are avoided through implementation of policies and procedures in the *FRTC Range Operations Manual*, which include:

- Ground training requests must be submitted to the NSAWC Range Office 45 days in advance.
- Contact with civilians should be anticipated. Open Navy lands are joint-use with the public. The military has no authority to ask civilians to exit or leave open land areas.
- All personnel shall adhere to posted speed limits. Dirt and gravel road speed limits must be commensurate with road conditions and should not exceed 45 miles per hour.
- Only blank ammunition, smoke, and flares are allowed on any of the open training areas. Flares and other pyrotechnics may be restricted during fire season. Laser use is not authorized on open lands.
- Helicopter landings on open lands may occur as long as the landing area avoids disturbing the public (if present).

Although not under the jurisdiction of the Navy, BLM lands may be available for limited ground training activities with proper and timely coordination with the NSAWC BLM liaison. The BLM Carson City District *Administrative Guide for Military Activities on and Over the Public Lands* (Bureau of Land Management 2012) provides for the use of public lands by the military under the concept of casual use. Casual use is not an authorization to train and does not provide special status for training to the military. The concept is that some civilian and military activities that have negligible impacts on the environment and other public land users can be conducted on the public lands without written authorizations or permits.

The BLM Administrative Guide and the FRTC Range Operations Manual contain coordination procedures to ensure that any ground training on public lands meets the definition of casual use. While training activities are evaluated on a case-by-case basis, the BLM Administrative Guide includes examples of activities that are or are not considered casual use. For example, any activity that uses live munitions, except blanks and certain pyrotechnics, is automatically considered above the threshold of casual use. If the proposed training requires any type of environmental assessment under the National Environmental Policy Act (NEPA), then it is not considered casual use. An example of a training activity that may be considered casual use is an individual or small team (approximately 12 or fewer) conducting land navigation (map and compass training) with any motorized transport confined to appropriate existing

roads and trails. Based on the concept of casual use, ground training on BLM lands under the No Action Alternative would not create land use conflicts or land use compatibility issues.

3.6.3.1.2 Access

Under the No Action Alternative, training activities at FRTC would continue at baseline levels on lands and within airspace specifically designated for these activities. About 35 percent (81,092 ac. [32,817 ha]) of the approximately 230,000 ac. (approximately 93,078 ha) of Navy-administered land within the FRTC is joint use and open to public access for recreational, livestock grazing, and other purposes. The remainder of the Navy-administered land is closed to the public to safeguard against potential hazards (Table 2-1). The acreage of land closed to the public would not change under the No Action Alternative, and procedures in the FRTC Range Operations Manual would continue to be implemented to ensure that public access and joint-use of open lands continues. Within the FRTC Study Area, federal agencies manage over 9 million acres of public lands, most of which is open to the public for recreational and other uses. Training activities, including aircraft overflights and limited casual use of BLM land, would have no direct impact on accessibility to these public lands. The Navy-administered lands that are closed to public access (120,841 ac. [48,903 ha]) represent a very small percentage (about 1.3 percent) of the total public lands within the FRTC Study Area. Consequently, the No Action Alternative would have negligible impacts on public access.

In summary, land uses within the Study Area are compatible with the current types of training activities conducted at FRTC and current training has a negligible impact on access to public lands. Training activities conducted under the No Action Alternative would have no significant impact on land use and recreation.

3.6.3.2 Alternative 1

3.6.3.2.1 Land Use Compatibility

Under Alternative 1, the number of annual activities would increase for Combat Search and Rescue, Gunnery Exercise (A-G), High-speed Anti-radiation Missile Exercise (HARMEX), and Missile Exercise (A-G) (Table 2-4). Two new activities, Ground Light Amplification by Stimulated Emission of Radiation (LASER) Targeting, and Dismounted Fire and Maneuver, would also be conducted. Additional platforms and systems would also be used during training activities under Alternative 1 (see Section 2.5.3, Proposed Additional Platforms and Systems). All training activities would continue to be conducted within existing training ranges, training areas, and airspace specifically designated for these activities. There would be no changes to training range or airspace boundaries under Alternative 1.

As discussed in Section 3.4 (Noise [Airborne]), changes in training activities and platforms under Alternative 1 would result in minor changes to the noise environment at FRTC. Noise modeling predicts that community sound levels from aircraft activities would continue to be compatible with noise-sensitive land uses. Noise modeling also indicates that contours for ordnance noise at B-16, B-19, and B-20 would not extend beyond range boundaries. At B-17, a noise contour extends just south of the range, but does not overlap with any sensitive receptors. Based on the results of noise modeling (Appendix E, Noise Study) and the analysis in Section 3.4 (Noise [Airborne]), land uses in the FRTC Study Area would continue to be compatible with training-related noise levels under Alternative 1.

Range Compatibility Zone-I areas for B-16, B-17, B-19, and B-20 would remain within the range boundaries under Alternative 1 as required by Navy policy. Prior to using new platforms or systems at FRTC, parameters such as surface danger zones, weapons danger zones, and training tactics would be

evaluated. Adjustments to tactical release parameters or target locations would be made to ensure that all Range Compatibility Zone-I areas remain within the range boundaries. Therefore, existing land uses would remain compatible with operations in Range Compatibility Zone-I, Range Compatibility Zone-II, and Range Compatibility Zone-III under Alternative 1.

Changes in ground training for Alternative 1 include increases in Combat Search and Rescue and Marksmanship training, and reintroduction of Ground LASER Targeting and Dismounted Fire and Maneuver training. Other ground training would be identical to the No Action Alternative. All ground training would continue to be conducted in the same areas described for the No Action Alternative, primarily on closed and open Navy-administered lands. Some aspects of Ground LASER Targeting would be conducted on both closed and open Navy-administered lands (B-16, B-17, B-19, DVTA, and the Shoal Site), but LASERs would only be used on closed lands certificated for LASER use. During this training, LASERs would be used as aiming devices for small arms, as target scoring systems in lieu of live rounds, for range finding, to illuminate targets at night, and to mark targets for identification by aircraft. The hazard zone for LASER targeting would be contained within Navy-administered land where public access is restricted. Standard operating procedures would be implemented to protect the public from operational hazards related to LASER targeting. Dismounted fire and Maneuver would be conducted on B-17, which is closed Navy-administered land.

As discussed for the No Action Alternative, ground training on closed Navy-administered lands does not present land use compatibility concerns because the training activities and any associated hazards are contained within the fenced range boundary. Ground training activities on open Navy-administered lands would increase for Alternative 1, and the likelihood that military and public users would encounter one another could increase. However, continued implementation of policies and procedures in the *FRTC Range Operations Manual* would ensure compatible joint use of these open lands. Alternative 1 does not include any specific proposals to conduct ground training activities on BLM public lands. However, limited ground training activities may be conducted on BLM lands as casual use, with proper and timely coordination with the NSAWC BLM liaison. As discussed for the No Action Alternative, casual use, by definition, would have negligible impacts on the environment and other public land users. Ground training under Alternative 1 would not result in land use compatibility issues.

3.6.3.2.2 Access

Alternative 1 does not include any direct changes to land use, training range or airspace boundaries, or existing public access polices for open or closed Navy-administered lands. Training activities would continue to be conducted on lands and within airspace already designated for these activities. As discussed above, military and public users might encounter one another more frequently on open Navy-administered lands as a result of increased or new training activity. Increased encounters would not affect public access or usability because the military has no authority to ask civilians to exit or leave open land areas. Also, continued implementation of policies and procedures in the *FRTC Range Operations Manual* would ensure compatible joint-use of these open lands. The Navy-administered lands that are closed to public access (120,841 ac. [48,903 ha]) represent a very small percentage (about 1.3 percent) of the total public lands within the FRTC Study Area. Consequently, Alternative 1 would have negligible impacts on public access.

In summary, land uses within the Study Area would remain compatible with training activities conducted at FRTC under Alternative 1 and there would a negligible impact on access to public lands. Training activities conducted under Alternative 1 would have no significant impact on land use and recreation.

3.6.3.3 Alternative 2 (Preferred Alternative)

3.6.3.3.1 Land Use Compatibility

Alternative 2 includes all elements of Alternative 1 and, with a few exceptions, a 10 percent increase in training activities compared to Alternative 1. The number of Long Range Strike for Joint Task Force Exercise (JTFEX) and Composite Training Unit Exercise (COMPTUEX), Dismounted Fire and Maneuver, and Ground Maneuver Tactics activities conducted for Alternative 2 would be the same as Alternative 1. The additional platforms and systems would also be the same as under Alternative 1 (see Section 2.5.3). All training activities would continue to be conducted within existing training ranges, training areas, and airspace specifically designated for these activities. There would be no changes to training range or airspace boundaries under Alternative 2.

As discussed in Section 3.4 (Noise [Airborne]), changes in training activities and platforms under Alternative 2 would result in minor changes to the noise environment at FRTC. Noise modeling predicts that community sound levels from aircraft activities would continue to be compatible with noise sensitive land uses. Noise modeling also indicates that contours for ordnance noise at B-16, B-19, and B-20 would not extend beyond range boundaries. At B-17, a noise contour extends just south of the range, but does not overlap with any sensitive receptors. Based on the results of noise modeling (Appendix E, Noise Study) and the analysis in Section 3.4 (Noise [Airborne]), land uses in the FRTC Study Area would continue to be compatible with training-related noise levels under Alternative 2.

Range Compatibility Zone-I areas for B-16, B-17, B-19, and B-20 would remain within the range boundaries under Alternative 1 as required by Navy policy. Prior to using new platforms or systems at FRTC, parameters such as surface danger zones, weapons danger zones, and training tactics would be evaluated. Adjustments to tactical release parameters or target locations would be made to ensure that all Range Compatibility Zone-I areas remain within the range boundaries. Therefore, existing land uses would remain compatible with operations in Range Compatibility Zone-I, Range Compatibility Zone-II, and Range Compatibility Zone-III under Alternative 2.

All ground training would continue to be conducted in the same areas described for the No Action Alternative and Alternative 1, primarily on closed and open Navy-administered lands. As discussed for the No Action Alternative, ground training on closed Navy-administered lands does not present land use compatibility concerns because the training activities and any associated hazards are contained within the fenced range boundary. Ground training activities on open Navy-administered lands would increase for Alternative 2 and the likelihood that military and public users would encounter one another could increase. However, continued implementation of policies and procedures in the *FRTC Range Operations Manual* would ensure compatible joint-use of these open lands. Alternative 2 does not include any specific proposals to conduct ground training activities on BLM public lands. However, limited ground training activities may be conducted on BLM lands as casual use, with proper and timely coordination with the NSAWC BLM liaison. As discussed for the No Action Alternative, casual use, by definition, would have negligible impacts on the environment and other public land users. Ground training under Alternative 2 would not result in land use compatibility issues.

3.6.3.3.2 Access

Alternative 2 does not include any direct changes to land use, training range or airspace boundaries, or existing public access polices for open or closed Navy-administered lands. Training activities would continue to be conducted on lands and within airspace already designated for these activities. As discussed above, military and public users might encounter one another more frequently on open Navy-

administered lands as a result of increased or new training activity. Increased encounters would not affect public access or usability because the military has no authority to ask civilians to exit or leave open land areas. Also, continued implementation of policies and procedures in the *FRTC Range Operations Manual* would ensure compatible joint-use of these open lands. The Navy-administered lands that are closed to public access (120,841 ac. [48,903 ha]) represent a very small percentage (about 1.3 percent) of the total public lands within the FRTC Study Area. Consequently, Alternative 2 would have negligible impacts on public access.

In summary, land uses within the Study Area would remain compatible with training activities conducted at FRTC under Alternative 2 and there would a negligible impact on access to public lands. Training activities conducted under Alternative 1 would have no significant impact on land use and recreation.

3.6.3.4 Proposed Management Practices, Monitoring, and Mitigation Measures

3.6.3.4.1 Proposed Best Management Practices

Policies and procedures in the *FRTC Range Operations Manual* would continue to be implemented to avoid land use conflicts. No additional management practices are warranted for land use and recreation based on the analysis presented in Section 3.6.3 (Environmental Consequences).

3.6.3.4.2 Proposed Monitoring

No monitoring measures are warranted for land use and recreation based on the analysis presented in Section 3.6.3 (Environmental Consequences) and continued implementation of policies and procedures in the *FRTC Range Operations Manual*.

3.6.3.4.3 Proposed Mitigation Measures

No mitigation measures are warranted for land use and recreation based on the analysis presented in Section 3.6.3 (Environmental Consequences) and continued implementation of policies and procedures in the *FRTC Range Operations Manual*.

3.6.3.5 Summary of Effects and Conclusions

Table 3.6-1 summarizes the effects of the alternatives on land use and recreation.

Table 3.6-1: Summary of Effects and Conclusions for Land Use and Recreation

Stressor	Summary of Effects and National Environmental Policy Act Determinations
No Action Alternative	
Land Use Compatibility	• Existing land uses are compatible with training-related noise levels. • Existing land uses are compatible with operations in Range Compatibility Zone-I, Range Compatibility Zone-II, and Range Compatibility Zone-III under Alternative 1.
Access	• Current access restrictions on Navy-administered lands would not change, and impacts would be negligible.
Impact Conclusion	• The No Action Alternative would not result in significant impacts on land use and recreation.
Alternative 1	
Land Use Compatibility	• Existing land uses would remain compatible with training-related noise levels. • Existing land uses would remain compatible with operations in Range Compatibility Zone-I, Range Compatibility Zone-II, and Range Compatibility Zone-III under Alternative 1.
Access	• Training activities proposed for Alternative 1 would not result in changes to current access restrictions on Navy-administered lands, and impacts would be negligible.
Impact Conclusion	• Alternative 1 would not result in significant impacts on land use and recreation.
Alternative 2	
Land Use Compatibility	• Existing land uses would remain compatible with training-related noise levels. • Existing land uses would remain compatible with operations in Range Compatibility Zone-I, Range Compatibility Zone-II, and Range Compatibility Zone-III under Alternative 2.
Access	• Training activities proposed for Alternative 2 would not result in changes to current access restrictions on Navy-administered lands, and impacts would be negligible.
Impact Conclusion	• Alternative 2 would not result in significant impacts on land use and recreation.

3.7 SOCIOECONOMICS, ENVIRONMENTAL JUSTICE, AND PROTECTION OF CHILDREN

3.7.1 INTRODUCTION

3.7.1.1 Overview

This section evaluates effects related to socioeconomics, environmental justice (as required under Executive Order [EO] 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*), and the protection of children (as required under EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*). Socioeconomics includes an evaluation of the basic attributes and resources associated with the human environment, particularly population and economic activity. Economic activity encompasses employment, personal income, and industrial growth. Impacts on these fundamental socioeconomic components influence other issues, such as housing availability and provision of public services. Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies (U.S. Environmental Protection Agency 1998). EO 13045 defines environmental health risks and safety risks to children as "risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest (such as the air we breathe, the food we eat, the water we drink or use for recreation, the soil we live on, and the products we use or are exposed to)."

3.7.1.2 Regulatory Framework and Management Practices

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, provides that "each Federal agency shall 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 populations and low-income populations." The Council on Environmental Quality Guidance on Environmental Justice (December 10, 1997) provides direction on the type of information generally used; it requires that the analysis determine whether the proposed action has adverse human health effects on minority populations, low-income populations, or Indian tribes, and whether the proposed action has other adverse environmental effects or impacts on minority populations, low-income populations, and Indian tribes.[1]

Section 1-101 of EO 12898 provides specific guidance to federal agencies for determining whether disproportionately high and adverse human health or environmental effects are caused by programs, policies, and activities. For this Proposed Action, analysis for EO 12898 requires assessment of readily available demographic data on the local, regional, and national populations, including race and ethnicity, age, income, and poverty metrics. Information to support this analysis is derived from the United States (U.S.) Census Bureau readily accessible documents and Internet sites. The U.S. Decennial Census forms the basis of the data for 2000 and 2010; the most recent census occurred in 2010. The U.S. Census Bureau 2010 Demographic Profile and the U.S. Census American Community Survey for 2007–2011 data are used to document the most recent conditions. Demographic analysis is the first step in determining disproportionately high and adverse human health or environmental effects on low-income and minority populations. This analysis sets the stage for the impacts analysis presented in Section 3.7.3 (Environmental Consequences). Demographic analysis includes defining the region of influence, low-income populations, and minority communities.

[1] The definitions for "low-income population," "minority," and "minority population" are found in Section 1-101 of EO 12898.

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, requires federal agencies to identify and assess environmental health risks and safety risks that may disproportionately affect children. This EO was prompted by the recognition that children are more sensitive than adults to adverse environmental health and safety risks because they are still undergoing physiological growth and development. Analysis for EO 13045 requires assessment of readily available information regarding demographic data on the local, regional, and national populations, in particular children less than 18 years old, to evaluate the number and distribution of children in the region and whether these children are exposed to environmental health and safety risks from the Proposed Action. Information to support this analysis is derived from the U.S. Census and is used to identify locations with potentially high concentrations of children, such as schools.

This Environmental Impact Statement (EIS) provides the Navy's analysis of potential environmental effects of the Proposed Action on children and minority and low income populations in compliance with EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* and EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*.

3.7.1.3 Approach to Analysis

Factors used to assess the significance of impacts on socioeconomics and environmental justice include the extent or degree to which an alternative would have a negative impact on regional and community economics, employment, housing, and population growth, as well as disproportionately high and adverse human health or environmental effects on minority populations or low-income populations.

Further information is provided in EO 12898 for determining disproportionate environmental effects in the guidance:

> "When determining whether environmental effects are disproportionately high and adverse, agencies are to consider the following three factors to the extent practicable:
>
> (a) Whether there is or will be an impact on the natural or physical environment that significantly (as employed by the National Environmental Policy Act [NEPA]) and adversely affects a minority population, low-income population, or Indian tribe. Such effects may include ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or Indian tribes when those impacts are interrelated to impacts on the natural or physical environment; and
>
> (b) Whether environmental effects are significant (as employed by NEPA) and are or may be having an adverse impact on minority populations, low-income populations, or Indian tribes that appreciably exceeds or is likely to appreciably exceed those on the general population or other appropriate communities of comparison (for purposes of this EIS, these are the nine counties[2] and the overall State of Nevada as shown in Table 3.7-1); and
>
> (c) Whether the environmental effects occur or would occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards."

[2] These nine counties were selected to be communities of comparison because portions of these counties underlie the Special Use Airspace (SUA) in the Fallon Range Training Complex (FRTC) Study Area.

A two-step screening process is used to identify environmental justice concerns. It defines the significance criteria for this issue; if either criterion is unmet, there is little likelihood of environmental justice effects occurring. The process is as follows:

1. Does the potentially affected community include minority or low-income populations?
2. Are the environmental impacts likely to fall disproportionately on minority or low-income members of the community or tribal resource?

If the two-step process for environmental justice concerns indicates that potential exists for effects to occur, analyses are conducted to consider the following:

- Whether there exists a potential for disproportionate risk of high and adverse human health or environmental effects
- Whether communities have been sufficiently involved in the decision-making process
- Whether communities currently suffer, or have historically suffered, from environmental and health risks and hazards

Finally, for EO 13045 analysis, factors used to assess the significance of potential impacts from military readiness activities at the Fallon Range Training Complex (FRTC) include the extent or degree to which an alternative would have a serious negative impact or disproportionate environmental health and safety risk specific to children. EO 13045 requires assessment of readily available information regarding demographic data on the local, regional, and national populations of children. For this assessment, children are defined as individuals less than 18 years of age. Demographic data is derived from the 2000 and 2010 U.S. Decennial Census (U.S. Census Bureau 2011) and is used to identify locations with potentially high concentrations of children, such as schools.

3.7.2 AFFECTED ENVIRONMENT

3.7.2.1 Regional Setting

As stated in Section 2.2.1 (Special Use Airspace), the FRTC Study Area (see Figure 1-1) includes 9 restricted areas, 15 military operations areas (MOAs), 14 Air Traffic Control Assigned Airspaces (ATCAAs), 2 supersonic operating areas, and a Civilian Visual Flight Rules corridor. The majority of land beneath the FRTC airspace is managed by the Bureau of Land Management (BLM), but it includes land managed by the U.S. Forest Service (USFS), the Bureau of Reclamation (BOR), the U.S. Fish and Wildlife Service (USFWS), Native American Tribes[3], and private land owners. The FRTC spans multiple county jurisdictions in northern Nevada, from Elko County in the east to Washoe County in the west (see Figure 1-1). There are nine counties underlying the FRTC Special Use Airspace (SUA): Churchill, Elko, Eureka, Lander, Lyon, Mineral, Nye, Pershing, and Washoe. FRTC land assets are primarily in Churchill County.

As presented in Section 3.6 (Land Use and Recreation), land use in the surrounding areas consists of livestock grazing lands, mining/industrial, forest lands, and desert. Recreational land use, among others, consists of hunting, fishing, camping, and off-highway vehicle use. Beneath the FRTC airspace, unincorporated areas exist that provide public facilities (e.g., bars and restaurants) and represent concentrations of people. These areas include Middlegate, Eastgate, and Kingston. The Navy avoids overflight of these areas to minimize impacts from military training.

[3] Because both “American Indian” and “Native American” are used by the U.S. government in laws and regulations they are both used within this section and have the same meaning.

3.7.2.2 Region of Influence

The socioeconomic region of influence includes all those portions of the Nevada counties underlying the FRTC SUA, which defines the FRTC Study Area boundary. The summary of socioeconomic activity in the region of influence is compiled from regional and federal government sources. In addition, data regarding minority populations and low-income populations is presented for the region of influence and, for comparison purposes, on a state and national level.

3.7.2.3 Regional and Local Economy

3.7.2.3.1 Regional Employment

Naval Air Station (NAS) Fallon is the largest employer in Fallon, Nevada, and in Churchill County. Up to 3,000 people work at NAS Fallon or in a business or industry benefitting from the air station's presence (U.S. Department of the Navy 2012).

Aside from the air station, the area's economy and employment have been traditionally influenced by the agriculture industry sector. Most land in the area is used to grow alfalfa for livestock feed and pastureland, and a powdered milk facility is being constructed in the area due to the growing dairy industry. For example, in Churchill County, according to the 2007 Census of Agriculture, there were 529 farms with total agricultural sales of $69.6 million, an increase of nearly $20 million from 2002 (Churchill County 2010). Realized net income paid to Churchill County farmers was $16.7 million. In 2007, total value of output generated by Churchill County's agricultural sector was $122.6 million. Applying multipliers, the total economic activity generated by Churchill County agricultural sectors was $175.43 million. However, in addition to agriculture, other industry sectors contribute significantly to the diverse area economy, including: construction, transportation, mining, manufacturing, professional/technical services, food services, health care, utilities, finance, government and entertainment.

The estimated total employment for the state of Nevada and the counties within the Study Area are provided in Table 3.7-1. The figures are for the years 2000 and 2010 as compiled by the Nevada Department of Employment, Training and Rehabilitation. In general (with the exception of Pershing County), total employment rose across the board in FRTC Study Area counties between 2000 and 2010. Most employment growth in Nevada occurred outside of the Study Area in the Las Vegas metropolitan area. Overall, 18.15 percent more people were employed in Nevada in 2010 versus 2000. Two FRTC Study Area counties (Eureka and Lander counties) grew employment at a faster rate than the state. Most FRTC Study Area counties saw job creation grow slower than the state, with Mineral County nearly flat and Pershing County losing jobs. Despite, the seemingly impressive employment growth rates in many counties, the number of jobs created did not keep up with the population growth. This phenomenon is illustrated by the growth in the unemployment rates shown in Table 3.7-1. By 2010, the effects of the recession were being felt across Nevada. As shown in Table 3.7-2, no county was left untouched by the economic downturn. Unemployment rates rose dramatically in 2010 in comparison to 2000 data (some over 200 percent). While unemployment rates have not since recovered to 2000 rates, by 2013, the unemployment rates for Nevada and FRTC Study Area counties had fallen by a few percentage points.

Table 3.7-1: Estimated Total Employment and Unemployment Rates

Jurisdiction	Employment (2000)	Employment (2010)	Percent Change	Unemployment Rate (2000)	Unemployment Rate (2010)	Percent Change
Nevada	1,015,221	1,199,517	18.15	4.5	13.8	206.67
Churchill County	11,237	12,159	8.21	6.2	10.7	72.58
Elko County	23,257	26,973	15.98	3.9	7.4	89.74
Eureka County	767	1,004	30.90	3.3	7.6	130.30
Lander County	2,685	3,987	48.49	5.8	7.1	22.41
Lyon County	16,876	19,240	14.01	5.8	17.9	208.62
Mineral County	2,159	2,160	0.05	8.3	14.0	68.67
Nye County	13,104	15,185	15.88	6.8	16.5	142.65
Pershing County	2,440	2,431	-0.37	4.4	11.0	150.00
Washoe County	187,469	197,219	5.20	3.7	13.1	254.05

Source: Nevada Department of Employment, Training and Rehabilitation 2013

3.7.2.4 Housing

According to the 2010 U.S. Census data, housing stock in Churchill County was 10,826 (Table 3.7-2). In general, all counties and the state of Nevada have shown a positive increase in housing stock over the decade. Lander County was the only county to post a minor decrease. The percentage of units occupied is high for all counties (U.S. Census Bureau 2010), and all counties are near the range shown for Nevada (85.7 percent).

Table 3.7-2: Estimated Total Housing Units

Jurisdiction	2000[1]	2010[2]	Percent Change	Percent of Units Occupied 2010
Nevada	827,457	1,173,814	+0.42	85.7
Churchill County	9,732	10,826	+0.11	89.3
Elko County	18,456	19,566	+0.06	89.1
Eureka County	1,025	1,076	+0.05	77.7
Lander County	2,780	2,575	-0.07	85.9
Lyon County	14,279	22,547	+0.58	87.9
Mineral County	2,866	2,830	-0.01	79.2
Nye County	15,934	22,350	+0.40	80.7
Pershing County	2,389	2,464	+0.03	81.9
Washoe County	143,908	184,841	+0.28	88.4

[1] U.S. Census Bureau 2000
[2] U.S. Census Bureau 2010

Housing is provided in two main areas at NAS Fallon: west of Pasture Road and southwest of the airfield. There are 360 military family housing units in addition to barracks capacity for 517 permanent unaccompanied personnel and 1,817 transient personnel (U.S. Department of the Navy 2006).

Underlying the FRTC airspace are the towns of Austin (population of 192 according to the 2010 Census), Crescent Valley (392), Fallon (8,606), and Gabbs (269). Beyond the boundaries of NAS Fallon (i.e., beyond the city of Fallon), population numbers are very low under the FRTC airspace.

3.7.2.5 Population Demographics

Table 3.7-3 presents population characteristics, including the population in 2000 and 2010, and the percent change in population between 2000 and 2010. As shown in Table 3.7-3, when compared to the national rate (+9.7 percent), Nevada's population grew impressively (+35.15 percent) over the first decade of this century, with most of that increase occurring in counties not in the FRTC Study Area. That growth was primarily in Clark County (surrounding the Las Vegas metropolitan area), where the county population grew by 575,504 persons to a total of 1,951,269 persons (or 72 percent of the state population). In sparsely populated north-central Nevada (where the FRTC Study Area is located), population change between 2000 and 2010 was typically low growth (Churchill County, Elko County, and Pershing County) or declining population (Lander County and Mineral County). Each of these five counties grew less than the national average. The heart of the FRTC SUA overlies Churchill County and Lander County, where the population changed +3.73 percent and -0.33 percent, respectively. Lyon County (+50.66 percent), Nye County (+35.28 percent), and Washoe County (+24.13 percent) populations grew faster than the rate of state population growth (+35.15 percent). Southern Washoe County (outside the FRTC Study Area) and western Lyon County (outside the FRTC Study Area) are experiencing the higher growth around the urbanized areas of Carson City, Reno, and Sparks. Southern Nye County (outside the FRTC Study Area) is experiencing high growth in Pahrump, a bedroom community for Las Vegas.

Table 3.7-3: Total Population Growth and Percent Change from 2000 to 2010

Jurisdiction	2000	2010	Percent Change from 2000 to 2010
United States	281,400,000	308,700,000	+9.70
Nevada	1,998,257	2,700,551	+35.15
Churchill County	23,982	24,877	+3.73
Elko County	45,291	48,818	+7.79
Eureka County	1,651	1,987	+20.35
Lander County	5,794	5,775	-0.33
Lyon County	34,501	51,980	+50.66
Mineral County	5,071	4,772	-5.90
Nye County	32,485	43,946	+35.28
Pershing County	6,693	6,753	+0.90
Washoe County	339,486	421,407	+24.13

Sources: U.S. Census Bureau 2011, U.S. Census Bureau 2013a

3.7.2.5.1 Minority Populations

The Council on Environmental Quality defines a minority as "individual(s) who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic." A minority population exists where either (1) the minority population of the affected area exceeds 50 percent, or (2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

The Nevada statewide total percentage of all minority populations is 47.1 percent (Table 3.7-4). The percent minority population includes all races except non-Hispanic white persons. For this analysis, the Navy determined the total minority population of each of the nine counties within the FRTC Study Area and evaluated whether the total minority population was meaningfully greater than the corresponding percentage in the general population (47.1 percent). As shown in Table 3.7-4, in all FRTC Study Area counties, the total minority population was substantially lower than the total minority population of the state of Nevada. Additionally, and more importantly, a similar calculation was performed for each individual minority population. Through this detailed analysis, the Navy identified whether the FRTC Study Area contained any discrete minority populations.

Table 3.7-4: Estimated Population Racial Characteristics by County (2012)

Race	Churchill	Elko	Eureka	Lander	Lyon	Mineral	Nye	Pershing	Washoe	Nevada	United States
Total Population	24,375	51,216	2,001	5,941	51,327	4,653	42,963	6,749	429,908	2,758,931	313,914,040
White	20,889	45,685	1,859	5,430	46,400	3,411	38,753	5,946	369,291	2,127,136	244,539,037
Percentage	85.7%	89.2%	92.9%	91.4%	90.4%	73.3%	90.2%	88.1%	85.9%	77.1%	77.9%
Black or African American	512	666	16	59	719	209	1,117	277	11,178	245,545	41,122,739
Percentage	2.1%	1.3%	0.8%	1.0%	1.4%	4.5%	2.6%	4.1%	2.6%	8.9%	13.1%
American Indian and Alaska Native	1,219	3,073	60	315	1,591	763	816	277	9,028	44,143	3,766,968
Percentage	5.0%	6.0%	3.0%	5.3%	3.1%	16.4%	1.9%	4.1%	2.1%	1.6%	1.2%
Asian	731	512	20	30	770	84	687	88	23,645	217,956	16,009,616
Percentage	3.0%	1.0%	1.0%	0.5%	1.5%	1.8%	1.6%	1.3%	5.5%	7.9%	5.1%
Native Hawaiian or Other Pacific Islander	73	102	0	0	154	5	258	13	3,009	19,313	62,782.81
Percentage	0.3%	0.2%	0.0%	0.0%	0.3%	0.1%	0.6%	0.2%	0.7%	0.7%	0.20%
Two or More Races	975	1,127	44	113	1,694	186	1,332	155	13,757	104,839	7,533,937
Percentage	4.0%	2.2%	2.2%	1.9%	3.3%	4.0%	3.1%	2.3%	3.2%	3.8%	2.4%
Hispanic or Latino	3,120	12,036	252	1,319	7,904	456	6,015	1,539	98,879	753,188	53,051,473
Percentage	12.8%	23.5%	12.6%	22.2%	15.4%	9.8%	14.0%	22.8%	23.0%	27.3%	16.9%
White Alone, not Hispanic or Latino	18,330	34,929	1,639	4,266	39,522	3,127	33,425	4,542	279,870	1,459,474	197,765,845
Percentage	75.2%	68.2%	81.9%	71.8%	77.0%	67.2%	77.8%	67.3%	65.1%	52.9%	63.0%
Total Minority Population	6,045	16,287	362	1,675	11,805	1,526	9,538	2,207	150,038	1,299,457	116,148,195
Percentage	24.8%	31.8%	18.1%	28.2%	23.0%	32.8%	22.2%	32.7%	34.9%	47.1%	37.0%

Source: U.S. Census Bureau 2013c

While not the focus of environmental justice analysis, the non-minority population statistics can enable certain inferences. For example, all nine Study Area counties have notably higher percentages of white, non-Hispanic residents than the state as a whole. Eureka County, in particular, is greater than 81.9 percent white, non-Hispanic, compared with approximately 52.9 percent for Nevada. Churchill County (75.2 percent) and Lander County (71.8 percent) also had notably higher percentages of white, non-Hispanic residents than the state as a whole (52.9 percent). These three counties comprise most of the FRTC Study Area. All nine counties have less than 5 percent black or African Americans, compared with nearly 9 percent for this group statewide. All nine counties have 5.5 percent or less Asians, compared with nearly 8 percent for the Asian group statewide. All nine counties have 23.5 percent or less Hispanic or Latinos, compared with over 27 percent statewide.

On the other hand, the one minority category with a higher percentage than the state in all region-of-influence counties is American Indian or Alaska Native. Statewide, the American Indian category represents 1.6 percent of the population. Within the nine counties touching the FRTC Study Area, the percentage of persons identifying themselves as American Indians ranges from 1.9 percent in Nye County to 16.4 percent in Mineral County. While the percentage of American Indians is higher than the corresponding state percentage when considering all county data (including those portions of the counties outside of the FRTC Study Area), the Navy reviewed the data closely to determine whether these minority populations were actually located within the FRTC Study Area.

Four Indian reservations are within the region of influence: the Yomba Indian Reservation in Nye County; Fallon Paiute-Shoshone Reservation in Churchill County and Lyon County; the Walker River Reservation in Mineral County, Churchill County, and Lyon County; and the Pyramid Lake Reservation in Washoe County. The Walker River Indian Reservation contains 529,970 acres (ac.) (214,471 hectares [ha]) and underlies Restricted Airspaces R-4810 and R-4812, Gabbs Central MOA/ATCAA, Ranch High and Ranch MOA, and Bandit ATCAA airspace assets. The total population on the Walker River Indian Reservation is 746 (U.S. Census Bureau 2010). Schurz, the town on the Walker River Reservation, accounts for the high percentage (16.4 percent) of American Indians in Mineral County. However, the minority population in Schurz is outside the FRTC Study Area. Additionally, Schurz (given its proximity to the FRTC SUA) is identified as a community noise disclosure area (a noise-sensitive area or community) in the FRTC range user's manual.

The Yomba Indian Reservation has a population of 114 persons (Yomba Shoshone Tribal Council 2013). In 2010, the population of the Yomba Indian Reservation was 95 individuals (U.S. Census Bureau 2010). The Yomba Indian Reservation underlies the Gabbs South and Austin 2 MOA/ATCAA and the Smokie ATCAA. The Yomba Indian Reservation is also identified in the FRTC range user's manual as a community noise disclosure area.

The Fallon Paiute-Shoshone Tribe's federal reservation (the Fallon Paiute-Shoshone Reservation) is northeast of NAS Fallon on 5,540 ac. (2,242 ha). Two geographically detached colonies are on sections between downtown Fallon and the airport northeast of the city of Fallon. The total population on the Fallon Paiute-Shoshone Reservation is 581, and the total population on the Fallon Paiute-Shoshone Colony is 130 (U.S. Census Bureau 2010). The reservation and colony lands are all within the Study Area/region of influence underlying the Bandit ATCAA. The southern portion of the Reno MOA/ATCAA overlies the northern portion of the Pyramid Lake Paiute Tribe's Pyramid Lake Indian Reservation. The population on the Pyramid Lake Paiute Reservation is 1,660 (U.S. Census Bureau 2010). However, residential areas in the southern portion of the reservation in the settlements of Sutcliffe, Nixon, and Wadsworth are located outside the FRTC Study Area and region of influence.

3.7.2.5.2 Low-Income Populations

The Navy used the Council on Environmental Quality definition of low-income and the annual statistical poverty thresholds from the U.S. Census Bureau. A low-income community exists when the percentage of low-income people in the area of interest is meaningfully greater than the corresponding percentage in the general population. For purposes of the analysis, the Navy used the statewide average of 12.9 percent to define the percentage of low-income people in the general population. To identify low-income populations, the Navy used Census Bureau data for each of the nine counties within the FRTC Study Area where the percentage of low-income people exceeded the state average.

Poverty thresholds are dollar amounts the Census Bureau uses to determine poverty status. In 2012, the preliminary estimate of weighted average poverty threshold for households with two people was $14,960; that for households with three people was $18,287 (U.S. Census Bureau 2013c). For the years 2007–2011, the average household size for Churchill County was 2.77; for Elko County it was 2.76; for Eureka County it was 2.42; for Lander County was 2.77; for Lyon County was 2.79; for Mineral County was 2.08; for Nye County was 2.38; for Pershing County was 2.38; and for Washoe County was 2.55. For this analysis, the Navy rounded the average household size for the counties within the region of influence to 3. Census data were available for the number of households with an income less than $10,000, those with an income between $10,000 and $14,999, and those with an income between $15,000 and $24,999. The Navy used the combined number of households with incomes less than $24,999 as the poverty threshold for the nine counties within the FRTC Study Area. The Navy compared this number of households within the FRTC Study Area to the number of households within the general state population below the poverty threshold to determine any disproportionate impact. These data are displayed in Table 3.7-5.

Analysis of the data illustrates that several counties have low-income households (i.e., at or above the statewide average [20.0 percent]) distributed throughout the region of influence, including Lander, Lyon, Mineral, Nye, Pershing, and Washoe Counties. However, only Mineral County (43.1 percent) and Nye County (30.8 percent) have a noticeably greater percentage of low-income households than the state percentage. Nye County is primarily populated in the south (outside of the FRTC Study Area and region of influence) in communities such as Pahrump (83 percent of the county population lives in Pahrump), Amargosa Valley, and Beatty. Tonopah in Nye County is also beyond the region of influence. Like Nye County, a small northerly portion of Mineral County underlies the FRTC SUA and Study Area. Also, like Nye County, the population of Mineral County is primarily outside of the region of influence. Most residents of Mineral County live in Hawthorne, near the Hawthorne Army Depot. In 2010, Mineral County had an estimated population of 4,772. Hawthorne's population in 2010 was 3,269 (68.5 percent of the county population). Other Mineral County communities such as those in Luning, Mina, and Schurz are outside of the region of influence. As shown in Table 3.7-5, the Nevada counties that make up most of the FRTC Study Area (i.e., Churchill, Lander, and Eureka) have roughly equal or lower percentages of households below the poverty threshold.

Table 3.7-5 also depicts median household income and poverty levels (for all families and all people) for Nevada, its counties, and the nation, using the U.S. Census Bureau's 2007–2011 American Community Survey data. The data illustrate findings similar to the household low-income poverty threshold data, with Mineral County ($31,108) and Nye County ($39,740) both exhibiting noticeably lower median household incomes than the state median household income ($55,553). Lyon County ($46,598) and Churchill County ($52,589) also had lower median household incomes than the state median household income, but Churchill County's median household income was nearly equal to the U.S. median household income figure. The percentages of the population in poverty for all families and all people in

Table 3.7-5 also show similar county to county differences. Viewed at the county level (considering only those county portions within the FRTC Study Area), the rates of poverty are not meaningfully higher than the statewide averages. Consequently, there are no environmental justice populations in the FRTC Study Area who are likely to be disproportionately affected by the Proposed Action.

Within Churchill County, the Navy considered income statistics for the City of Fallon (population 8,606) (U.S. Census Bureau 2010). The percentage of low-income families in the City of Fallon (6.8 percent) with incomes below poverty level (based on family size and composition) is lower than for Churchill County (7.5 percent) and Nevada (9.5 percent) (U.S. Department of the Navy 2013). However, the percentage of individuals with incomes below the poverty level in the City of Fallon (11.9 percent) is greater than for Churchill County (10.5 percent). Both the City of Fallon and Churchill County have percentages of low-income families and individuals below that for the state (12.9 percent). The rates of poverty in Fallon are not meaningfully higher than the county or statewide averages. Consequently, there are no environmental justice populations in the City of Fallon or Churchill County who are likely to be disproportionately affected by the Proposed Action.

Table 3.7-5: Estimated Median Income and Poverty Level Census Data by County (2012)

	Churchill	Elko	Eureka	Lander	Lyon	Mineral	Nye	Pershing	Washoe	Nevada	United States
Low-Income Households											
Total Households	8,849	17,244	719	2,006	18,373	2,209	18,348	2,062	160,889	966,741	114,761,359
Income less than $10,000	533	733	26	71	1,169	288	1,531	88	9,094	57,736	8,176,081
Income $10,000 to $14,999	378	465	28	72	906	229	1,600	96	7,277	40,750	6,248,397
Income $15,000 to $24,999	783	1,607	80	266	1,987	435	2,526	308	16,088	95,157	12,217,054
Total Low-Income Households	1,694	2,805	134	409	4,062	952	5,657	492	32,459	193,643	26,641,532
Percent Households below Poverty Threshold	19.1%	16.3%	18.6%	20.4%	22.1%	43.1%	30.8%	23.9%	20.2%	20.0%	23.2%
Amount above or below State Percentage	-0.9%	-3.8%	-1.4%	0.4%	2.1%	23.1%	10.8%	3.8%	0.1%	0.0%	3.2%
Income and Benefits (in 2011 inflation-adjusted dollars)											
Median Household Income	$52,589	$69,459	$61,908	$69,814	$46,598	$31,108	$39,740	$56,473	$55,813	$55,553	$52,762
Amount above or below State Median Income	($2,964)	$13,906	$6,355	$14,261	($8,955)	($24,445)	($15,813)	$920	$260	$0	($2,791)
Percentage of Families and People Below the Poverty Level											
All Families	7.5%	6.5%	10.8%	8.7%	9.0%	10.9%	15.7%	8.3%	9.0%	9.5%	10.5%
Comparison to State Poverty Level	-2.0%	-3.0%	1.3%	-0.8%	-0.5%	1.4%	6.2%	-1.2%	-0.5%	0.0%	1.0%
All People	10.5%	8.6%	15.3%	12.3%	13.6%	21.9%	20.5%	11.9%	12.9%	12.9%	14.3%
Comparison to State Poverty Level	-2.4%	-4.3%	2.4%	-0.6%	0.7%	9.0%	7.6%	-1.0%	0.0%	0.0%	1.4%

Sources: U.S. Census Bureau 2013b (2007–2011 American Community Survey 5-Year Estimates)

3.7.2.6 Protection of Children

Children are not expected to wander onto NAS Fallon, the bombing ranges, or other areas of the FRTC from the surrounding areas via roads or trails due to fences and posted signs installed on the boundaries and the extreme distance children would have to walk or drive to the proposed training ranges from populated areas. During operation of the training ranges, Range Control safety personnel ensure that there are no people forward of the firing line or in the target areas. As discussed in Section 3.10 (Public Health and Safety), procedures are in place in the training areas to protect the public, including children, from training activities.

Table 3.7-6 depicts the region setting for the percentage of the population less than 18 years of age and the average family size for the counties that underlie the FRTC, as well as for Nevada and the nation. The population of children in Churchill County, where NAS Fallon is located, is only slightly higher than for state or national populations.

Underlying the FRTC airspace are the towns of Austin (population of 192 according to the 2010 census), Crescent Valley (392), Fallon (8,606), and Gabbs (269). Beyond the boundaries of NAS Fallon (i.e., beyond the city of Fallon), population numbers are very low under the FRTC airspace.

Table 3.7-6: Population of Children in the Fallon Range Training Complex Region of Influence

U.S., State, or Selected Counties within the FRTC Study Area	Population		Percentage of the Population Less than 18 Years of age		Average Family Size	
	2000	2010	2000	2010	2000	2010
United States	281,400,000	308,700,000	26%	24%	3.14	3.14
Nevada	1,998,257	2,700,551	26%	24%	3.14	3.22
Churchill County	23,982	24,877	29%	25%	3.09	3.60
Elko County	45,291	48,818	32%	29%	3.33	3.28
Eureka County	1,651	1,987	28%	24%	3.08	3.17
Lander County	5,794	5,775	28%	32%	3.23	3.05
Lyon County	34,501	51,980	27%	25%	3.02	3.42
Mineral County	5,071	4,772	24%	18%	2.78	2.53
Nye County	32,485	43,946	24%	21%	2.90	2.92
Pershing County	6,693	6,753	26%	20%	3.22	2.75
Washoe County	339,486	421,407	25%	24%	3.09	3.10

Notes: FRTC = Fallon Range Training Complex, U.S. = United States
Sources: U.S. Census Bureau 2011, U.S. Census Bureau 2013a

Nine counties underlie the FRTC SUA that defines the FRTC Study Area boundary: Churchill, Elko, Eureka, Lander, Lyon, Mineral, Nye, Pershing, and Washoe. The Churchill County School District, where NAS Fallon is located, enrolls about 4,400 students in a combined five elementary and secondary schools in the City of Fallon. The Elko County School District has about 9,400 students enrolled in 16 elementary schools and 10 secondary schools. The Eureka County School District is made up of about 225 students enrolled in one elementary and one secondary school in the City of Eureka. The Lander County School District has about 1,300 students enrolled in a combined five elementary schools and secondary schools.

The Lyon County School District is made up of about 8,200 students enrolled in a combined 18 elementary schools and secondary schools. The Mineral County School District is made up of about 570 students enrolled in a combined four elementary schools and secondary schools. The Nye County School District is made up of about 6,400 students enrolled in 11 elementary schools, 2 middle schools, and 5 high schools. The Pershing County School District is made up of about 720 students enrolled in a combined four elementary schools and secondary schools. The Washoe County School District is made up of about 64,800 students enrolled in 63 elementary schools, a special education school, 14 middle schools, and 13 comprehensive high schools. Public schools within the region of influence (as defined by the maximum extent of noise impacts) are identified in Section 3.4 (Noise).

3.7.3 ENVIRONMENTAL CONSEQUENCES

This section evaluates how and to what degree the activities described in Chapter 2 (Description of Proposed Action and Alternatives) could impact socioeconomic resources and environment justice within the Study Area. The analysis focuses on potential impacts and overall changes as they relate to employment, housing, and minority populations and low-income populations associated with implementation of all current and proposed military readiness activities at the FRTC. Table 2-4 presents the baseline and proposed training activities for each alternative. Each socioeconomic resource and environmental justice stressor is introduced and analyzed by alternative. Table 3.0-1 shows the warfare areas and associated stressors that were considered for analysis. The stressors vary in intensity, frequency, duration, and location within the Study Area. The primary stressors applicable to socioeconomic resources in the Study Area and that are analyzed include the following:

- Noise
- Physical disturbance
- Economics and usability (air/land training activities, access/usability)

The primary stressors applicable to environmental justice in the Study Area and that are analyzed include the following:

- Noise
- Secondary stressors (water quality and air quality)

An assessment of environmental justice is based on potential impacts associated with air quality and water quality from the Proposed Action. Air emissions and pollutants are addressed in Section 3.2 (Air Quality), in accordance with the Clean Air Act. Effects on water quality are addressed in Section 3.3 (Water Quality).

The primary stressors applicable to the protection of children in the Study Area and that are analyzed are the following:

- Noise
- Secondary stressors (water quality and air quality)

3.7.3.1 No Action Alternative

Under the No Action Alternative, the frequency of FRTC training activities would remain unchanged.

3.7.3.1.1 Socioeconomics

Noise

Noise generated from Navy activities such as weapons firing, in-air explosions, and aircraft transiting have the potential to disrupt noise-sensitive economic sectors such as recreation and leisure, leading to potential losses in economic activity in the FRTC Study Area. The public will hear noise from aircraft overflights and other training activities if they are near a training event, but there would likely be no impact on public enjoyment of recreational activities leading to a loss of economic activity because of the infrequency and short duration of events. In particular, munitions impact ranges are located in remote areas with limited to no surrounding populations to be affected by detonation noise. Potential noise effects would occur on a temporary basis, only during weapons firing, in-air explosions, and aircraft transiting. Under the No Action Alternative, training activities would continue at current levels and within established ranges and training locations. There would be no additional impacts on socioeconomic resources. Navy operational procedures and practices are already in place to avoid impacts on ongoing activities adjacent to training areas. Therefore, airborne noise impacts on socioeconomic resources would be negligible.

Physical Disturbance

There would be no anticipated impacts on socioeconomic resources in the FRTC Study Area from physical disturbances because the Navy clears an area before training activities take place, and the Navy does not train in areas close to civilian infrastructure or civilian activities. Further, weapons safety zones have been developed around the impact areas in the FRTC. Based on the Navy's standard operating procedures and the large expanse of the training ranges, the likelihood of a physical interaction and disturbance of civilian property (i.e., equipment or infrastructure) in the FRTC Study Area would be negligible. Therefore, loss of revenue or employment changes in the FRTC Study Area would not be expected under the No Action Alternative.

Economics and Usability

No changes to the current socioeconomic conditions (employment, housing, and population growth) within the Study Area are expected under the No Action Alternative because the Navy would maintain baseline levels of personnel already employed at NAS Fallon and no changes in training would occur. Therefore, regional and community economics, employment, housing, and population growth are not affected as a result of the No Action Alternative from training activities.

There would be no anticipated impacts on socioeconomic resources in the FRTC Study Area from access/usability of the training area because the Navy is not proposing to add any new restricted areas and proposes to continue the same type of temporary area closures that have occurred for decades. It is not anticipated that the No Action Alternative would affect local aviation traffic. Local aviators may coordinate activities that require entrance into restricted airspace during active hours, and Notices to Airmen allow aviators the opportunity to plan around military readiness activities and coordinate flight times with the Air Route Traffic Control Center. Therefore, while local activities will need to schedule for use of airspace, economic activity, such as local employment, farming, or ranching operations, would not be significantly impacted.

3.7.3.1.2 Environmental Justice

Noise

Major sources of sound within the FRTC include aircraft (fixed-wing and helicopters) and weapons firing. Concerns related to noise from the No Action Alternative on the surrounding communities include hearing loss, nonauditory health effects, and speech interference/temporary attention. Sound impacts on community noise levels from military readiness activities under the No Action Alternative are negligible on lands outside of the Target Areas and are partially mitigated by the training schedule. Military aircraft readiness activities in the FRTC occur primarily during the day (e.g., 75–80 percent of NAS Fallon activities occur during the day), whereas individuals are most sensitive to sound at night (only 20–25 percent of the activities occur at night). The areas underlying FRTC SUA are primarily agricultural or federally owned land (e.g., BLM, Department of Energy, USFWS, USFS, and BOR) and, thus, very few members of the public are exposed to sound from military readiness activities within the FRTC Study Area. Minority populations of Native Americans at the Walker River Reservation (near Bravo [B]-19) would not be disproportionately impacted. At B-19, the majority of elevated community day-night average sound levels (DNL) are contained within the range boundary. However, a small portion of reservation lands south of the southern B-19 range boundary fall under contours that indicate C-weighted day-night levels (CDNL) above 62 C-weighted decibels (dBC). This area, approximately 260 ac. (105 ha), is located on lands belonging to the Walker River Reservation. Visual inspection of these lands utilizing aerial imagery indicates no sensitive receptors that would be incompatible with Noise Zone II. Therefore, in these areas, during busy months of activities at FRTC, noise would not interfere with normal activities associated with its use, and noise from aircraft activities would not represent degradation in the noise environment at these locations.) The main noise contributors to the contours at B-19 are H-60 operations in the easternmost holding area south of B-19 and the air-to-ground pattern. These missions are flown at approximately 200–300 feet (ft.) above ground level (AGL). Although there are fixed-wing operations within B-19, they do not contribute to the noise environment because of the few sorties that occur, mostly between 7,000 and 15,000 ft. AGL. No noise contours (60 monthly average day-night average sound level [L_{dnmr}] contours or higher) are found in the vicinity of the Fallon Paiute-Shoshone Reservation. Therefore, there are currently no disproportionately high and adverse human health or environmental effects on minority populations or low-income populations.

Secondary Stressors (Water Quality and Air Quality)

Secondary stressors of air quality and water quality were addressed in previous chapters of the EIS. Air Quality (Section 3.2) determined air emissions occur under the No Action Alternative but are within or below historical or desired air quality conditions, and therefore they do not pose disproportionately high and adverse human health or environmental effects on minority populations and low-income populations. The results of the water quality analysis (Section 3.3) determined there is little chance for an incidental spill to reach groundwater, if one were to occur, based on the response procedures in place and the small quantities of materials and wastes used and generated within the FRTC Study Area. Nonexplosive practice munitions would have negligible effects on groundwater under the No Action Alternative because potential contaminants are not expected to migrate to groundwater. Based on predictive modeling and sampling studies, munitions expenditure at B-17, B-19, and B-20 ranges does not appear to result in off-range migration of munitions constituents (U.S. Department of the Navy 2008). The potential for perchlorate and other munitions constituents of concern would continue to be evaluated through the Range Sustainability Environmental Program assessment process and during 5-year range condition assessment updates. Continued implementation of the operational range clearance plan would also substantially reduce potential impacts on water quality. Because water discharges do

not have significant impacts on the local water resources within the FRTC, they do not pose health or environmental risks to the surrounding communities. Therefore, there are no disproportionately high and adverse human health or environmental effects on minority populations or low-income populations.

3.7.3.1.3 Protection of Children

Noise

Major sources of sound within the FRTC include aircraft (fixed-wing and helicopters), sonic booms, and weapons firing. Concerns related to noise from the No Action Alternative on the surrounding communities include hearing loss, nonauditory health effects, and speech interference/temporary attention. Sound impacts on community noise levels from military readiness activities under the No Action Alternative are negligible on lands outside of the target areas and are partially mitigated by the training schedule. Military aircraft readiness activities in the FRTC occur primarily during the day (75–80 percent of NAS Fallon activities occur during the day), whereas individuals are most sensitive to sound at night (only 20–25 percent of the activities occur at night). The areas underlying FRTC SUA are primarily agricultural or federally owned land (e.g., BLM, Department of Energy, USFWS, USFS, and BOR) and, thus, very few members of the public are exposed to sound from military readiness activities within the FRTC Study Area.

Secondary Stressors (Water Quality and Air Quality)

Secondary stressors of air quality and water quality were addressed in previous chapters of the EIS. The results of the air quality analysis (Section 3.2) determined air emissions occur under the No Action Alternative but are within or below historical or desired air quality conditions, and therefore they do not pose disproportionately high and adverse human health or environmental effects on children. Water Quality (Section 3.3) determined there is little chance for an incidental spill to reach groundwater, if one were to occur, based on the response procedures in place and the small quantities of materials and wastes used and generated within the FRTC Study Area. Nonexplosive practice munitions would have negligible effects on groundwater under the No Action Alternative because potential contaminants are not expected to migrate to groundwater. Based on predictive modeling and sampling studies, munitions expenditure at B-17, B-19, and B-20 ranges does not appear to result in off-range migration of munitions constituents (U.S. Department of the Navy 2008). The potential for perchlorate and other munitions constituents of concern would continue to be evaluated through the Range Sustainability Environmental Program assessment process and during 5-year range condition assessment updates. Continued implementation of the operational range clearance plan would also substantially reduce potential impacts on water quality. Because water discharges do not have significant impacts on the local water resources within the FRTC, they do not pose health or environmental risks to the surrounding communities. Therefore, there are no disproportionately high and adverse human health or environmental effects on children.

3.7.3.2 Alternative 1

Implementation of Alternative 1 would include an increase in existing military readiness activities and new military readiness activities.

3.7.3.2.1 Socioeconomics

Noise

Noise generated from Navy activities such as weapons firing, in-air explosions, and aircraft transiting have the potential to disrupt enjoyment of recreational activities, leading to a loss of revenue in the FRTC Study Area under Alternative 1. No additional impacts are expected beyond those described in the

No Action Alternative because Navy operational procedures and practices are already in place to avoid impacts on ongoing activities adjacent to training areas. Navy training activities producing airborne noise are normally short term and temporary. Therefore, airborne noise impacts on socioeconomic resources would be negligible.

Physical Disturbance

Physical interactions and disturbances have the potential to impact industry revenue or operating costs under Alternative 1; however, no additional impacts are expected beyond those described in the No Action Alternative because the Navy clears the area before training activities take place, and the Navy does not train in areas close to civilian infrastructure or civilian activities. Based on the Navy's standard operating procedures and the large expanse of the training ranges, the likelihood of a physical interaction and disturbance on civilian property (e.g., equipment or infrastructure) in the FRTC Study Area would be negligible. Therefore, loss of revenue or employment changes to human activities in the FRTC Study Area would not be expected under Alternative 1.

Economics and Usability

Under Alternative 1, total annual training activities would increase by approximately 6 percent, specifically in strike warfare and other range activities, as described in Table 2-2. No changes to the current socioeconomic conditions (employment, housing, and population growth) within the Study Area are expected under Alternative 1 because the Navy would maintain baseline levels of personnel already employed at NAS Fallon attributed to military readiness activities. There is potential for a positive effect on local businesses from an increase in personnel traveling to NAS Fallon as a result of the increase in training activities; however, regional and community economics, employment, housing, and population growth would not change due to this factor.

Navy training activities have the potential to impact the access/usability of the Study Area by temporarily changing access to airspace in the FRTC Study Area. It is not anticipated that the increase under Alternative 1 would affect local aviation traffic. Local aviators may coordinate activities that require entrance into Restricted Airspace during active hours with air traffic control, and general flight publications and Notices to Airmen allow aviators to plan around military readiness activities and coordinate flight times with the Air Route Traffic Control Centers. Therefore, while local activities will continue to need to schedule use of airspace, economic activity such as local employment, farming, or ranching operations would not be significantly impacted.

3.7.3.2.2 Environmental Justice

Noise

Major sources of sound include aircraft (fixed-wing and helicopters) and weapons firing. Concerns related to noise from Alternative 1 on the surrounding communities would include hearing loss; nonauditory health effects; speech interference; and cognitive effects to attention, reading, problem solving, and memory. Based on the distribution and magnitude of noise impacts under Alternative 1, communities surrounding and underlying FRTC SUA would continue to be slightly affected by training noise. No surrounding land areas have a community day-night noise level in excess of 65 A-weighted decibels (dBA). Community sound levels up to 65 dBA are compatible with land uses such as residences, transient lodging, and medical facilities. Additionally, sounds that propagate beyond the FRTC Study Area are partially mitigated by the training schedule. Military aircraft readiness activities in the FRTC occur primarily during the day (e.g., 75–80 percent of NAS Fallon activities occur during the day); whereas individuals are most sensitive to sound at night (only 20–25 percent of the activities occur at night). The areas underlying FRTC SUA are primarily agricultural or federally owned land (e.g., BLM,

Department of Energy, USFWS, USFS, and BOR) and, thus, very few members of the public are exposed to sound from military readiness activities within the FRTC Study Area. Minority populations of Native Americans at the Walker River Reservation (near B-19) would not be disproportionately impacted because B-19 flight operations do not exceed 54 dBA in any location. The main noise contributors to the contours at B-19 are H-60 operations in the easternmost holding area south of B-19 and the air-to-ground pattern. These missions are flown at approximately 200–300 ft. AGL. Although there are fixed-wing operations within B-19, they would not contribute to the noise environment because of the few sorties, which occur mostly between 7,000 and 15,000 ft. AGL. Although the 57 dBC day-night noise level contours from ordnance-related noise would extend up to 3 miles beyond the range boundary at B-19 (into the Walker River Reservation), they would not affect any populated area because none exist in the vicinity. No noise contours (60 L_{dnmr} contours or higher) would be found in the vicinity of the Fallon Paiute-Shoshone Reservation. Therefore, acoustic emissions with implementation of Alternative 1 would not result in disproportionately high and adverse human health or environmental effects on minority populations and low-income populations compared to communities of comparison, the state of Nevada, and the United States.

Secondary Stressors (Water Quality and Air Quality)

Secondary stressors of air quality and water quality were addressed in previous chapters of the EIS. Air Quality (Section 3.2) determined air emissions occur from Alternative 1 but do not pose human health or environmental risks to surrounding communities because the status of the air quality in the Nevada counties (including Washoe) underlying the FRTC SUA would not be affected. Therefore, air quality emissions with implementation of Alternative 1 would not result in disproportionately high and adverse human health or environmental effects on minority populations and low-income populations compared to communities of comparison, the state of Nevada, and the United States. Water Quality (Section 3.3) determined there is little chance for an incidental spill to reach groundwater, if one were to occur, based on the response procedures in place and the small quantities of materials and wastes used and generated within the FRTC. Nonexplosive practice munitions would have negligible effects on groundwater under Alternative 1 because potential contaminants are not expected to migrate to groundwater. Based on predictive modeling and sampling studies, munitions expenditure at B-17, B-19, and B-20 ranges does not appear to result in off-range migration of munitions constituents (U.S. Department of the Navy 2008). The potential for perchlorate and other munitions constituents of concern would continue to be evaluated through the Range Sustainability Environmental Program assessment process and during 5-year range condition assessment updates. Continued implementation of the operational range clearance plan would also substantially reduce potential impacts on water quality. Domestic wastewater would continue to be treated by septic systems serving the installation assets. Based on the personnel presence within the FRTC, loadings to the septic systems would be low, and the effects on groundwater under Alternative 1 would be negligible. While current groundwater usage data are not available for the FRTC, use is limited based on the limited number of personnel and the limited needs to support training. Because water discharges do not have significant impacts on the local water resources within the FRTC Study Area, they do not pose health or environmental risks to the surrounding communities. Therefore, water quality with implementation of Alternative 1 would not result in disproportionately high and adverse human health or environmental effects on minority populations and low-income populations compared to communities of comparison, the state of Nevada, and the United States.

3.7.3.2.3 Protection of Children

Noise

Major sources of sound include aircraft (fixed-wing and helicopters) and weapons firing. Concerns related to noise from Alternative 1 on the surrounding communities would include hearing loss, nonauditory health effects, and speech interference/temporary attention. Based on the distribution and magnitude of noise impacts under Alternative 1, communities surrounding and underlying FRTC SUA would continue to be slightly affected by training noise. No surrounding land areas have a community day-night noise level in excess of 65 A-weighted decibels (dBA). Community sound levels up to 65 dBA are compatible with land uses such as residences, transient lodging, and medical facilities. Additionally, sounds that propagate beyond the FRTC Study Area are partially mitigated by the training schedule. Military aircraft readiness activities in the FRTC occur primarily during the day (e.g., 75–80 percent of NAS Fallon activities occur during the day), whereas individuals are most sensitive to sound at night (only 20–25 percent of the activities occur at night). The areas underlying FRTC SUA are primarily agricultural or federally owned land (e.g., BLM, Department of Energy, USFWS, USFS, and Bureau of Reclamation) and, thus, very few members of the public are exposed to sound from military readiness activities within the FRTC Study Area. Children at the Walker River Reservation (near B-19) would not be disproportionately impacted because B-19 flight operations do not exceed 54 dBA. The main noise contributors to the contours at B-19 are H-60 operations in the easternmost holding area south of B-19 and the air-to-ground pattern. These missions are flown at approximately 200–300 ft. above ground level. While there are fixed-wing operations within B-19, they would not contribute to the noise environment because few sorties occur, and those that do are mostly between 7,000 and 15,000 ft. above ground level. Although the 57 dBC day-night noise level contours for ordnance-related noise would extend up to 3 miles beyond the range boundary at B-19 (into the Walker River Reservation), they would not affect any populated area because none exist in the vicinity. No noise contours (60 L_{dnmr} contours or higher) would be found in the vicinity of the Fallon Paiute-Shoshone Reservation.

Secondary Stressors (Water Quality and Air Quality)

Secondary stressors of air quality and water quality were addressed in previous chapters of the EIS. Air Quality (Section 3.2) determined air emissions occur from Alternative 1 but do not pose human health or environmental risks to surrounding communities because the status of the air quality in the Nevada counties (including Washoe) underlying the FRTC SUA would not be affected. Therefore, air quality emissions with implementation of Alternative 1 would not result in disproportionately high and adverse human health or environmental effects on children. Water Quality (Section 3.3) determined there is little chance for an incidental spill to reach groundwater, if one were to occur, based on the response procedures in place and the small quantities of materials and wastes used and generated within the FRTC. Nonexplosive practice munitions would have negligible effects on groundwater under Alternative 1 because potential contaminants are not expected to migrate to groundwater. Based on predictive modeling and sampling studies, munitions expenditure at B-17, B-19, and B-20 ranges does not appear to result in off-range migration of munitions constituents (U.S. Department of the Navy 2008). The potential for perchlorate and other munitions constituents of concern would continue to be evaluated through the Range Sustainability Environmental Program assessment process and during 5-year range condition assessment updates. Continued implementation of the operational range clearance plan would also substantially reduce potential impacts on water quality. Domestic wastewater would continue to be treated by septic systems serving the installation assets. Based on the personnel presence within the FRTC, loadings to the septic systems would be low, and the effects on groundwater under Alternative 1 would be negligible. While current groundwater usage data are not available for the FRTC, use is limited based on the limited number of personnel and the limited needs to support training.

Because water discharges do not have significant impacts on the local water resources within the FRTC Study Area, they do not pose health or environmental risks to the surrounding communities. Therefore, water quality with implementation of Alternative 1 would not result in disproportionately high and adverse human health or environmental effects on children.

3.7.3.3 Alternative 2

Alternative 2, the Preferred Alternative, would include all elements of Alternative 1. In addition, Alternative 2 training activities of the types currently conducted would increase by 10 percent over the levels identified in Alternative 1.

3.7.3.3.1 Socioeconomics

Noise

Noise generated from Navy activities such as weapons firing, in-air explosions, and aircraft transiting have the potential to disrupt enjoyment of recreational activities, leading to a loss of revenue in the FRTC Study Area under Alternative 2. No additional impacts are expected beyond those described in the No Action Alternative because Navy operational procedures and practices are already in place to avoid impacts on ongoing activities adjacent to training areas. Navy training activities producing airborne noise are normally short term and temporary. Therefore, airborne noise impacts on socioeconomic resources would be negligible.

Physical Disturbance

Physical interactions and disturbances may impact industry revenue or operating costs under Alternative 2. No additional impacts are expected beyond those described in the No Action Alternative because the Navy clears the area before training activities take place, and the Navy does not train in areas close to civilian infrastructure or civilian activities. Based on the Navy's standard operating procedures and the large expanse of the training ranges, the likelihood of a physical interaction and disturbance on civilian property (e.g., equipment or infrastructure) in the FRTC Study Area would be negligible. Therefore, loss of revenue or employment changes to human activities in the FRTC Study Area would not be expected under Alternative 2.

Economics and Usability

Under Alternative 2, training activities would increase overall by 10 percent as shown in Table 2-3. No changes to the current socioeconomic conditions (employment, housing, and population growth) within the Study Area are expected under Alternative 2 because the Navy would maintain baseline levels of personnel already employed at NAS Fallon attributed to military readiness activities. There is potential for a positive effect on local businesses from an increase in personnel traveling to NAS Fallon as a result of the increase in training activities; however, regional and community economics, employment, housing, and population growth would not change due to this factor.

Navy training activities have the potential to impact access/usability of the Study Area by temporarily changing access to airspace in the FRTC Study Area. It is not anticipated that increase under Alternative 2 would affect local aviation traffic. Local aviators may coordinate activities that require entrance into Restricted Airspace during active hours with air traffic control, and general flight publications and Notices to Airmen allow aviators to plan around military readiness activities and coordinate flight times with the Air Route Traffic Control Center. Therefore, while local activities will continue to need to schedule use of airspace, economic activity such as local employment, farming, or ranching operations would not be significantly impacted.

3.7.3.3.2 Environmental Justice

Under Alternative 2, noise and secondary stressors (air quality and water quality) would be similar to those described under Alternative 1, under which minority populations and low-income populations would not be affected as a result of associated activities compared to communities of comparison, the state of Nevada, and the United States. Minority populations of Native Americans at the Walker River Reservation (near B-19) would not be disproportionately impacted because B-19 flight operations would not exceed 54 dBA. Although the 57 dBC day-night noise level contours for ordnance-related noise would extend up to 3 miles beyond the range boundary at B-19 (into the Walker River Reservation), they would not affect any populated area because none exist in the vicinity. No noise contours (60 L_{dnmr} contours or higher) would be found in the vicinity of the Fallon Paiute-Shoshone Reservation or other Indian reservations. Therefore, no disproportionately high and adverse human health or environmental effects as a result of implementation of Alternative 2 are anticipated on minority populations and low-income populations compared to communities of comparison, the state of Nevada, and the United States.

3.7.3.3.3 Protection of Children

Under Alternative 2, noise and secondary stressors (air quality and water quality) would be similar to those described under Alternative 1. No disproportionately high and adverse human health or environmental effects are anticipated on children from implementation of Alternative 2.

3.7.3.4 Proposed Management Practices, Monitoring, and Mitigation Measures

3.7.3.4.1 Proposed Best Management Practices

No adverse socioeconomic effects were identified; therefore, no proposed management practices for socioeconomics and environmental justice are warranted. However, best management practices for other resources that affect environmental justice (e.g., air quality, water quality, and noise) would be implemented.

3.7.3.4.2 Proposed Monitoring

No specific monitoring needs were identified for socioeconomics and environmental justice.

3.7.3.4.3 Proposed Mitigation Measures

No mitigation measures are warranted for socioeconomics and environmental justice based on the analysis presented in Section 3.7.3 and implementation of proposed best management practices.

3.7.3.5 Summary of Effects and Conclusions

Table 3.7-7 summarizes the effects of and mitigation measures under the No Action Alternative, Alternative 1, and Alternative 2 for socioeconomics and environmental justice.

Table 3.7-7: Summary of Effects for Socioeconomics and Environmental Justice

Resource	Stressor	Summary of Effects and National Environmental Policy Act Impact Determination
No Action Alternative		
Socioeconomics	• Noise • Physical disturbance • Economics and usability	• Regional and community economics, employment, housing, and population growth are not affected as a result of the No Action Alternative stressors (i.e., noise, physical disturbance, or economics and usability).
Environmental Justice	• Noise • Secondary stressors (water quality and air quality)	• The No Action Alternative presents no disproportionately high and adverse human or environmental health effects (from noise or secondary stressors) on minority populations and low-income populations compared to communities of comparison, the state of Nevada, and the United States.
Protection of Children	• Noise • Secondary stressors (water quality and air quality)	• The No Action Alternative presents no disproportionate health and safety risks (from noise or secondary stressors) to children.
Impact Conclusion	• The No Action Alternative would result in no significant impacts on the regional and community economics, employment, housing, and population. • The No Action Alternative would result in no significant or disproportionately high and adverse human or environmental health impacts on minority populations and low-income populations compared to communities of comparison, the state of Nevada, and the United States. • The No Action Alternative would result in no significant or disproportionate environmental health or safety risks to children.	
Alternative 1		
Socioeconomics	• Noise • Physical disturbance • Economics and usability	• Beneficial effects on the local economy would result from increased spending by additional military personnel employed by NAS Fallon and the increased military personnel participating in military readiness activities while in the local area. • Local activities would need to schedule use of airspace, but there would be no significant impact or change in economic activity related to farming and ranching operations.
Environmental Justice	• Noise • Secondary stressors (water quality and air quality)	• Alternative 1 presents no disproportionately high and adverse human or environmental health effects (from noise or secondary stressors) on minority populations and low-income populations compared to communities of comparison, the state of Nevada, and the United States.

Table 3.7-7: Summary of Effects for Socioeconomics and Environmental Justice (continued)

Resource	Stressor	Summary of Effects and National Environmental Policy Act Impact Determination
Protection of Children	• Noise • Secondary stressors (water quality and air quality)	• Alternative 1 presents no disproportionate health and safety risks (from noise or secondary stressors) to children.
Impact Conclusion	• Alternative 1 would result in no significant impacts on the socioeconomics of the FRTC Study Area. • Alternative 1 would result in no significant or disproportionately high and adverse human or environmental health impacts on minority populations and low-income populations compared to communities of comparison, the state of Nevada, and the United States. • Alternative 1 would result in no significant or disproportionate environmental health or safety risks to children.	
Alternative 2		
Socioeconomics	• Noise • Physical disturbance • Economics and usability	• Beneficial effects on the local economy would result from increased spending by additional military personnel employed by NAS Fallon and the increased military personnel participating in military readiness activities while in the local area. • Local activities would need to schedule use of airspace, but there would be no significant impact or change in economic activity related to farming and ranching operations.
Environmental Justice	• Noise • Secondary stressors (water quality and air quality)	• Alternative 2 presents no disproportionately high and adverse human or environmental health effects (from noise or secondary stressors) on minority populations and low-income populations compared to communities of comparison, the state of Nevada, and the United States.
Protection of Children	• Noise • Secondary stressors (water quality and air quality)	• Alternative 2 presents no disproportionate health and safety risks (from noise or secondary stressors) to children.
Impact Conclusion	• Alternative 2 would result in no significant impacts on the socioeconomics of the FRTC Study Area. • Alternative 2 would result in no significant or disproportionately high and adverse human or environmental health impacts on minority populations and low-income populations compared to communities of comparison, the state of Nevada, and the United States. • Alternative 2 would result in no significant or disproportionate environmental health or safety risks to children.	

Notes: FRTC = Fallon Range Training Complex, NAS = Naval Air Station

3.8 TRANSPORTATION

3.8.1 INTRODUCTION

This section addresses potential impacts of the alternatives on transportation (ground and air) in the Fallon Range Training Complex (FRTC) Study Area and the surrounding areas of the City of Fallon and Churchill County.

3.8.1.1 Overview

Transportation refers to the movement of vehicles on roadways and aircraft in the airspace in the Study Area.

Ground Traffic. Ground traffic refers to an integration of travel by rail, bike, or bus. Road and highway (hwy) networks consist of primary roads and secondary roads. Primary roads are principal arterials, such as interstate freeways and state hwys, designed to move vehicle traffic. Primary roads provide limited access to adjacent areas. Secondary roads are arterials such as major surface streets that provide access to residential, commercial, and recreational areas; public service facilities such as hospitals and schools; government facilities; and other commonly accessed infrastructure. Secondary roads also collect traffic from common areas and transfer it to primary roads (Nevada Department of Transportation 2013b).

Air Traffic. Air traffic refers to movements of aircraft through airspace. Safety and security factors dictate that use of airspace and control of air traffic is closely regulated. To accomplish this, airspace is divided into two categories: regulatory and non-regulatory. Within these two categories, there are four types: controlled, uncontrolled, special use, and other airspace. Controlled airspace is a generic term that covers the different classifications of airspace and defined dimensions within which air traffic control (ATC) service is provided in accordance with the airspace classification. Controlled airspace consists of Class A, B, C, D, and E airspace. Uncontrolled airspace, or Class G airspace, is the portion of the airspace that has not been designated as Class A, B, C, D, or E. Subsequently, it is designated "uncontrolled" airspace (see Figure 3.8-1).

Source: Federal Aviation Administration

Figure 3.8-1: Airspace classifications

Special Use Airspace (SUA), established under procedures outlined in 14 Code of Federal Regulations Part 73.1, is the designation for airspace in which certain activities must be confined, or where limitation may be imposed on aircraft operations that are not part of those activities. Most SUA is established for military flight activities and, with the exception of prohibited areas (e.g., over the White House), may be

used for commercial or general aviation when not reserved for military activities[1]. There are multiple types of SUA, and the types found in the Study Area include prohibited areas, restricted areas, warning areas, alert areas, and military operations areas (MOAs) (Federal Aviation Administration 1996).

3.8.1.2 Regulatory Framework and Management Practices

3.8.1.2.1 Ground Traffic

The Nevada Department of Transportation (NDOT) is responsible for the planning, construction, operation and maintenance of the 5,400 miles of hwy and over 1,000 bridges which make up the Nevada highway system. NDOT is administratively divided into three geographical districts; the Study Area is included in all three (Figure 3.8-2, Nevada Department of Transportation 2013a).

The mission of the Department is to "provide the driving public with a transportation system consistent with the state's social, economic and environmental objectives."

3.8.1.2.2 Air Traffic

Congress has charged the Federal Aviation Administration (FAA) with responsibility for developing plans and policy for the use of the navigable airspace and with responsibility for assigning by regulation or order the use of the airspace necessary to ensure the safety of aircraft and their efficient use (49 United States Code 40103(b); FAA Order 7400.2). The FAA's responsibilities include designation of SUA, which consists of that airspace wherein activities must be confined because of their nature, or wherein limitations are imposed upon aircraft operations that are not a part of those activities, or both. Regulations applicable to all aircraft are regulated by the FAA to define permissible uses of designated airspace and to control that use. These regulations are intended to accommodate the various categories of aviation, whether military, commercial, or general aviation. FAA JO 7400.8W, dated February 12, 2014, provides a listing of all regulatory and non-regulatory SUA areas as well as issued but not yet implemented amendments to those areas established by the FAA. This document is updated and published annually.

In addition to the plans and policies of the FAA for use of navigable airspace, the United States (U.S.) Department of the Navy's (Navy's) follows additional instructions which provide specific guidelines, procedures, and restrictions for military aircraft transiting FRTC airspace, range scheduling procedures, responsibilities for airspace planning and administration, and reporting requirements.

3.8.1.3 Approach to Analysis

Factors used to assess the significance of impacts on vehicle traffic include the extent or degree to which an alternative would seriously disrupt the flow of residential or hwy traffic. The Federal Highway Administration uses level of service to characterize the effectiveness and quality of transportation infrastructure performance. Level of service analyzes road traffic flow with corresponding safe driving conditions and has the following level of service rating system:

- Level of service A = Free flow
- Level of service B = Reasonably free flow

[1] The proposed action of this EIS does not seek to limit commercial or general aviation's use of the FRTC

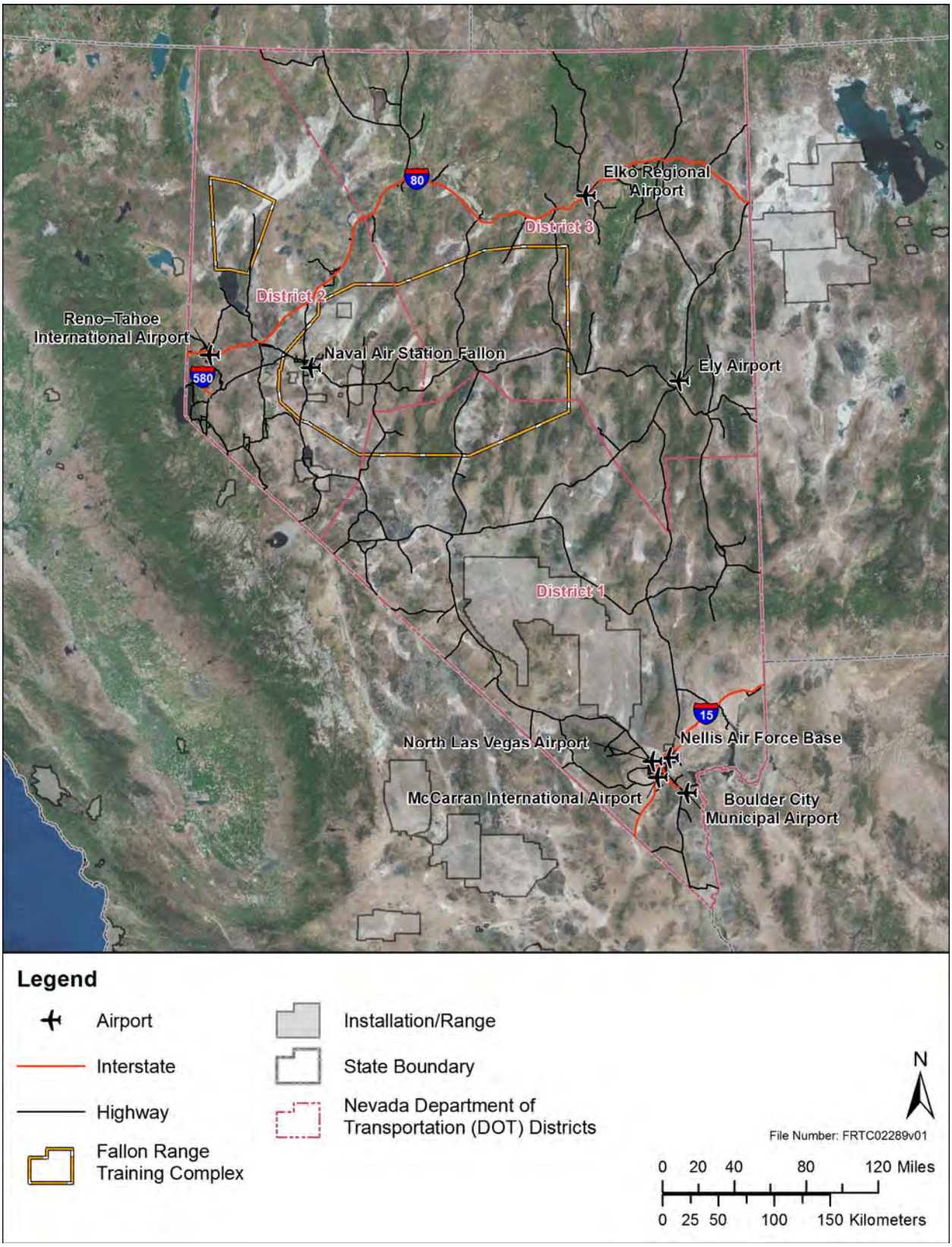


Figure 3.8-2: Department of Transportation Districts and Regional Roadways

- Level of service C = Stable flow
- Level of service D = Approaching unstable flow
- Level of service E = Unstable flow
- Level of service F = Forced or breakdown flow

A serious disruption to vehicular traffic occurs when the level of service of an area increases to an unacceptable level of service of D, E, or F. However, personnel transiting roadways at intersections do so upon appropriate traffic cycles and do not disrupt roadway traffic (Transportation Research Board 2008).

Factors used to assess the significance of impacts on air traffic include consideration of an alternative's potential to result in (1) an airspace modification that would cause disruption to commercial air traffic patterns, or (2) air operations that will markedly restrict civilian aviation in the project area (U.S. Department of the Navy 2013).

Restrictions to the availability of ground or air transportation resources are evaluated to identify specific components that could act as stressors by having direct or indirect effects on the resources. A potential change in level of service would be an impact to ground transportation. A potential change that could affect existing capacity in air transportation such that the increase could not be accommodated within established operational procedures and flight patterns, or that the change might increase collision potential between military and non-participating civilian operations, would be an impact to air transportation resources.

3.8.2 AFFECTED ENVIRONMENT

3.8.2.1 Ground Traffic

U.S. Hwy 95 is the principal north-south transportation corridor traversing between Fallon Naval Air Station (NAS) Bombing Ranges (west and southeast) and Fallon NAS Van Voorhis Field (east). U.S. Hwy 95 continues north from the City of Fallon to connect with Interstate 80 and extends south to Las Vegas, Nevada and Interstate 15.

U.S. Hwy 50 (dubbed the "Loneliest Road in America" by *Life Magazine*) traverses east of Fallon NAS in a southeasterly direction (Nevada Commission on Tourism 2012). U.S. Hwy 50 extends from Carson City, Nevada across the state of Nevada to Baker, Nevada (see Figure 3.8-2).

The annual average daily traffic count for U.S. Hwy 95, south of the City of Fallon, has increased by approximately 1,000 (roughly 22 percent) since 2009 with the 2012 count at 5,600. Traffic counts on U.S. Hwy 50, east of the City of Fallon, have remained stable since 2009 with the 2012 count for U.S. Hwy 50 at an annual average daily traffic count of 1,300 (Nevada Department of Transportation 2013c). The traffic counts on secondary roads reflect the same patterns as established for the primary roads, with a peak in traffic counts in 2009 and stable or declining average daily traffic counts in subsequent years (Nevada Department of Transportation 2013c).

Secondary roads include Nevada State Hwys 723, 117, 715, 115, 720, 118, 19, 120, and 718 (see Figure 3.8-3).

Figure 3.8-3: Primary and Secondary roadways Underlying FRTC Airspace

3.8.2.2 Air Traffic

The Study Area is within the FAA's Western Pacific Region, which includes the states of California, Nevada, Arizona, and Hawaii. Oakland or Salt Lake Air Route Traffic Control Centers (ARTCCs) are the controlling authorities for the FRTC's assigned restricted areas, MOAs, and Air Traffic Control Assigned Airspace (ATCAAs). Management of SUA areas is, in turn, delegated to NAS Fallon Desert Control, which is responsible for issuing airspace clearances.

3.8.2.2.1 Military Air Traffic

FRTC airspace overlays approximately 10.4 million acres of land that includes 9 restricted areas, 15 MOAs, 14 ATCAAs, two supersonic operating areas, and a civilian Visual Flight Rules (VFR) corridor. A complete description of the airspace is available in Section 2.2 (Description of the Fallon Range Training Complex Study Area) and Table 3.8-1. Figure 3.8-4 depicts FRTC's airspace.

Standard Operating Procedures are in place to ensure safety in FRTC airspace. Oakland or Salt Lake ARTCCs are the controlling authorities for FRTC assigned restricted areas, MOAs, and ATCAAs. Naval Strike and Air Warfare Center (NSAWC) is the controlling authority for all ranges and areas within the FRTC. MOAs are SUA that are established to separate military flight activity from Instrument Flight Rules traffic and to identify to VFR traffic where the activity is occurring. Management of SUA areas is, in turn, delegated to NAS Fallon Desert Control, which is responsible for issuing airspace clearances.

Access to any and all ranges at the FRTC must be scheduled through NSAWC as an approved range activity. Aircrew and Range Operations Center (ROC) personnel are jointly responsible for air safety. Prior to releasing weapons, each aircraft conducting training in the airspace and on the ranges of the FRTC shall make a pass without releasing munitions (referred to as a "cold pass") to clearly identify the intended target. During the first cold pass for an exercise, flight crews must ensure that nonparticipating aircraft, ground vehicles, and livestock are clear of the surrounding airspace and the intended target. At all times, two-way radio communication between the ROC and individual aircraft must be established. Aircrews operating within MOAs and ATCAAs are responsible for abiding by the spatial restrictions specified by Desert Control.

Within the FRTC, military assumes responsibility for separation of aircraft (MARSA) applies at all times. FRTC MARSA operations are defined by a letter of agreement between NSAWC and the FAA. When MARSA operations are complete, separation responsibility is relinquished back to Air Traffic Control (U.S. Department of the Navy 2013).

Table 3.8-1: Fallon Range Training Complex Special Use Airspace

No.	Airspace	Description Notes	Floor	Ceiling	Scheduling/Controlling Authority
Restricted Areas (R)					
1.	R-4803	3 nm radius circle	Surface	Up to but not including FL 180	NSAWC/Oakland ARTCC
2.	R-4804A[1]	5 nm and 3 nm radius circles	Surface	Up to but not including FL 180	NSAWC/Oakland ARTCC
2.	R-4804B	5 nm and 3 nm radius circles	FL 180	FL 350	NSAWC/Oakland ARTCC
3.	R-4810	5 nm and 3 nm radius circles	Surface	17,000' MSL	NSAWC/Oakland ARTCC

Table 3.8-1: Fallon Range Training Complex Special Use Airspace (continued)

No.	Airspace	Description Notes	Floor	Ceiling	Scheduling/Controlling Authority
Restricted Areas (R)					
4.	R-4812[2]	5 nm bounded on the east by R-4804 and on the west by R-4810	Surface	Up to but not including FL 180	NSAWC/Oakland ARTCC
5.	R-4813A	15 nm radius circle	Surface	Up to but not including FL 180	NSAWC/Oakland ARTCC
5.	R-4813B	15 nm radius circle	FL180	FL 350	NSAWC/Oakland ARTCC
6.	R-4816N		1,500' AGL	Up to but not including FL 180	NSAWC/Oakland ARTCC
7.	R-4816S	1 nm north of U.S. Hwy 50	500' AGL	Up to but not including FL 180	NSAWC/Oakland ARTCC
Military Operations Areas (MOAs)					
1.	Fallon North 1[3]		100' AGL	Up to but not including FL 180	NSAWC/Oakland ARTCC
2.	Fallon North 2[3]		100' AGL	Up to but not including FL 180	NSAWC/Oakland ARTCC
3.	Fallon North 3		100' AGL	Up to but not including FL 180	NSAWC/Salt Lake ARTCC
4.	Fallon North 4		200' AGL	Up to but not including FL 180	NSAWC/Salt Lake ARTCC
5.	Fallon South 1		100' AGL	Up to but not including FL 180	NSAWC/Oakland ARTCC
6.	Fallon South 2		100' AGL	Up to but not including FL 180	NSAWC/Oakland ARTCC
7.	Fallon South 3		100' AGL	Up to but not including FL 180	NSAWC/Oakland ARTCC
8.	Fallon South 4[4]		200' AGL	Up to but not including FL 180	NSAWC/Salt Lake ARTCC
9.	Fallon South 5[5]		200' AGL	Up to but not including FL 180	NSAWC/Salt Lake ARTCC
10.	Churchill High	3 nm centered to the point of beginning excluding that airspace within R-4803	900' MSL	Up to but not including FL 180	NSAWC/Oakland ARTCC
11.	Churchill Low		500' AGL	9,000' MSL	NSAWC/Oakland ARTCC
12.	Ranch High	Excluding that airspace in R-4810 when active	9,000' MSL	13,000' MSL	NSAWC/Oakland ARTCC
13.	Ranch	Excluding that airspace in R-4810 when active	500' AGL	9,000' MSL	NSAWC/Oakland ARTCC
14.	Carson		500' AGL	Up to but not including FL 180	NSAWC/Oakland ARTCC
15.	Reno		30,000' MSL	FL180	NSAWC/Oakland ARTCC

Table 3.8-1: Fallon Range Training Complex Special Use Airspace (continued)

No.	Airspace	Description Notes	Floor	Ceiling	Scheduling/Controlling Authority
Air Traffic Control Assigned Airspace (ATCAA)					
1.	Bandit		FL 180	FL 400	NSAWC/Oakland
2.	Fallon North 1[6]		FL 180	FL 400	NSAWC/Oakland ARTCC
3.	Fallon North 2[6]		FL 180	FL 400	NSAWC/Oakland ARTCC
4.	Fallon North 3[6]		FL 180	FL 400	NSAWC/Oakland ARTCC
5.	Fallon North 4[6]		FL 180	FL 400	NSAWC/Oakland ARTCC
6.	Fallon South 1[6]		FL 180	FL 400	NSAWC/Oakland ARTCC
7.	Fallon South 2[6]		FL 180	FL 400	NSAWC/Oakland ARTCC
8.	Fallon South 3[6]		FL 180	FL 400	NSAWC/Oakland ARTCC
9.	Fallon South 4[6]		FL 180	FL 400	NSAWC/Oakland ARTCC
10.	Reno[6]		FL 180	FL 310	NSAWC/Oakland ARTCC
11.	Smokie		FL 180	FL 250	NSAWC/Oakland ARTCC
12.	Diamond		FL 180	FL 280	NSAWC/Salt Lake City ARTCC
13.	Duckwater		FL 180	FL 250	NSAWC/Salt Lake City ARTCC
14.	Zircon		FL 180	FL 500	NSAWC/Salt Lake City ARTCC
Supersonic Operating Areas					
1.	Area A		FL 300	N/A	NSAWC/Oakland/Salt Lake City ARTCC
2.	Area B		11,000' MSL	FL 300	NSAWC/Oakland/Salt Lake City ARTCC

[1] Surface to but not including FL 180 excluding 2,000 feet AGL up to but not including 8,500 feet MSL, north of and within 1 nm of U.S. Highway 50 between the intersection of U.S. Highway 50 with W118-26-00 and W118-08-00.

[2] Surface to but not including FL 180 excluding that portion from 2,000 feet AGL up to 8,500 feet MSL which lies north of and 1 nm from U.S. Highway 50, between the intersections of U.S. Highway 50 with W118-25-33 and W118-07-33.

[3] Excluding that airspace within R-4813A when active, and those portions of the Fallon and Stillwater National Wildlife Refuge areas below 3,000' AGL.

[4] Airspace encompassed by a 3 nm radius centered on the town of Austin, NV; below 2,000' AGL. That airspace encompassed by a 3 nm radius centered on Austin Airport, NV. That airspace 2 nm either side of State Route 722 to the town of Austin, then 2 nm either side of U.S. Highway 50 to the eastern boundary of the Fallon South 4 MOA between 2,000' AGL and 10,500' MSL.

[5] Excluding that airspace 2 nm either side of U.S. Highway 50 between 2,000' AGL and 10,500' MSL.

[6] ATCAA overlays a MOA with the same name.

Notes: AGL = above ground level, ARTCC = Air Route Traffic Control Center, ATCAA = Air Traffic Control Assigned Airspace, FL = Flight Level, Hwy = Highway, MOA = Military Operations Area, MSL = mean sea level, nm = nautical miles, NSAWC = Naval Strike and Air Warfare Center, R = Restricted Area, U.S. = United States

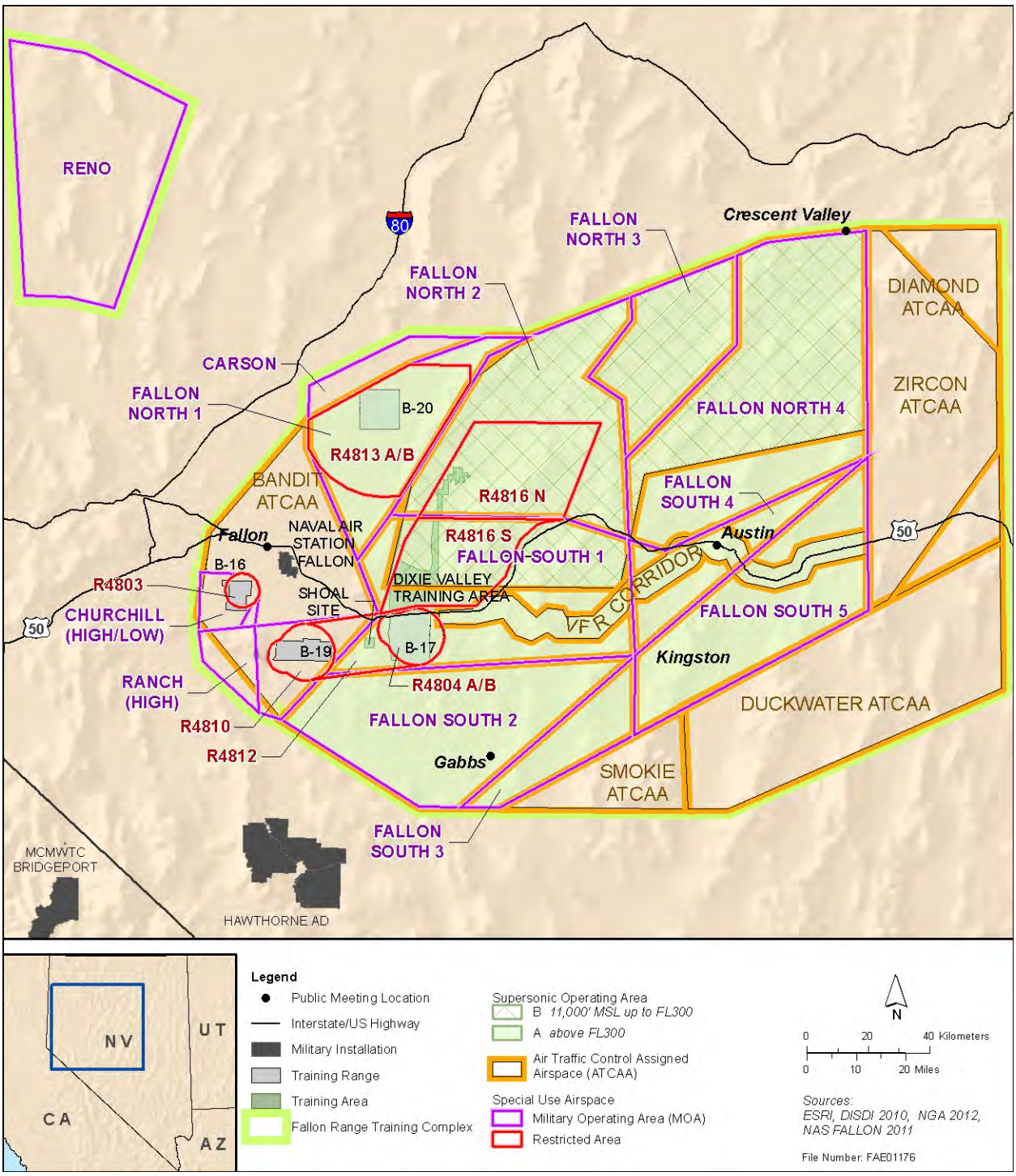


Figure 3.8-4: Fallon Range Training Complex Military Operations Areas and Air Traffic Control Assigned Airspaces

3.8.2.2.2 Civilian Air Traffic

There are numerous registered airports under or near the FRTC SUA. Some of these airports, as well as larger regional and international airports within the Study Area, are depicted in Table 3.8-4 and identified in Table 3.8-2. Civilian air traffic in the Study area includes scheduled commercial air carrier

services, general aviation flying (i.e. sightseeing, and pilot training) as well as air transport services. Additionally, as mentioned above, there exists within the FRTC a civilian VFR corridor. The corridor exists to facilitate civilian aircraft transit of FRTC's SUA, thus enabling aircraft to not have to fly around the airspace. The civilian VFR corridor (Figure 3.8-3) follows U.S. Hwy 50 from Sand Mountain to Austin, Nevada[2]. The proposed action of this Environmental Impact Statement will not impact general aviation's use of the VFR corridor.

Table 3.8-2: Federal Aviation Administration Registered Airfields Under or Near the FRTC SUA

Name (Location Identification)	Location	Remarks
Austin (TMT)	70 miles east northeast of Fallon, Nevada	Bureau of Land Management/Public Use
Crescent Valley (U74)	132 miles northeast of Fallon, Nevada	Bureau of Land Management
Elko Regional Airport (EKO)	181 miles northeast of Fallon, Nevada	Publicly Owned
Ely Airport (ELY)	206 miles east of Fallon, Nevada	Publicly Owned
Darrow Field Airport (26NV)	6 miles southwest of Fallon, Nevada	Private Use Visual Flight Rules
Dayton Valley Airpark (A34)	53 miles west southwest of Fallon, Nevada	Public Use
Derby Field (LOL)	50 miles north of Fallon, Nevada	County Owned/Public Use
Dixie Valley Airport (NV30)	50 miles northeast of Fallon, Nevada	Private Use Visual Flight Rules
Fallon Municipal Airport (FLX)	2 miles northeast of Fallon, Nevada	Publicly Owned
Fallon Naval Air Station/Van Voorhis Field Airport (NFL)	3 miles northeast of Fallon, Nevada	Navy-owned
Fallon Southwest Airpark Airport (1NV1)	5 miles southwest of Fallon, Nevada	Private Use Visual Flight Rules
Gabbs (GAB)	53 miles southeast of Fallon, Nevada	County Owned/Public Use
Kingston (N15)	77 miles east of Fallon, Nevada	Public Airport
McCarran International Airport (LAS)	307 miles southeast of Fallon, Nevada	International Airport
Nellis Air Force Base (LSV)	298 miles southeast of Fallon, Nevada	U.S. Air Force-owned
North Las Vegas Airport (VGT)	293 miles southeast of Fallon, Nevada	Publicly Owned
O'Toole Ranch (NV02)	63 miles east southeast of Fallon, Nevada	Private
Reno-Tahoe International Airport (RNO)	65 miles west of Fallon, Nevada	International Airport

Notes: Navy = United States Department of the Navy, U.S. = United States
Source: City-Data.com 2013

As stated above, most SUA is established for military or government use; however, it may also be accessed for civilian air traffic when not reserved for military or government use. Close coordination between military and civilian air traffic control facilities enables safe, effective, real-time use of the FRTC

[2] Altitude restrictions for the civilian VFR corridor are from 2,000 ft. (610 m) to 8,000 ft. (2,438 m) above ground level (AGL) from Sand Mountain to Fairview Peak and then from 2,000 ft. (610 m) to 10,500 ft. (3,200 m) AGL east from Fairview Peak until exiting the FRTC Airspace. From Sand Mountain to Fairview Peak, the corridor extends 1 mile (mi.) (1.6 kilometers [km]) north of Hwy 50. From Fairview Peak to State Hwy 722 at East Gate, the width increases to 1 mi. (1.6 km) north and 2 mi. (3.2 km) south. At East Gate, the corridor widens to 2 mi. on each side of U.S. Hwy 50.

SUA. Under this procedure, regardless of the schedule for the use of a military airspace, civilian aircraft may use SUA until a military aircraft is actually en route to that area. FRTC is responsible for ensuring that civilian air transit of SUA does not conflict with Department of Defense operations and training (U.S. Department of the Navy 2013).

3.8.2.3 Current Requirements and Management Practices

These precautions minimize the potential for interaction between military and civilian activities by communicating hazardous training and testing activities to all vessels, aircraft, and operators. Safely conducting activities in the controlled training and testing areas is ensured through implementation of the Navy's safety policies and procedures that include, but are not limited to, the following:

- Abiding by VFR and Instrument Flight Rules
- Scheduling activities through NSAWC
- Ensuring that the entire hazard zone is clear before commencing hazardous activities
- Coordinating with Range Safety Officers prior to expending military munitions
- Ensuring clearance of appropriate safety zones

3.8.3 ENVIRONMENTAL CONSEQUENCES

This section evaluates how and to what degree the activities described in Chapter 2 (Description of Proposed Action and Alternatives) could impact transportation resources within the Study Area. The analysis focuses on potential impacts and overall changes as they relate to ground and air transportation associated with implementation of all current and proposed military readiness activities and proposed range enhancements at the FRTC. Table 2-4 in Chapter 2 presents the baseline and proposed training activities for each alternative. Table 3.0-2 in Chapter 3 presents the warfare areas and associated stressors that were considered for analysis. The stressors vary in intensity, frequency, duration and location within the Study Area. The primary stressors applicable to transportation resources in the Study Area and that are analyzed include the following:

- Economics/Usability (Accessibility)

The training categories associated with the transportation stressor of accessibility are Anti-Air, Electronic, Strike, and Naval Special Warfare, as well as other training activities as shown in Table 3.8-3.

Table 3.8-3: Transportation Stressor Categories and Number of Training Activities

Components	Area	Air or Ground Traffic Participation		Number of Training Activities		
		Ground	Air	No Action Alternative	Alternative 1	Alternative 2
Transportation Stressors Training Categories						
Anti-Air Warfare	NSAWC 1, NSAWC 2		✓	2,582	2,582	2,841
Electronic Warfare	NSAWC 1, NSAWC 2	✓	✓	4,025	4,025	4,428
Strike Warfare	B-16, B-17, B-19, B-20, NSAWC 1, NSAWC 2, EW Range	✓	✓	1,790	1,958	2,154

Table 3.8-3: Transportation Stressor Categories and Number of Training Activities (continued)

Components	Area	Air or Ground Traffic Participation		Number of Training Activities		
		Ground	Air	No Action Alternative	Alternative 1	Alternative 2
Transportation Stressors Training Categories						
Naval Special Warfare	Dixie Valley Training Area, NSAWC 1, NSAWC 2, B-16, Dixie Valley Training Area	✓	✓	75	75	82
Other Training Activities	B-16, B-17, B-19, B-20, Dixie Valley Training Area, Shoal Site, Over the City of Fallon, Nevada	✓	✓	359	766	842

Notes: B = Bravo, EW = Electronic Warfare, NSAWC = Naval Strike and Air Warfare Center

3.8.3.1 No Action Alternative

3.8.3.1.1 Economics/Usability (Accessibility)

Ground Traffic

Current ground traffic forecasts predict a flat growth rate until 2014. However, by the year 2060 daily traffic is forecasted to double on most hwys outside of the metropolitan areas of Northern and Southern Nevada. Despite this doubling, Nevada's rural hwy network is anticipated to have adequate capacity. Any forecast deficiencies are outside the Study Area with the exception of U.S. hwy 95 to Boulder City (Nevada Department of Transportation 2013d).

Under the No Action Alternative, training activities using ground transportation resources could occur throughout the Study Area and, as indicated in Chapter 2, have been ongoing at various levels and frequencies since the 1940s. Activities averaged over the years of 2010–2012 provide the baseline level for this analysis. Under the No Action Alternative, the Navy would not increase the training activities or provide for range investments.

- Anti-Air Warfare training is typically conducted in NSAWC 1 and 2 airspace and would have no impact to ground traffic.
- Electronic Warfare training is primarily conducted in FRTC airspace; however, land-based fixed and mobile electronic signal emitters are used to simulate opposition forces. These signal emitters consist of specialized electronic equipment with the mobile units mounted on trailers.
- Naval Special Warfare training consists of ground convoy operations, which are tactical ground mobility activities that are primarily conducted on the Bravo (B)-16 range; on occasion and with prior approval, however, existing roads and trails on Bureau of Land Management (BLM) land are used. Any activities on BLM land are coordinated with the NSAWC BLM Liaison.
- Strike Warfare training involves fixed-wing attack aircraft pilots and aircrews in the delivery of military munitions (real and simulated) against a land-based target and would have no impact to ground traffic.
- Other training conducted at the FRTC includes
    - Proposed dismounted fire and maneuver training which consists of limited vehicle travel on existing roads to position personnel for dismounted maneuvers. This activity would

occur in the Bell Canyon Area of B-17. Although the area is available, training has not been conducted.
- Ground maneuver tactics training (to include ground light amplification by stimulated emission of radiation [LASER] targeting training) involves military vehicles in rough terrain, navigation, vehicle recovery training and transitioning from mounted to dismounted operations. This training is only approved to be conducted on B-16, B-17, and B-19.
- Land demolition and demolition of unexploded ordnance (military munitions), which is conducted in Training Ranges B-17, B-19, and B-20.
- Mission Area Training, which involves marksmanship training on B-19.
- Urban close air support is conducted in the airspace and has no impact on ground transportation.

The location and number of activities proposed for these training activities are shown in Table 3.8-3.

The impact upon ground transportation by military training activities at FRTC is minimal other than transit to and from the training areas. The majority of ground training is contained on FRTC training areas and does not impact the local ground transportation system. With regard to tactical ground mobility training conducted on BLM land, the level of activity is commensurate with the level of public use and is covered under BLM's "casual use" definition. Subsequently, due to the infrequent nature and overall low number of these types of training activities, tactical ground mobility training does not impact the local ground transportation system. During Fiscal Year (FY) 2010, the NDOT implemented the statewide Level of Service Monitoring and Tracking System to determine and establish the congestion level in urban and rural areas. During FY 2010 the baseline for rural roads was established as level of service D for 100 percent of the state of Nevada. For FY 2012, Nevada rural roads still have level of service D or better for 100 percent of roadways (Nevada Department of Transportation 2012).

There would be no anticipated impacts on ground traffic transportation resources as the activities occur on the FRTC in training areas specifically designed for such activities. There would be no anticipated impacts on level of service in the Study Area due to ground transportation accessibility factors as a result of implementation of the No Action Alternative level of training.

Air Traffic

Passenger data for small public airports is not reported to the U.S. Department of Transportation. A Regional Air Service Study conducted for the Nevada Department of Transportation for those Nevada regions outside the major metropolitan areas of Reno and Las Vegas reviewed the existing and forecast population and air service data for airports that are existed or anticipated. The conclusion was that while Nevada is anticipated to increase the State's population by 53 percent by 2030, rural areas such as the Study Area will remain or slightly decline in population due to a growing urbanization of the State to more concentrated population centers in and around Reno and Las Vegas (Nevada Department of Transportation 2009).

Under the No Action Alternative, training activities using air transportation resources could occur throughout the Study Area, and as indicated in Chapter 2 (Description of Proposed Action and Alternatives), have been ongoing at various levels and frequencies since the 1940s. Activities averaged over the years of 2010–2012 provide the baseline level for this analysis. Under the No Action Alternative, the Navy would not increase the training activities or provide for range investments. Training typically conducted in FRTC airspace includes Anti-Air, Electronic, and Strike Warfare, and urban

close air support. Naval Special Warfare training consists of ground operations that do not impact air transportation resources. The location and number of activities proposed for these training activities are shown in Table 3.8-4.Additionally, under the No Action Alternative, there would be no impact to the VFR corridor or commercial and general aviation's use of the FRTC airspace.

As a result of the Standard Operating Procedures implemented at the FRTC (see Section 3.8.2.2.1, Military Air Traffic), there would be no anticipated impacts on existing capacity in air transportation such that the proposed level of activity could not be accommodated within established operational procedures and flight patterns. Implementation of the No Action Alternative would not result in an increased collision potential between military and non-participating civilian operation due to air transportation accessibility factors in the Study Area.

3.8.3.2 Alternative 1

Under Alternative 1, training activity levels for Anti-Air, Electronic, and Naval Special Warfare remain the same as the No Action Alternative. Strike Warfare is proposed to increase by 168 training activities and other training activities increase by 407 training activities over that proposed for the No Action Alternative.

3.8.3.2.1 Economics/Usability (Accessibility)

Ground Traffic

Ground-based activities (as depicted in Table 2-4 in Chapter 2, under other training activities) will increase by 407 over that proposed for the No Action Alternative. This increase will not impact ground traffic transportation resources as the activities occur on the FRTC in training areas specifically designed for such activities. There would be no anticipated impacts on level of service in the Study Area due to ground transportation accessibility factors as a result of implementation of the Alternative 1 level of training.

Air Traffic

As a result of the Standard Operating Procedures implemented at the FRTC (see Section 3.8.2.2.1, Military Air Traffic), the 168 training activity increase over the No Action Alternative in Strike Warfare training activities proposed under Alternative 1 (see Table 2-4, in Chapter 2) will not impact existing capacity in air transportation such that the increase could not be accommodated within established operational procedures and flight patterns. Implementation of Alternative 1 would not result in an increase that might increase collision potential between military and non-participating civilian operation due to air transportation accessibility factors in the Study Area. Additionally, similar to the No Action Alternative, there would be no impact to the VFR corridor or commercial and general aviation's use of the FRTC airspace under Alternative 1.

3.8.3.3 Alternative 2 (Preferred Alternative)

Under Alternative 2, training activity levels for Anti-Air Warfare increase by 259 over those proposed for the No Action Alternative. Electronic Warfare activities increase by 403 over those proposed for the No Action Alternative. Strike Warfare activities increase by 364 over those proposed for the No Action Alternative. Naval Special Warfare activities increase by seven over those proposed for the No Action Alternative. Other training activities increase by 483 over those proposed for the No Action Alternative.

3.8.3.3.1 Economics/Usability (Accessibility)

Ground Traffic

The increase in other training activities (483 over that proposed for the No Action Alternative), as depicted in Table 2-4, are primarily ground-based training activities. This increase will not impact ground traffic transportation resources as the activities occur on the FRTC in training areas specifically designed for such activities. There would be no anticipated impacts on level of service in the Study Area due to ground transportation accessibility factors as a result of implementation of the Alternative 2 level of training.

Air Traffic

As a result of the Standard Operating Procedures implemented at the FRTC (see Section 3.8.2.2.1, Military Air Traffic), the increases over the No Action Alternative in Anti-Air, Electronic Warfare, Strike Warfare, Naval Special Warfare, and other training activities proposed under Alternative 2 (see Table 2-4) will not impact existing capacity in air transportation such that the increase could not be accommodated within established operational procedures and flight patterns. Implementation of Alternative 2 would not result in an increase that might increase collision potential between military and non-participating civilian operation due to air transportation accessibility factors in the Study Area. Additionally, similar to the No Action Alternative, there would be no impact to the VFR corridor or commercial and general aviation's use of the FRTC airspace under Alternative 2.

3.8.3.4 Proposed Management Practices, Monitoring, and Mitigation Measures

3.8.3.4.1 Proposed Best Management Practices

Best management practices are not proposed beyond the established Standard Operating Procedures already in place for separation of civilian and military aircraft.

3.8.3.4.2 Proposed Monitoring

Proposed monitoring is not proposed beyond the established FAA controls already in place for the safety of aviation resources in the Study Area.

3.8.3.4.3 Proposed Mitigation Measures

Proposed mitigation measures are not proposed beyond the established Standard Operating Procedures already in place for separation of civilian and military aircraft.

3.8.3.5 Summary of Effects and Conclusions

Under the No Action Alternative, Alternative 1, or Alternative 2, activities that could impact accessibility would be primarily confined to established FRTC training areas. The aggregate impact on ground and air transportation resources would not observably differ from existing conditions. Table 3.8-4 summarizes the effects of the No Action Alternative, Alternative 1, and Alternative 2.

Table 3.8-4: Summary of Effects

Stressors	Effects
No Action Alternative	
Ground Traffic	• The impact upon ground transportation by military training activities at FRTC is minimal other than transit to and from the training areas. • There would be no anticipated impacts on ground traffic transportation resources as the activities occur on the FRTC in training areas specifically designed for such activities. • There would be no anticipated impacts on level of service in the Study Area due to ground transportation accessibility factors as a result of implementation of the No Action Alternative level of training.
Air Traffic	• With Standard Operating Procedures implemented at the FRTC, there would be no anticipated impacts on existing capacity in air transportation such that the proposed level of activity could not be accommodated within established operational procedures and flight patterns. • Implementation of the No Action Alternative would not result in an increased collision potential between military and non-participating civilian operation due to air transportation accessibility factors in the Study Area.
Impact Conclusion	• The No Action Alternative would not result in significant impacts on transportation.
Alternative 1	
Ground Traffic	• Ground-based training would increase but will not impact ground traffic transportation resources as the activities occur on the FRTC in training areas specifically designed for such activities. • There would be no anticipated impacts on level of service in the Study Area due to ground transportation accessibility factors as a result of implementation of the Alternative 1 level of training.
Air Traffic	• The training activity increase under Alternative 1 will not impact existing capacity in air transportation such that the increase could not be accommodated within established operational procedures and flight patterns. • Implementation of Alternative 1 would not result in an increase that might increase collision potential between military and non-participating civilian operation due to air transportation accessibility factors in the Study Area.
Impact Conclusion	• Alternative 1 would not result in significant impacts on transportation.
Alternative 2	
Ground Traffic	• Ground-based training would increase but will not impact ground traffic transportation resources as the activities occur on the FRTC in training areas specifically designed for such activities. • There would be no anticipated impacts on level of service in the Study Area due to ground transportation accessibility factors as a result of implementation of the Alternative 2 level of training.
Air Traffic	• The training activity increase under Alternative 2 will not impact existing capacity in air transportation such that the increase could not be accommodated within established operational procedures and flight patterns. • Implementation of Alternative 2 would not result in an increase that might increase collision potential between military and non-participating civilian operation due to air transportation accessibility factors in the Study Area.
Impact Conclusion	• Alternative 2 would not result in significant impacts on transportation.

Note: FRTC = Fallon Range Training Complex

3.9 CULTURAL RESOURCES

3.9.1 INTRODUCTION

3.9.1.1 Overview

This section describes existing cultural resources in the Fallon Range Training Complex (FRTC) Study Area and assesses the possible consequences to these resources by the Proposed Action. A cultural resource is any definite location or object of past human activity, occupation, or use, identifiable through inventory, historical documentation, or oral evidence. Cultural resources include buildings, structures, districts, archaeological sites, historic landscapes, and traditional cultural properties of significance in history, architecture, archaeology, engineering, or culture. Cultural resources also include associated documents and records. Cultural resources currently identified in or near the Study Area consist of archaeological sites, historic trails, historic architectural resources, and Native American resources. Archaeological resources include both prehistoric and historic sites. Prehistoric resources are physical properties resulting from human activities that predate written records and are generally identified as archaeological sites. They can include village sites, temporary camps, lithic scatters, roasting pits/hearths, milling features, petroglyphs, rock features, and burials. Historic archaeological resources postdate the advent of written records in a region, must be at least 50 years old, and can include building foundations, ruins, mines, and refuse scatters. Travel corridors can also provide physical evidence of previous human activity, and segments of the Pony Express Route, the Overland Stage and Mail Line, the California Emigrant Trail, and the Lincoln Highway traverse the FRTC Study Area.

Architectural resources consist of standing buildings or structures from the historic period. Buildings provide shelter for human activity and may consist of residential buildings (e.g., farmhouses and associated outbuildings, including sheds and barns), commercial buildings (e.g., stores, banks, and other business-related office buildings), and military buildings (e.g., administrative buildings and ancillary outbuildings). Structures are defined as those that do not provide shelter for human activity and include transportation-related structures (e.g., roads and bridges), military structures (e.g., water tanks or beacons), and irrigation features (e.g., canals).

Traditional cultural properties are resources associated with the beliefs and cultural practices of a living culture, subculture, or community. The beliefs and practices associated with the traditional cultural property and community must be rooted in the group's history and important to maintaining the group's cultural identity. Traditional cultural properties are not limited to Native Americans and can represent any ethnic group with strong ties to the property (National Park Service 1998). Traditional cultural properties listed in or eligible for listing in the National Register of Historic Places (NRHP) are afforded the same protection as other types of historic properties. Resources that are significant to Native American Tribes and may be considered traditional cultural properties include, but are not limited to, prehistoric sites and artifacts, sacred areas, traditional use areas (e.g., native plant gathering areas or wildlife habitat), traditional materials and their sources, and sites for cultural practices. Many resources are also sacred places important to Native Americans and may include mountain peaks, springs, and burial sites. Traditional uses may prescribe the use of particular native plants, animals, or minerals from specific places. Therefore, activities that may affect sacred areas or the availability of materials used in traditional practices may be of concern to Native Americans.

3.9.1.2 Regulatory Framework and Management Practices

Archaeological resources, historic trails, architectural resources, and Native American traditional cultural properties are protected by various laws and their implementing regulations: the National Historic Preservation Act (NHPA) of 1966, as amended (16 United States Code [U.S.C.] 470), the Archaeological

and Historic Preservation Act of 1974, the American Indian Religious Freedom Act of 1978, the Archaeological Resources Protection Act of 1979, and the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990. The Advisory Council on Historic Preservation further guides treatment of archaeological and architectural resources through the regulations *Protection of Historic Properties* (36 Code of Federal Regulations [C.F.R.] §800). Historic properties, as defined by the NHPA, represent the subset of cultural resources listed in, or eligible for inclusion in, the NRHP.

Historic properties must be important in American history, have physical integrity, and meet at least one of the NRHP criteria defined at 36 C.F.R. §60.4:

- Criterion A: Be associated with events that have made a significant contribution to the broad patterns of American history
- Criterion B: Be associated with the lives of persons significant in the American past
- Criterion C: 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
- Criterion D: Yield, or may be likely to yield, information important in prehistory or history

To convey significance and qualify for the NRHP, historic properties also possess several and usually most of the following aspects of integrity: location, design, setting, materials, workmanship, feeling, and association.

Traditional cultural properties are eligible for listing in the NRHP because of their association with cultural practices or beliefs of a living community that (1) are rooted in that community's history, and (2) are important in maintaining and continuing cultural identity of the community. Traditional cultural properties may be identified by Native Americans or other living communities. Even if resources that are significant to Native American Tribes may not be considered traditional cultural properties, these resources may be afforded protection by other laws, regulations, or executive orders.

Under the implementing regulations of Section 106 of the NHPA, federal agencies must take into account the effects that an action would have on historic properties. The regulations implementing Section 106 (36 C.F.R. §800) specify a consultation process to assist in satisfying this requirement. The Navy is conducting consultation with the Nevada State Historic Preservation Office (SHPO) and appropriate federally recognized tribes (Duckwater Shoshone Tribe, Fallon Paiute-Shoshone Tribe, Inter-Tribal Council of Nevada, Pyramid Lake Paiute Tribe, Te-Moak Tribe, Walker River Paiute Tribe, Yerington Paiute Tribe, and Yomba Shoshone Tribe) for the Proposed Action in accordance with the implementing regulations of Section 106 of the NHPA 1966 as amended (16 U.S.C. 470). Consultation with the appropriate federally recognized tribes will be initiated with the release of the Draft Environmental Impact Statement (EIS).

Under the National Environmental Policy Act (NEPA), an EIS must address the adverse and beneficial effects of a proposed federal action on important historic and cultural aspects of our national heritage (40 C.F.R. §1508.8) (here defined as resources eligible for or listed in the NRHP, and other designations such as the National Trails System). While NEPA and Section 106 of the NHPA represent two separate procedural laws, the public participation for the Proposed Action has been integrated to the extent possible. The NEPA scoping and Draft EIS public review processes (see Section 1.4.1) provided opportunities for the public to not only participate in the NEPA process but also contribute to public involvement in accordance with Section 106 of the NHPA.

Secretary of the Navy Instruction (SECNAVINST) 5090.8a, *Policy for Environmental Protection, Natural Resources and Cultural Resources Programs*, and Chief of Naval Operations Instruction (OPNAVINST) 5090.1c, Chapter 27, *Cultural Resources Management* require the United States (U.S.) Department of the Navy (Navy) to consider the effects of its undertakings on cultural resources in its planning and program efforts. SECNAVINST 4000.35a, *Department of the Navy Cultural Resources Program*, establishes policy and assigns responsibilities within the Department of the Navy for fulfilling the requirements of cultural resources laws such as the NHPA.

Cultural resources at the FRTC Study Area are managed in accordance with the NHPA, the Archaeological Resources Protection Act, the American Indian Religious Freedom Act, NAGPRA, and appropriate Navy Instructions. The Navy also abides by a Programmatic Agreement (PA) with the Nevada SHPO, Bureau of Land Management (BLM), and the Advisory Council on Historic Preservation that requires the identification, evaluation, and treatment of historic properties on lands managed by NAS Fallon to ensure protection of cultural resources and coordination between the Navy and the Nevada SHPO (Naval Air Station Fallon et al. 2011). The PA contains stipulations that address cultural resource staffing, coordination and information exchange with the SHPO, standard procedures, special procedures, public participation, dispute resolution, training of nonprofessional staff, reports and monitoring, reviews, amendments, suspension, termination, execution, and implementation. In addition, the Navy abides by a Memorandum of Understanding (MOU) concerning Native American human skeletal remains and associated artifacts signed in 1991 by NAS Fallon, the Fallon Paiute-Shoshone Tribe, the Nevada SHPO, the U.S. Fish and Wildlife Service, and the Nevada State Museum (Naval Air Station Fallon et al. 1991).

An Integrated Cultural Resources Management Plan (ICRMP) was completed in 2013. The document provides guidance to staff at NAS Fallon to ensure that all laws, regulations, policies, and directives related to cultural resources are appropriately followed while fulfilling the installation's mission. The integrated cultural resources management plan also provides standard operating procedures for routine actions that may affect cultural resources (U.S. Department of the Navy 2013).

Any inadvertent discovery of sensitive archaeological materials on the FRTC Study Area would be handled in accordance with the Navy's best management practices, which include provisions for stopping work and notifying the appropriate parties. If human remains are inadvertently discovered, then the procedures established under the NAGPRA and OPNAVINST 11170.2 series, *Navy Responsibilities Regarding Undocumented Human Burials*, would be followed.

3.9.1.3 Approach to Analysis

Under Section 106, an undertaking (e.g., the Proposed Action under NEPA) is considered to have an effect on a historic property when the undertaking may alter characteristics of the property that may qualify it for inclusion in the NRHP. An effect is considered adverse when it diminishes the integrity of the property's location, design, setting, materials, workmanship, feeling, or association (36 C.F.R. §800.5(a)(1)).

Adverse effects as defined under 36 C.F.R. §800.5(a)(2)(i) through (vii) include, but are not limited to:

1) Physical destruction, damage, or alteration of all or part of the property
2) Isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualification for the NRHP

3) Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting
4) Neglect of a property resulting in its deterioration or destruction
5) Transfer, lease, or sale of the property

Adverse effects under the NHPA also include reasonably foreseeable effects, both direct and indirect, caused by the alternatives, and those effects that could occur later in time, be farther removed in distance, or be cumulative (36 C.F.R. §800.5(a)(1)). Because cultural resources are typically nonrenewable, most adverse effects on NRHP-eligible or NRHP-listed resources in the Area of Potential Effects (APE) would be permanent.

Any physical disturbance of a NRHP-listed or -eligible cultural resource, or modification to such a resource, can result in alteration or destruction of those characteristics or qualities that make it eligible for inclusion in the NRHP and, thus, would be an adverse effect under Section 106 of the NHPA. An adverse effect on a historic property, however, does not necessarily equate to a significant impact under NEPA. Under NEPA, a significant impact can be mitigated to less than significant through completion of the Section 106 process, resulting in development of an agreement document resolving the adverse effects through some form of mitigation that could include data recovery or other treatment measures. For this document, a significant impact under NEPA is defined as an "unresolvable" adverse effect under Section 106 of the NHPA.

3.9.2 AFFECTED ENVIRONMENT

3.9.2.1 Cultural Context

The following cultural context is excerpted and adapted from the *Integrated Cultural Resources Management Plan for Naval Air Station Fallon* (U.S. Department of the Navy 2013).

3.9.2.1.1 Prehistoric Context

Prehistoric periods identified in or near the FRTC Study Area include the Hypothetical Pre-Clovis (< 20,000–9500 BC), Western Clovis (9500–8500 BC), Great Basin Stemmed Point (8500–5000 BC), Mixed Dart (5000–2500 BC), Gatecliff (2500–500 BC), Elko (500 BC–AD 500), Rosegate (AD 500–1350), and Desert (AD 1350–1850) Periods (U.S. Department of the Navy 2013). Pre-Clovis groups were probably organized into highly mobile, independent family units with an unspecialized subsistence economy based on hunting and gathering a wide variety of plants and animals. Sites would most likely be identified along the former shorelines of Pleistocene Lakes. The Western Clovis period occupations area are identified by the presence of fluted points and may represent an adaptation to lacustrine (marshes, lakes, and rivers) resources rather than big game hunting as defined in other parts of the western United States. The lacustrine adaptation continues in the Great Basin Stemmed Point period and is characterized by weakly shouldered large blades with heavily ground and usually rounded bases. Twined basketry and weaving are present during this period.

The Mixed Dart period represents a shift from the large stemmed points to a variety of strongly shouldered dart points, some notched with expanding stems, others with square stems, and most importantly the Pinto Split-stem point. Milling slabs and handstones for processing seeds are common. Basketry including simple S-twist and diagonal twisting as well as some of the earliest examples of coiled basketry are associated with this period. Olivella shell beads were also being traded from the California coast. The Gatecliff period occupations indicate some degree of sedentism suggested by the structural complexity, and the size and number of houses found in winter villages. Lowland sites tend to have well-

developed milling assemblages and fauna dominated by rabbits and rodents. Periodic movement to resource zones away from these villages is indicated by the use of caves as temporary camps and cache sites. Specialized hunting camps in the mountains are also common and often include faunal assemblages dominated by bighorn sheep. Trade of Olivella shell beads increased during this time. The Elko period occupations were a continuation of the Gatecliff adaptation; however, the trade of Olivella shell beads decreased greatly.

Bow and arrow technology characterizes the Rosegate Period. Villages along major rivers were occupied but the houses became smaller. Cave sites continued to be used for burials and caches. Intensification of plant food processing and small game harvest (especially rabbits) characterized the subsistence in the Rosegate period, with less emphasis on the use of large game. The Desert period is identified by the presence of the Desert Side-Notched point. Residential sites near rivers and marshes were still in use in this period, but there was a decrease in house size, and most lack internal features such as hearths, post holes, and cache and burial pits. The diet appears to have been dominated by fish, small game, waterfowl, and seeds. Some groups began to intensively exploit pinyon along the eastern slope of the Sierra and in some of the higher interior ranges.

3.9.2.1.2 Historic Context

The Fallon area's Euro-American history began in the late 1820s with fur trapping parties and exploratory expeditions. Major events that influenced the region's chronology included emigrant wagon trains in the 1840s, the 1849 California Gold Rush, and Comstock Lode (1859–1880). In the early twentieth century, the Newlands Project (1903–1905), highway construction, and the construction of the county's airstrip set the stage for the Study Area's strong ties to the federal government that continue to the present.

Originally a dirt airstrip developed by Churchill County in 1930, the Civil Aviation Administration and the Army Air Corps constructed an emergency landing field at this location in 1943. Later that year, the Navy assumed control of the airfield and constructed barracks, hangars, air traffic control facilities, and target ranges. In 1944, the Naval Auxiliary Air Station Fallon was commissioned. By 1946, the station was placed on caretaker status. The Naval Auxiliary Air Station Fallon was reactivated in 1951. Throughout the 1950s and 1960s, Naval Auxiliary Air Station Fallon's mission was to train pilots in rocketry, gunnery, and bombing and to provide night field carrier landing practice. In the mid-1960s, the training capabilities at Naval Auxiliary Air Station Fallon gained an all-electronic range that could simulate threats from enemy surface-to-air missiles and radar. On January 1, 1972, Naval Auxiliary Air Station Fallon became NAS Fallon. NAS Fallon's training mission expanded steadily in the 1980s with the arrival of the Tactical Aircrew Combat Training System (TACTS) and the permanent assignment of Strike Fighter Squadron 127, the "Desert Bogeys." Changes in aviation technology brought more advanced aircraft to NAS Fallon, such as the F/A-18 Hornet. In 1995 and 1996, the U.S. Navy Fighter Weapons School (TOPGUN) and the Carrier Airborne Early Warning Weapons School (TOPDOME) were merged with Strike University, creating the Naval Strike and Air Warfare Center (NSAWC).

3.9.2.2 Area of Potential Effects

As defined by 36 C.F.R. 800.16(d) of Section 106 of the NHPA, the APE represents "…the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of the undertaking and may be different for different kinds of effects caused by the undertaking." Two APEs have been identified based on activities associated with the Proposed Action: direct and indirect (e.g.,

ground disturbance and noise and vibration intrusions) and the types of resources that could be affected by these activities (Figure 2-1).

The APE for direct effects (i.e., ground-disturbing training activities), as defined in accordance with 36 C.F.R. §800.16(d), consists of 1,649.6 acres associated with the Operational Range Clearance (ORC) areas on the four Bravo (B) training ranges (B-16, B-17, B-19, and B-20) (Figures 3.9-1 through 3.9-5). The ORCs include the range targets and a radius around each target, which have been identified as the area most likely to be hit by ordnance. The clearance footprints at each target were determined through evaluation of past after-action reports, experience clearing these targets over time and current knowledge of target use and degradation. Typically, the ORC areas measure from 100 to 300 feet (ft.) from the target center. This APE includes archaeological resources, architectural resources, and Native American traditional cultural properties that could be impacted by ground disturbances from target range activities (air-to-ground delivery of both live and inert ordnance). Other types of ground disturbing activities, such as ground training, have been previously evaluated under other analyses and are incorporated by reference in the EIS; thus, they are not included in the APE for direct effects.

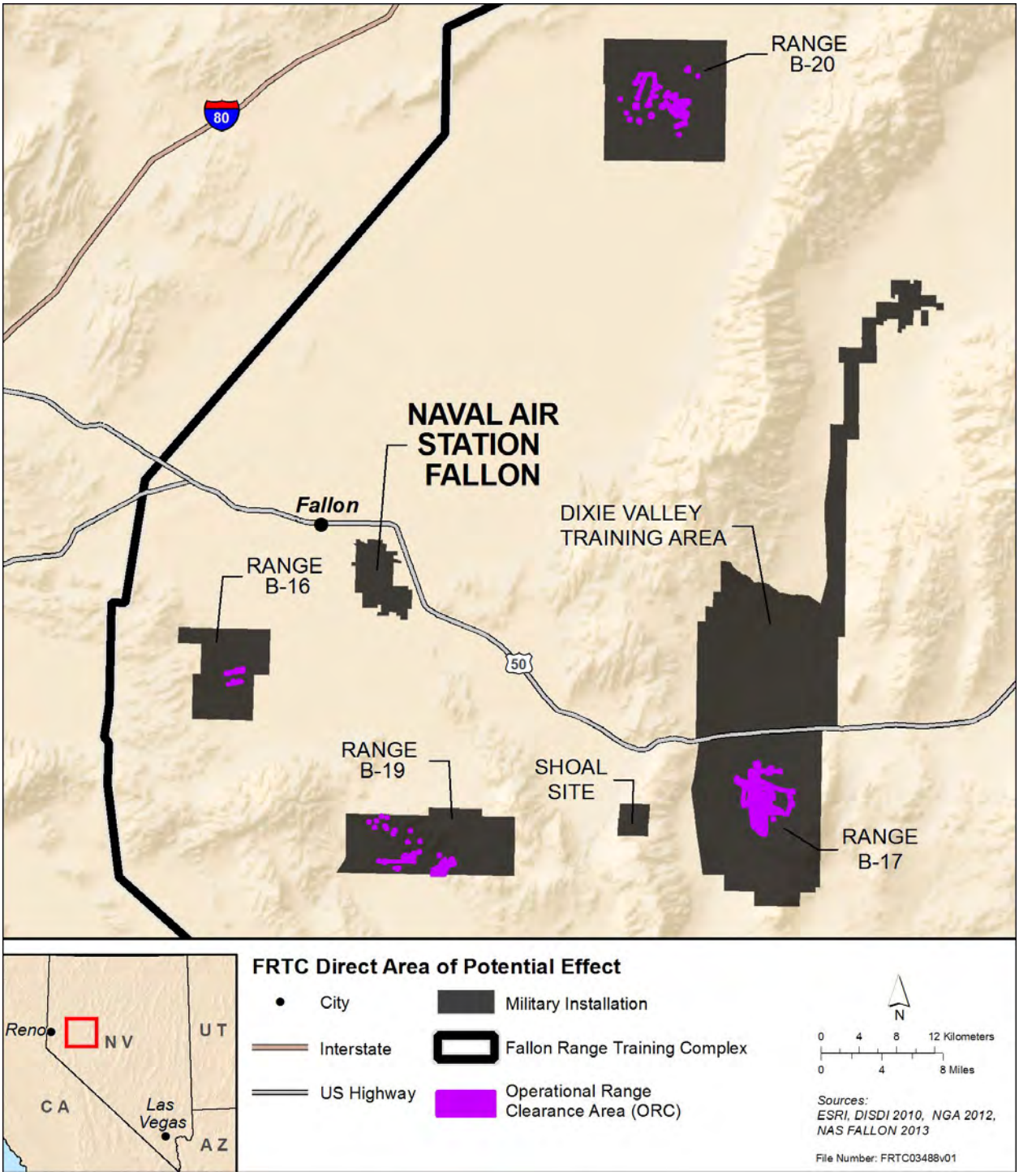


Figure 3.9-1: Overview of Areas of Potential Effects for Direct Effects

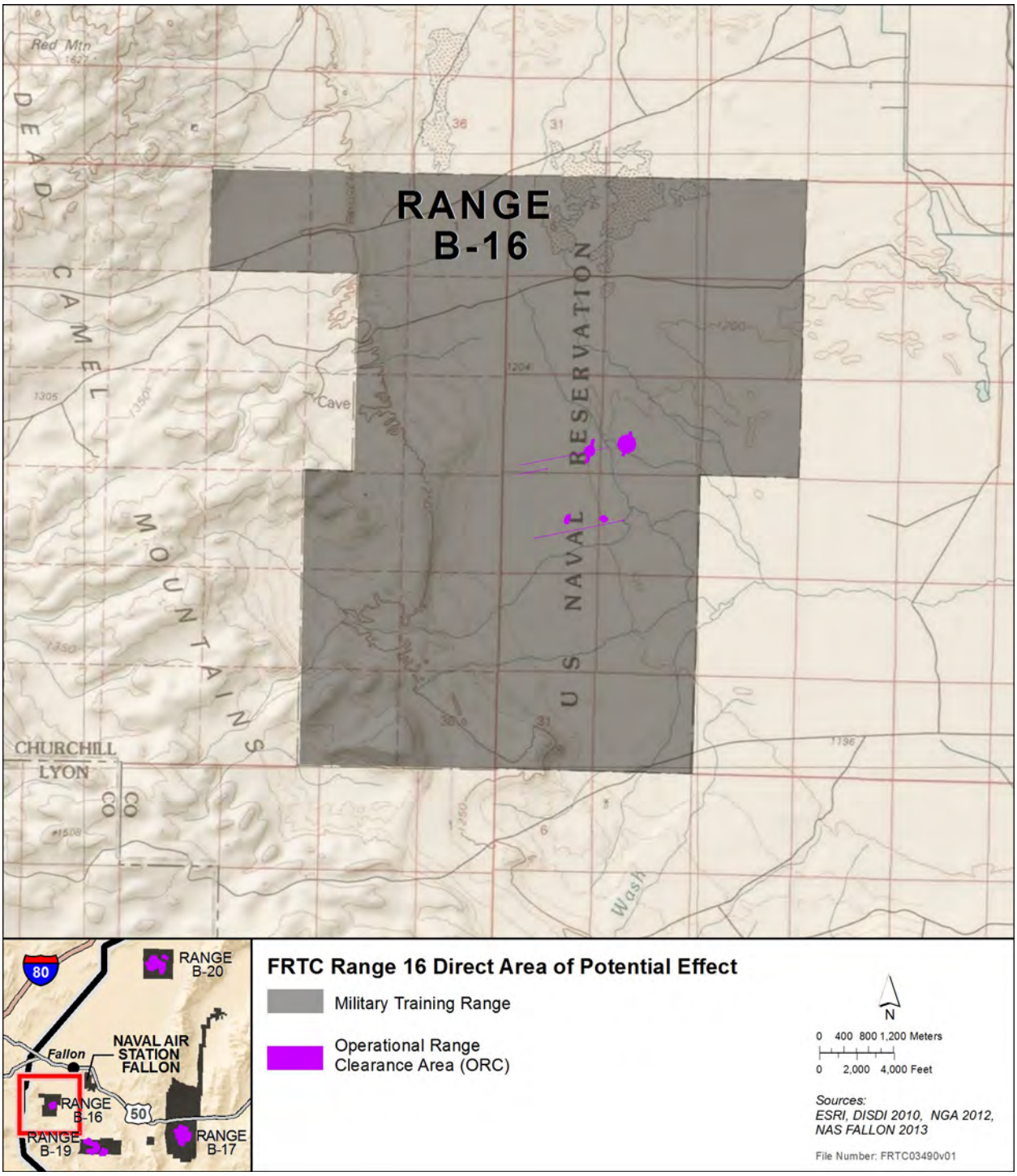


Figure 3.9-2: Area of Potential Effects for Direct Effects on B-16

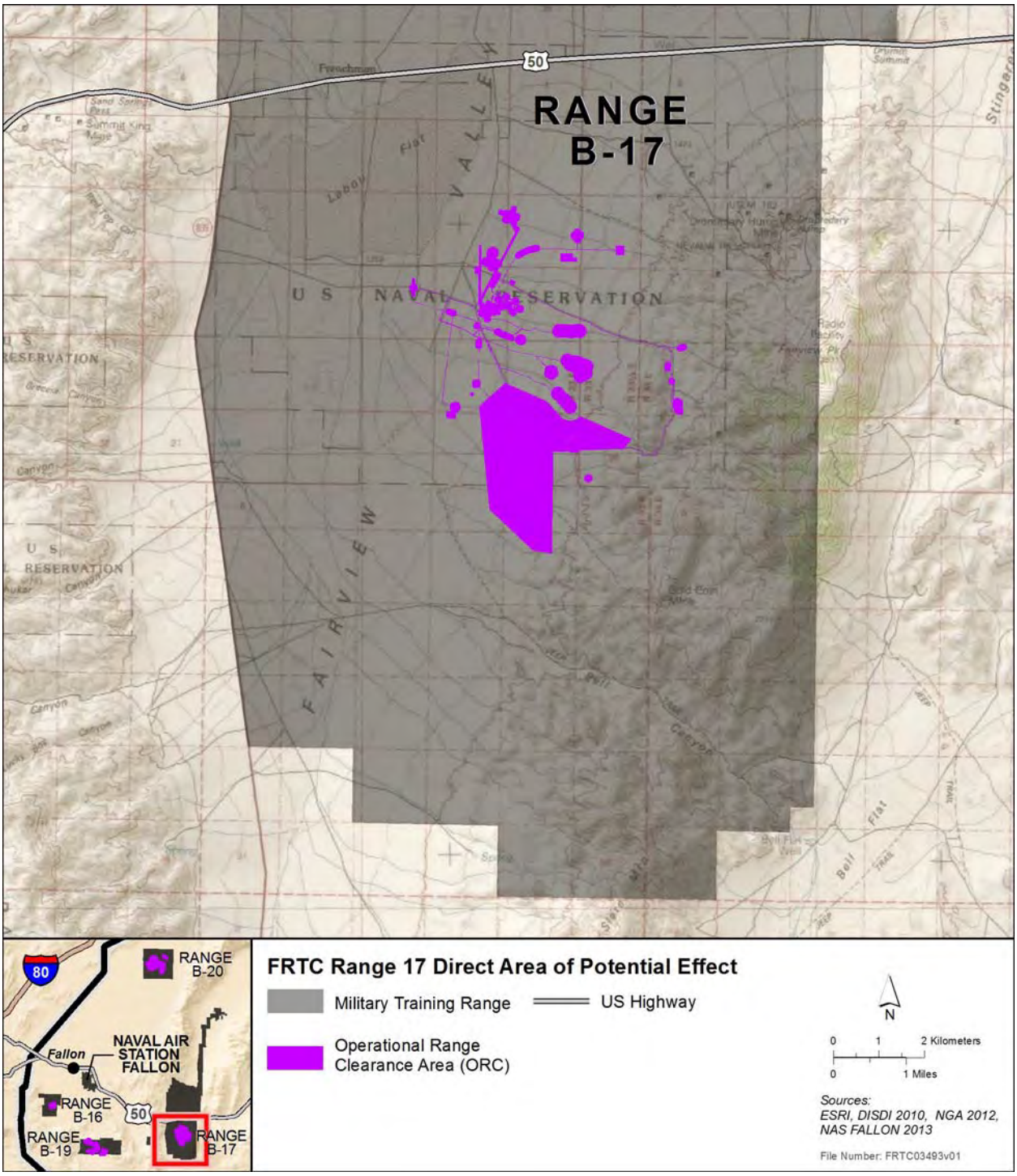


Figure 3.9-3: Area of Potential Effects for Direct Effects on B-17

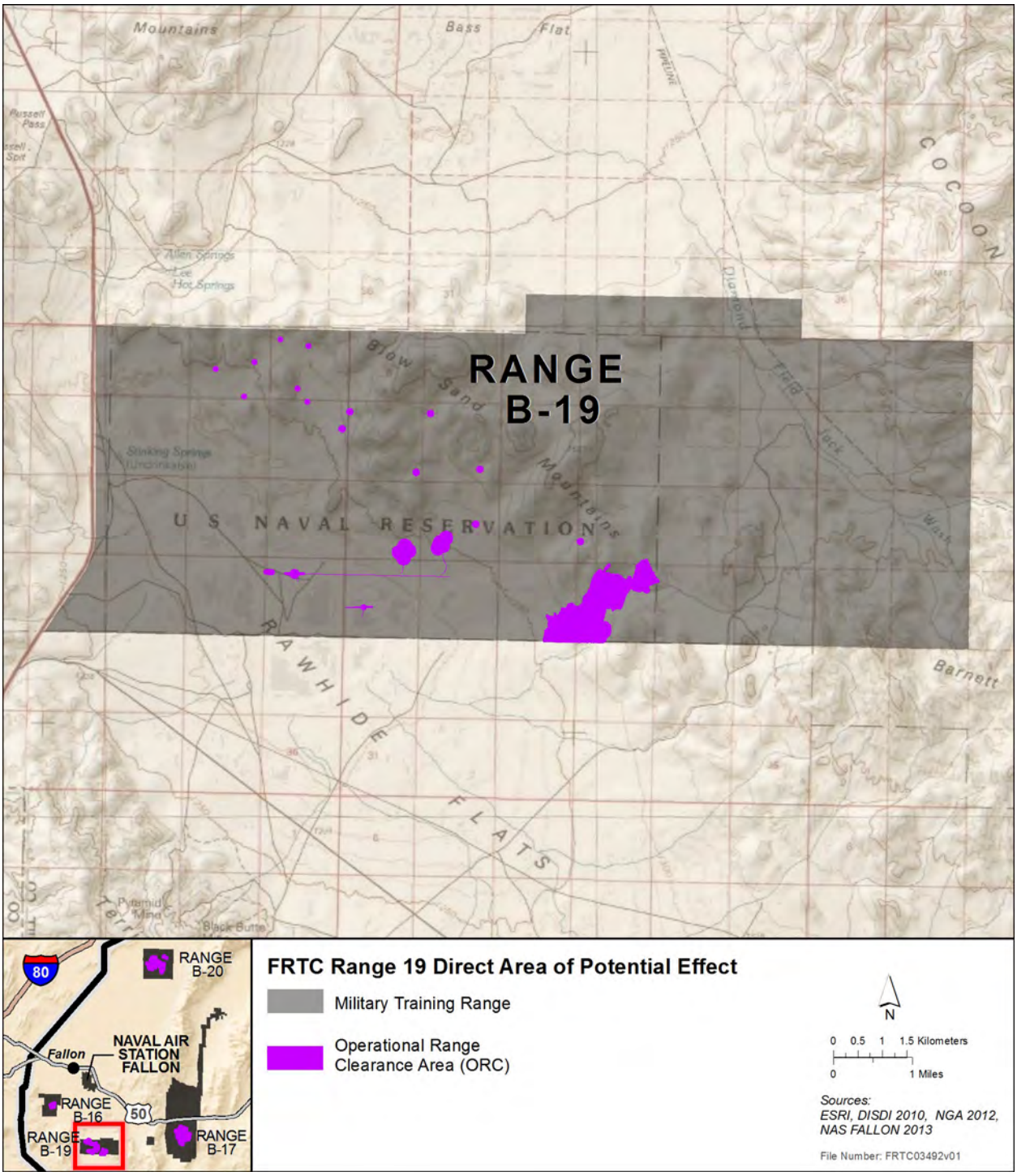


Figure 3.9-4: Area of Potential Effects for Direct Effects on B-19

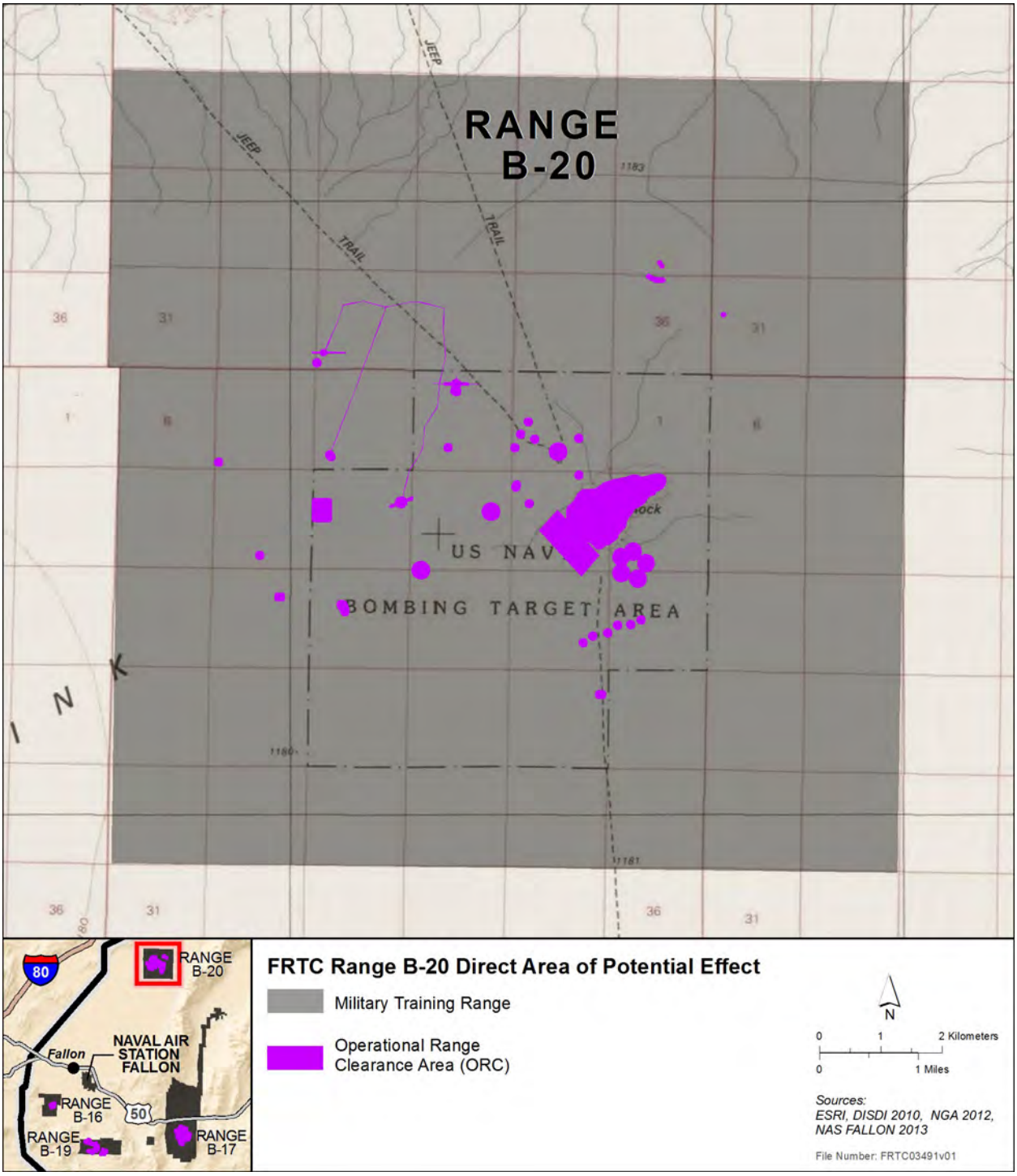


Figure 3.9-5: Area of Potential Effects for Direct Effects on B-20

The APE for indirect effects (activities that could generate noise and vibration) consists of areas that lie beneath the Supersonic Operating Area B (supersonic operations above 11,000 ft.), including private land and BLM lands (U.S. Department of the Interior, Bureau of Land Management 2013b), and within the 60 C-Weighted Day Night Level contours for ordnance activity associated with the four Bravo training ranges (B-16, B-17, B-19, and B-20) (Figure 3.9-6). The APE for noise and vibration includes

prehistoric archaeological sites with natural features (e.g., caves, rockshelters, petroglyphs or pictographs on rock faces) and historic architectural resources (e.g., adobe structures in the Dixie Valley Settlement Area, unreinforced stone structures, and mine shafts and adits [horizontal mine passages]). Supersonic Operating Area A is comprised of the entire FRTC boundary and consists of supersonic operations above 30,000 ft. Supersonic Operating Area A is not included in the APE because sonic booms created at 30,000 ft. and above would be refracted in the atmosphere and sonic overpressures that cause damage to sensitive resources would not reach the ground (Sutherland et al. 1990). The town of Austin is located beneath Supersonic Operating Area A and is not located in the APE for indirect effects.

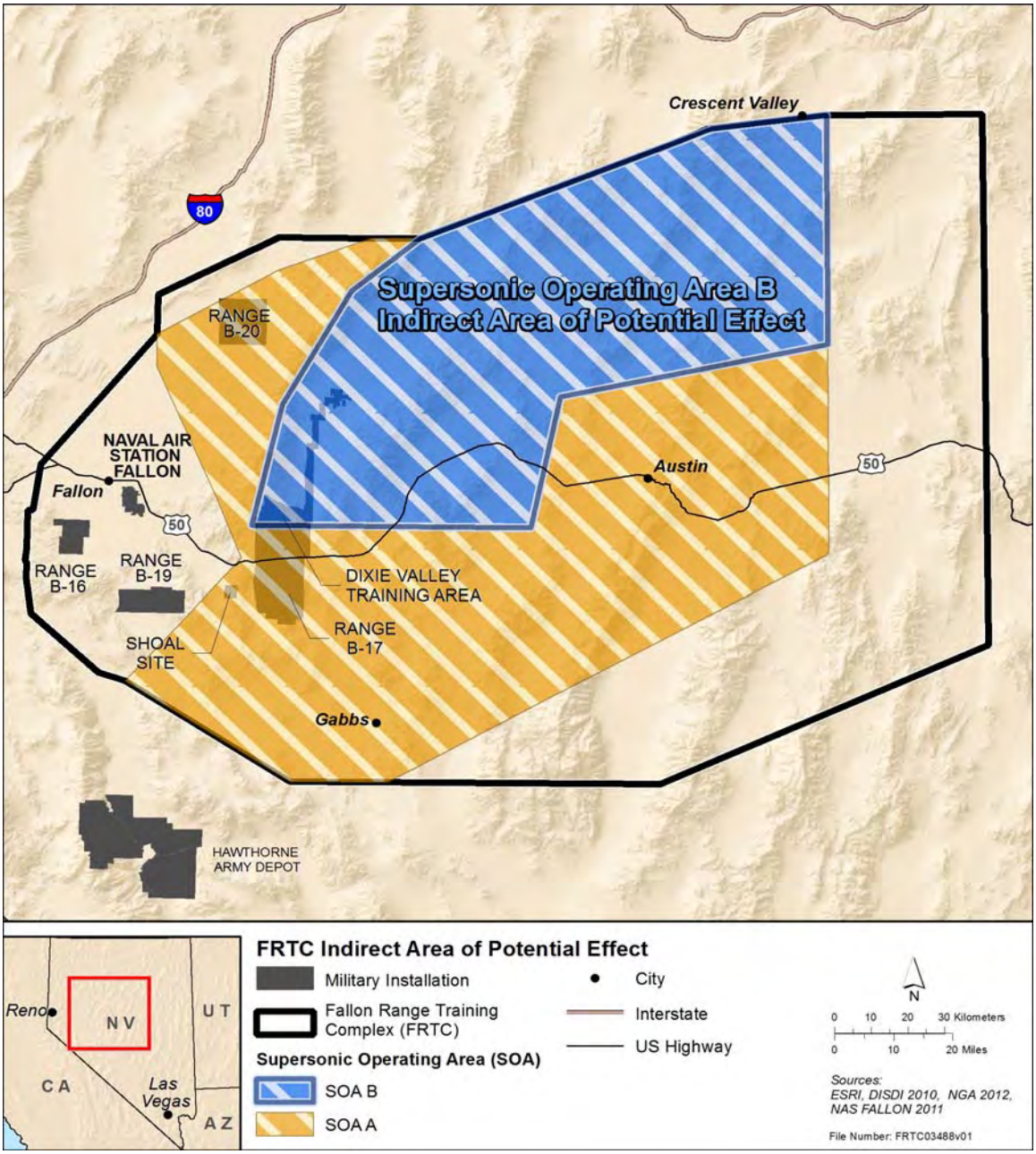


Figure 3.9-6: Area of Potential Effects for Indirect Effects

3.9.2.3 Archaeological Resources

FRTC includes 240,986 acres (ac.) (97,523 hectares [ha]) of Navy-administered land (including NAS Fallon), of which 191,714 ac. (77,584 ha) are available for archaeological inventory. Due to safety concerns, all of B-20 (41,007 acres) and the target area at B-17 (8,318 ac. [3,366 ha]) are exempt from Section 106 review per the PA with the Nevada SHPO, BLM, and the Advisory Council on Historic (Naval Air Station Fallon et al. 2011). As of August 2014, 50,094 ac. (20,272 ha) (approximately 26 percent) have been inventoried. A total of 823 archaeological sites have been recorded on Navy-administered land. Of the 823 known sites, 67 have been determined eligible for listing in the NRHP, 258 have been determined not eligible, and 498 are currently unevaluated. NAS Fallon has no sites currently listed in the NRHP. It has been estimated that 2,300 additional archaeological sites exist on the nearly 241,000 ac. (97,415 ha) at NAS Fallon and the FRTC (U.S. Department of the Navy 2013).

Prehistoric site types include open campsites, caves and rockshelters, pictographs and petroglyphs, rock alignments, quarry sites, and small camp and task sites. Four rockshelters have been recorded in B-16. Historic site types consist of homestead locations, mining-related areas, town sites, agricultural features, woodcutting and processing sites, historic refuse scatters, building and bridge foundations (e.g., the Redman Station), all of which can sometimes associated with architectural resources. Historic mine sites have been identified in B-17 and B-19 and consist of dry stacked stone structures, mine adits, shafts, and prospect pits; none of these sites have yet been inventoried or evaluated to determine NRHP eligibility. Linear historic archaeological resources in the Study Area are related to roads and transportation features including the Pony Express National Historic Trail (runs parallel to U.S. Highway 50 within the FTRC Study Area), the Overland Stage and Mail Line, the California Emigrant Trail, and the Lincoln Highway.

About 10 percent of BLM land, or less than 500,000 ac. (202,343 ha), have been inventoried for cultural resources in the BLM Carson City District, which includes land beneath the Supersonic Operating Area B. Approximately 9,000 prehistoric and historic archaeological sites have been recorded district-wide. Only two NRHP-listed resources are located near the Supersonic Operating Area B: the Grimes Point Archaeological Area and Hidden Cave, and the Sand Springs Pony Express Station (U.S. Department of the Interior, Bureau of Land Management 2013b).

3.9.2.4 Architectural Resources

The vast majority of built environment resources at NAS Fallon are military buildings and structures constructed in the years since 1942. A few scattered ranch-associated structures built by civilians before the Navy acquired the lands are located on outlying ranges and currently in poor repair. Also, some of the Truckee-Carson Irrigation District canals, built for the Newlands Project before World War II, continue in use today, bringing water to and through the Main Station (U.S. Department of the Navy 2013). The Navy manages 12 NRHP-eligible architectural resources on NAS Fallon and Dixie Valley Training Area (Table 3.9-1) (U.S. Department of the Navy 2013). The Dixie Valley Settlement Area comprises several homesteads and ranches settled between 1914 and 1940. For most of the 20th century, the ranchers in Dixie Valley formed a close-knit community, relying on each other in this very remote area of Churchill County. Despite the abandonment of nearly all of the ranches in the 1980s, a number of features continue to exist that preserve the efforts of the people in the valley. Eligible resources in Dixie Valley include the Boyer-Gilbert Ranch, the Ellis Ranch, and the Devore Homesite (Table 3.9-1).

A site files search was conducted with the Nevada SHPO, and information was compiled from BLM documents to identify architectural resources located beneath the Supersonic Operating Area B and

considered eligible for listing on the NRHP (U.S. Department of the Interior, Bureau of Land Management 2013b). The 12 architectural resources identified in the site files search include historic districts and sites with collapsing and ruined buildings or structures that are visible on or above the present ground surface (Table 3.9-1). Most of these sites occur in and around areas of modern or abandoned towns, mines, and ranches (U.S. Department of the Interior, Bureau of Land Management 2013b). The Tenabo Townsite Historic District consists of 65 ac. (26 ha) with nine contributing elements and two non-contributing elements. The contributing elements include five wood frame buildings (two stores and three residences) and four structures (three wood frame and earthen root cellars and one wood headframe). Tenabo was an active lode and place mining town between 1906 and 1912 with some mining activity in the 1920s. Nine buildings and structures are associated with the town of Cortez, another small mining town occupied between 1885 and the 1910s.

Table 3.9-1: NRHP Eligible Architectural Resources in the Study Area

Building/Site Number	Name	Location	Date of Construction	Description
	Newlands Reclamation Thematic Resource (NRTR)	NAS Fallon	Pre-1941	Canals, drains and other features of the irrigation system within the Truckee-Carson Irrigation District
4	Hangar 7	NAS Fallon	1944	Naval Auxiliary Air Station Fallon
95	Aircraft Beacon	NAS Fallon	1944	Naval Auxiliary Air Station Fallon
96	Aircraft Beacon Vault	NAS Fallon	1944	Naval Auxiliary Air Station Fallon
800	Radar Air Traffic Control Center (RATCC) Building	NAS Fallon	1961	Contributing element to the complex of buildings/structures associated with the Fallon Air Force Base, Semi Automatic Ground Environment Back Up Interceptor Control (SAGE BUIC) 1962–1975
801	Guard House	NAS Fallon	1961	Contributing element to the complex of buildings/structures associated with the Fallon Air Force Base, Semi Automatic Ground Environment Back Up Interceptor Control (SAGE BUIC) 1962
804	Radar Tower	NAS Fallon	1961	Contributing element to the complex of buildings/structures associated with the Fallon Air Force Base, Semi Automatic Ground Environment Back Up Interceptor Control (SAGE BUIC) 1962
806	Power Plant	NAS Fallon	1961	Contributing element to the complex of buildings/structures associated with the Fallon Air Force Base, Semi Automatic Ground Environment Back Up Interceptor Control (SAGE BUIC) 1962
26Ch1012	Boyer-Gilbert Ranch	Lamb Parcel	1860s	Gilbert Storeroom and Gilbert Root Cellar associated with the historic archaeological deposits

Table 3.9-1: NRHP Eligible Architectural Resources in the Study Area (continued)

Building/Site Number	Name	Location	Date of Construction	Description
26Ch2179	Devore Homesite (formerly part of Ellis Ranch)	Dixie Valley Training Area	1920s	Eroded adobe structure and small adobe food cellar associated with the historic archaeological deposits
26Ch2180	Ellis Ranch	Dixie Valley Training Area	1920s	Structural remains associated with the historic archaeological deposits
26Ch2183	Spencer-Derrick Homestead	Dixie Valley Training Area	1920s	Semi-subterranean food storage building with stone foundation associated with the historic archaeological deposits
D142	Tenabo Townsite Historic District	Beneath Supersonic Operating Area B	1907–1950s	Nine contributing elements (five wood frame buildings consisting of two stores and three residences, four structures including three wood frame and earthen root cellars and a wood headframe) and two non-contributing elements
C40	Carico Lake Ranch Bunkhouse	Beneath Supersonic Operating Area B	1941–1942	Wood frame building (adjacent adobe structure)
C41	Carico Lake Ranch Cellar	Beneath Supersonic Operating Area B	1890s	Stone cellar located under bunkhouse
26EU2621	Lime Kiln	Beneath Supersonic Operating Area B	1885	Top-loading lime kiln; contributing element to the Cortez Historic District
26LA1314	Dwelling A	Beneath Supersonic Operating Area B	1900	Wood frame and eroded adobe building; contributing element to the Cortez Historic District
26LA1314	Dwelling B	Beneath Supersonic Operating Area B	1900	Adobe walled building with stone foundation; contributing element to the Cortez Historic District
26LA1314	Dwelling C	Beneath Supersonic Operating Area B	1900	Adobe walled building with stone foundation; contributing element to the Cortez Historic District
26LA1314	Dwelling D	Beneath Supersonic Operating Area B	1890	Wood frame building; contributing element to the Cortez Historic District

Table 3.9-1: NRHP Eligible Architectural Resources in the Study Area (continued)

Building/Site Number	Name	Location	Date of Construction	Description
26LA1314	Dwelling E	Beneath Supersonic Operating Area B	1910	Wood frame building; contributing element to the Cortez Historic District
26LA1314	Dwelling F	Beneath Supersonic Operating Area B	1890	Wood frame building; contributing element to the Cortez Historic District
26LA1314	Dwelling G (Cortez Company Store/Boarding House/Office Storage Room/ Warehouse	Beneath Supersonic Operating Area B	1890	Stone building; contributing element to the Cortez Historic District
26LA1314	Dwelling H	Beneath Supersonic Operating Area B	1900	Adobe building with stone foundation; contributing element to the Cortez Historic District

3.9.2.5 Native American Resources

Traditional cultural properties are locations that have cultural or religious value to contemporary Native Americans and that are determined to be eligible for the NRHP. They include some prehistoric and historic archeological sites (especially those with cemeteries), locations of harvestable resources, and spiritual locations that lack physical artifacts. While Native American burial sites have been discovered at NAS Fallon, no non-archaeological traditional cultural properties have been identified at this time (U.S. Department of the Navy 2013).

The Fallon Paiute-Shoshone, the Walker River Paiute, and the Yomba Paiute tribes have land or utilize resources within the FRTC Study Area (U.S. Department of the Navy and U.S. Department of the Interior, Bureau of Land Management 2001). During previous consultation and discussions with the tribes for the Resource Management Plan for certain federal lands in Churchill County, sensitive areas having religious or cultural importance have been identified (U.S. Department of the Navy and U.S. Department of the Interior, Bureau of Land Management 2001). Resource types include mountain peaks, springs, plant resources, and pinyon stands. Numerous other religious or sacred sites are present, but these areas have not been identified to the land managing agencies.

In 1991, the Navy signed a MOU with the Fallon Paiute-Shoshone Tribes regarding Native American burials and materials found within the FRTC Study Area (Naval Air Station Fallon et al. 1991). This MOU was developed in accordance with requirements established under NAGPRA and includes procedures for the notification, excavation, and removal of human remains and objects of cultural patrimony, interim curation and scientific analyses, and reinterment. In 2005, the Navy also signed a Memorandum of Agreement with the Walker River Paiute Tribe for the safe removal of munitions found on tribal lands.

Potentially affected tribes were invited by the Navy to participate in the NEPA process for this EIS. The following groups were notified on May 16, 2013 (Appendix C) about the Proposed Action through

mailings and invited to provide information on Native American concerns and traditional cultural properties: Duckwater Shoshone Tribe, Fallon Paiute-Shoshone Tribe, Inter-Tribal Council of Nevada, Pyramid Lake Paiute Tribe, Te-Moak Tribe, Walker River Paiute Tribe, Yerington Paiute Tribe, and Yomba Shoshone Tribe. In accordance with Executive Order (EO) 13175; Presidential Memorandum dated April 29, 1994; Department of Defense (DoD) American Indian and Alaska Native Policy; and Section 106 of the NHPA, the Navy will be continuing consultation for this project with the Duckwater Shoshone Tribe, Fallon Paiute-Shoshone Tribe, Inter-Tribal Council of Nevada, Pyramid Lake Paiute Tribe, Te-Moak Tribe, Walker River Paiute Tribe, Yerington Paiute Tribe, and Yomba Shoshone Tribe.

In the Carson City District Resource Management Plan Revision and associated Draft EIS, the BLM has proposed two areas of critical environmental concern (ACEC) near or beneath the Supersonic Operating Area B that contain sensitive Native American resources: Fox Peak and Greater Sand Mountain. The Fox Peak ACEC is located in the Stillwater Mountain Range and includes the Stillwater Marsh area; this ACEC occurs beneath the Supersonic Operating Area B on the west side. This proposed Fox Peak ACEC is important to the Fallon Paiute-Shoshone Tribe because the area is associated with local creation stories, contains habitation sites with burials, and is a traditional procurement area for animals and plants for food, medicine, and basketry (U.S. Department of the Interior, Bureau of Land Management 2013a). The Greater Sand Mountain ACEC is located immediately south of the Supersonic Operating Area B. In addition to prehistoric and historic archaeological sites (of which 60 of 104 are considered eligible for listing on the NRHP) and presence of an important prehistoric transportation route, Sand Mountain is considered sacred by the Fallon Paiute-Shoshone Tribe (U.S. Department of the Interior, Bureau of Land Management 2013a).

3.9.3 ENVIRONMENTAL CONSEQUENCES

This section evaluates how and to what degree the activities described in Chapter 2 (Description of Proposed Action and Alternatives) could impact cultural resources within the Study Area. The analysis focuses on potential impacts and overall changes as they relate to cultural resources associated with implementation of all current and proposed military readiness activities and proposed range enhancements at the FRTC Study Area. Table 2-4 presents the baseline and proposed training activities for each alternative. Each cultural resource stressor is introduced and then analyzed by alternative. Table 3.0-2 shows the warfare areas and associated stressors that were considered for analysis. The stressors vary in intensity, frequency, duration, and location within the Study Area. The primary stressors applicable to cultural resources in the Study Area and that are analyzed include the following:

- Noise and Vibration
- Physical Disturbance

Several studies have been conducted on the effects of subsonic aircraft overflights on fragile cultural resources such as caves and rockshelters associated with archaeological sites, rock faces containing petroglyphs and pictographs, adobe and unreinforced stone structures, and mine shafts and adits (Battis 1988, Hanson et al. 1991). Noise vibration studies indicate that, with the exception of heavy helicopters (studied at 50 ft. above ground level), subsonic aircraft overflights do not generate sufficient vibrations to cause physical damage to these types of cultural resources. Therefore, vibration associated with subsonic overflights will not be analyzed further for cultural resources.

Impulsive noise, such as that resulting from supersonic overflights (sonic booms) and ordnance detonations, create intense shock waves that cause airborne vibration. This repeated vibration, over time, has the potential to degrade or destroy sensitive structural or cultural elements such as caves,

rockshelters, rock faces containing petroglyphs and pictographs, adobe structures, and mine shafts and adits.

Supersonic overflights create sonic booms, which are caused by aircraft (or ordnance) moving faster than the speed of sound (approximately 750 miles per hour [mph] at sea level). The duration of a sonic boom is brief, less than a second (100 milliseconds or 0.100 seconds), for most fighter-sized aircraft. Several factors influence sonic booms: weight, size, and shape of aircraft or vehicle; altitude; flight paths; and atmospheric conditions. A larger and heavier aircraft must displace more air and create more lift to sustain flight, compared with small, light aircraft. Therefore, larger aircraft create sonic booms that are stronger and louder than those of smaller, lighter aircraft. Increasing altitude is the most effective method of reducing sonic boom intensity. For straight and level flight, the width of the boom area (referred to as "carpet boom") exposed to a sonic boom beneath an aircraft is about 1 mile for each 1,000 ft. of altitude. For example, an aircraft flying supersonic straight and level at 50,000 ft. can produce a sonic boom carpet about 50 miles wide. Maximum intensity is directly beneath the aircraft, and decreases as the lateral distance from the flight path increases until shock waves refract away from the ground and the sonic boom attenuates.

A study of the effects of supersonic overflights (including Air Combat Maneuver flight training activities) on unconventional structures such as historic adobe, brick, masonry/stone, and wood buildings; adobe and masonry/stone prehistoric structures; caves; and rock formations was conducted from 1988 to 1990 by Wyle Laboratories for the Human Systems Division, Noise and Sonic Boom Impact Technology Program at Wright-Patterson Air Force Base (Sutherland et al. 1990) and based on concerns related to five Supersonic Operating Areas, including the Fallon Supersonic Operating Areas. The study reviewed existing literature on damage prediction and assessment techniques for structures, provided a statistical model for sonic boom overpressures, developed an analytical model to predict probability of damage, implemented an experimental program to test the predictive model, and defined algorithms for a computer program. Probabilities of damage per day for an average of 500 sorties per month (6,000 sorties a year) by structure type were generated, and percentages of a damage event occurring on any one given day were developed (Sutherland et al. 1990). Damage to caves, rockshelters, rock formations containing petroglyphs, and adobe or stone structures with no roofs ranged from 0.1 to 1 percent on any given day; damage to adobe walls ranged from 0.01 to 0.1 percent on any given day (Sutherland et al. 1990).

Vibration effects from sonic booms created during supersonic flight operations in Supersonic Operating Area A are not included in this analysis. Based on the study conducted from 1988 to 1990 by Wyle Laboratories for the Human Systems Division, Noise and Sonic Boom Impact Technology Program at Wright-Patterson Air Force Base (Sutherland et al. 1990), at higher altitudes, such as 30,000 ft. and above, creation of sonic booms in the atmosphere reaches a lateral cut-off point where refraction prevents the sonic boom from reaching the ground, and these sonic booms are less likely to create overpressures that would affect unconventional structures.

A study on the effects of impulsive noise generated from artillery and tank gun firing and explosive ordnance disposal activities on modern structures, conducted by Wyle, LCS Acoustics, and the U.S. Army-ERDC for the Department of Defense Strategic Environmental Research and Development Program, used field measurements and monitoring to generate a predictive model and guidelines for probability of damage to structural elements (Plotkin et al. 2012). Variations in effects are based on distance to source, quantity of explosive, and type of structural elements (Plotkin et al. 2012).

The stressors analyzed for archaeological sites are noise and vibration from supersonic aircraft overflights and ordnance detonations, and physical disturbances caused by ground-disturbing activities that may occur during training and range maintenance. Sonic booms and ordnance detonations have the potential to cause structural instability in sensitive topographic features associated with archaeological sites such as caves, rockshelters, and rock faces containing petroglyphs or pictographs. Archaeological sites can potentially be impacted from air and ground training activities. Use of live ordnance can affect the integrity of cultural remains both on the surface and below ground. Physical disturbance also occurs during some training exercises in the form of foot and vehicle traffic, increasing the likelihood of artifact-collecting activities and disturbance. Ground-disturbing activities in the area of an archaeological site eligible for the NRHP, or modification to such a site, can affect the physical integrity of that cultural resource, resulting in alteration or destruction of those characteristics or qualities that make it eligible for inclusion in the NRHP.

The stressors analyzed for architectural resources are vibrations associated with sonic booms from supersonic aircraft overflights and ordnance detonations. Physical disturbance such as building demolition or physical alterations to existing historic structures are not included in any of the alternatives. Vibrations have the potential to cause structural instability in sensitive historic structures such as adobe and unreinforced stone buildings, and mine shafts and adits. Any noise impacts resulting in alteration or destruction of architectural traits can affect the integrity of an architectural resource eligible for the NRHP, diminishing those characteristics or qualities that make it eligible for inclusion in the NRHP.

The potential impacts to Native American resources include physical disturbance and noise from overflights and ordnance detonations that may result in loss of integrity, character, or feeling of the resource, resulting in a loss of cultural continuity. Types of training activities that could cause physical disturbance to Native American resources would be the same as those described above for archaeological resources (i.e., live ordnance, as well as foot and vehicle traffic). Such disturbances could damage contributing characteristics of traditional cultural properties. Permanent, intermittent intrusions during training activities from aircraft overflights, vehicle operation, weapons firing, and explosive ordnance detonations may disrupt the audio landscape of Native American traditional cultural properties, which may require natural quiet. Any ground-disturbing action or audio in the area of a Native American traditional cultural property can affect the physical integrity of that cultural resource, resulting in alteration or destruction of the special Native American quality (sacredness) of the resource.

Any physical disturbance of a NRHP-listed or NRHP-eligible cultural resource, or modification to such a resource, can result in alteration or destruction of those characteristics or qualities that make it eligible for inclusion in the NRHP and, thus, would be an adverse effect under Section 106 of the NHPA. If unresolved by the Section 106 process, such adverse effects would be considered a significant impact under the NEPA process.

3.9.3.1 No Action Alternative

3.9.3.1.1 Noise and Vibration

Archaeological Resources

Under the No Action Alternative, existing training activities in the FRTC Study Area would continue at current levels in existing locations. Existing activities that could produce vibrations include supersonic aircraft overflights in Supersonic Operating Area B and detonation of high explosive ordnance on B-16, B-17, B-19, and B-20. Most supersonic flights occur during adversarial training simulating air-to-air

combat situations during Anti-Air Warfare and Large Force Exercises. An estimated 458 supersonic events would occur during the busiest month under the No Action Alternative (Appendix E, Noise Study). Explosive ordnance is not fired or dropped on B-16, but Explosive Ordnance Disposal (EOD) activities and Land Demolitions may occur there. Primary sources of vibrations on B-17, B-19, and B-20 include live bombs with higher net explosive weights (e.g., GBU-12, GBU-13, GBU-16, GBU-32, MK-82, MK-83, MK-84, and BLU-111), AGM-114 Hellfire Missiles, EOD, and Land Demolitions.

The current level of supersonic events (458 during busiest month) is within the parameters (500 supersonic sorties per month or 6,000 sorties per year) defined by Sutherland et al. (1990) as creating negligible to minor damage to caves, rockshelters, or rock formations containing petroglyphs (probability of damage ranging from 0.1 to 1 percent on any given day). The four rockshelters in B-16 and the historic mines sites in B-17 and B-19 are located away from the target areas, and any vibration from ordnance detonation is disrupted by intervening topographic features. Although vibrations from sonic booms have the potential to cause structural instability in sensitive natural features associated with archaeological sites located under the G:\PROJECTS\Navy\EIS FRTC\003_DEIS\004_Version 3\08_SUBMITTAL\00_WORD VERSION\copied by Matt Supersonic Operating Area B (e.g., caves, rockshelters, and rock faces containing petroglyphs and pictographs), procedures are in place for the identification, evaluation, and protection of such resources as defined in the PA (Naval Air Station Fallon et al. 2011). NAS Fallon employs one full-time cultural resource manager who regularly monitors the condition of such resources. Archaeological sites would continue to be managed in accordance with current federal law, Navy policy, the PA, and the ICRMP (U.S. Department of the Navy 2013).

Architectural Resources

Under the No Action Alternative, existing training activities in the FRTC would continue at current levels in existing locations. The current level of supersonic events (458 during busiest month) is within the parameters (500 supersonic sorties per month or 6,000 sorties per year) defined by Sutherland et al. (1990) as creating negligible to minor damage to adobe or stone structures with no roofs (probability of damage ranging from 0.1 to 1 percent on any given day) and negligible damage to adobe walls (probability of damage ranging from 0.01 to 0.1 percent on any given day). No architectural resources sensitive to vibration effects are located within B-16, B-17, B-19, or B-20. Although vibrations from sonic booms have the potential to cause degradation of sensitive historic resources (Sutherland et al. 1990) such as adobe structures in the Dixie Valley Settlement Area and mine shafts and adits under the Supersonic Operating Area B, procedures are in place for the identification, evaluation, and protection of such resources as defined in the PA (Naval Air Station Fallon et al. 2011). NAS Fallon employs one full-time cultural resource manager who regularly monitors the condition of such resources. Architectural resources would continue to be managed in accordance with current federal law, Navy policy, the PA (Naval Air Station Fallon et al. 2011), and the ICRMP (U.S. Department of the Navy 2013).

Native American Resources

Under the No Action Alternative, existing training activities in the FRTC would continue at current levels in existing locations. Native American resources would continue to be managed in accordance with current federal law, Navy policy, the PA (Naval Air Station Fallon et al. 2011), and the ICRMP (U.S. Department of the Navy 2013).

3.9.3.1.2 Physical Disturbance

Archaeological Resources

Under the No Action Alternative, existing training activities in the FRTC Study Area would continue at current levels in existing locations. Continued use of high explosives at designated target areas within the training ranges that have been used historically for this purpose are not considered a source of new ground disturbance as the areas have been previously disturbed and intact archaeological sites will not occur. This particular activity is exempt from Section 106 review in accordance with the PA Appendix 4 (Naval Air Station Fallon et al. 2011). Protective measures for NRHP-eligible cultural resources located in existing ground-based training areas have been previously implemented in accordance with the PA and the ICRMP. NAS Fallon employs one full-time cultural resource manager who regularly monitors the condition of such resources. Cultural resources would continue to be managed in accordance with current federal law, Navy policy, the PA (Naval Air Station Fallon et al. 2011), and the ICRMP (U.S. Department of the Navy 2013).

Architectural Resources

Under the No Action Alternative, existing training activities in the FRTC Study Area would continue at current levels at existing locations. No demolitions or alterations to structures eligible for or listed in the NRHP would occur. Architectural resources would continue to be managed in accordance with current federal law, Navy policy, the PA (Naval Air Station Fallon et al. 2011), and the ICRMP (U.S. Department of the Navy 2013). NAS Fallon employs one full-time cultural resource manager who regularly monitors the condition of such resources. Therefore, no architectural resources would be impacted by physical disturbance resulting from existing training activities under the No Action Alternative.

Native American Resources

Under the No Action Alternative, existing training activities in the FRTC Study Area would continue at current levels at existing locations. Native American resources would continue to be managed in accordance with current federal law, Navy policy, the PA (Naval Air Station Fallon et al. 2011), and the ICRMP (U.S. Department of the Navy 2013).

3.9.3.2 Alternative 1

3.9.3.2.1 Noise and Vibration

Archeological Resources

Under Alternative 1, training activities in the FRTC Study Area would be enhanced through introduction of new platforms and an overall increase in tempo. However, there would be no change in Anti-Air Warfare or Large Force Exercises under Alternative 1, and the estimated supersonic events during busiest month would remain at 458 (Appendix E, Noise Study). Vibrations associated with sonic booms under Alternative 1 would be the same as the No Action Alternative. The only changes in ordnance detonations under Alternative 1 would be increases in AGM-114 Hellfire Missiles fired on B-17 (25 to 44 per year), B-19 (17 to 23 per year), and B-20 (5 to 12 per year). The historic mines sites in B-17 and B-19 are located away from the target areas, and any vibration from ordnance detonations is disrupted by intervening topographic features. Although vibrations from sonic booms have the potential to cause structural instability in sensitive natural features associated with archaeological sites located under the Supersonic Operating Area B (e.g., caves, rockshelters, and rock faces containing petroglyphs and pictographs), procedures are in place for the identification, evaluation, and protection of such resources as defined in the PA (Naval Air Station Fallon et al. 2011). NAS Fallon employs one full-time cultural resource manager who regularly monitors the condition of such resources. Archaeological sites would

continue to be managed in accordance with current federal law, Navy policy, the PA, and the ICRMP (U.S. Department of the Navy 2013) under Alternative 1.

Architectural Resources

Under Alternative 1, training activities in the FRTC Study Area would be enhanced through introduction of new platforms and an overall increase in tempo. However, there would be no change in Anti-Air Warfare or Large Force Exercises under Alternative 1, and the estimated supersonic events during the busiest month would remain at 458 (Appendix E, Noise Study). Vibrations associated with sonic booms under Alternative 1 would be the same as the No Action Alternative. No architectural resources sensitive to vibration effects are located within B-16, B-17, B-19 or B-20. Although vibrations associated with sonic booms have the potential to cause structural instability in sensitive historic resources (Sutherland et al. 1990) such as adobe structures in the Dixie Valley Settlement Area and mine shafts and adits under the Supersonic Operating Area B, procedures are in place for the identification, evaluation, and protection of such resources as defined in the PA (Naval Air Station Fallon et al. 2011). Architectural resources would continue to be managed in accordance with current federal law, Navy policy, the PA (Naval Air Station Fallon et al. 2011), and the ICRMP (U.S. Department of the Navy 2013) under Alternative 1.

Native American Resources

Under Alternative 1, training activities in the FRTC Study Area would be enhanced through introduction of new platforms and an overall increase in tempo. In accordance with EO 13175; Presidential Memorandum dated April 29, 1994; DoD American Indian and Alaska Native Policy; and Section 106 of the National Historic Preservation Act, the Navy will be continuing consultation for this project with the Duckwater Shoshone Tribe, Fallon Paiute-Shoshone Tribe, Inter-Tribal Council of Nevada, Pyramid Lake Paiute Tribe, Te-Moak Tribe, Walker River Paiute Tribe, Yerington Paiute Tribe, and Yomba Shoshone Tribe. The Navy, in consultation with these Indian Tribes, will identify traditional cultural properties in the FRTC Study Area, assess potential noise and visual impacts to such resources, and develop mitigations as appropriate.

3.9.3.2.2 Physical Disturbance

Archeological Resources

Under Alternative 1, training activities in the FRTC Study Area would be enhanced through introduction of new platforms and an overall increase in tempo. Continued use of high explosives at designated target areas within the training ranges that have been used historically for this purpose are not considered a source of new ground disturbance as the areas have been previously disturbed and intact archaeological sites will not occur. This particular activity is exempt from Section 106 review in accordance with the PA Appendix 4 (Naval Air Station Fallon et al. 2011). Ground-based training activities would continue to occur at existing locations. Protective measures for NRHP-eligible cultural resources located in these training areas have been previously implemented in accordance with the PA (Naval Air Station Fallon et al. 2011) and the ICRMP (U.S. Department of the Navy 2013). NAS Fallon employs one full-time cultural resource manager who regularly monitors the condition of such resources.

Architectural Resources

Under Alternative 1, training activities in the FRTC Study Area would be enhanced through introduction of new platforms and an overall increase in tempo. No demolitions or alterations to structures eligible

for or listed in the NRHP are included in this alternative. No NRHP-eligible architectural resources would be impacted by physical disturbance resulting from training activities under Alternative 1.

Native American Resources

Under Alternative 1, training activities in the FRTC Study Area would be enhanced through introduction of new platforms and an overall increase in tempo. In accordance with EO 13175; Presidential Memorandum dated April 29, 1994; DoD American Indian and Alaska Native Policy; and Section 106 of the National Historic Preservation Act, the Navy will be continuing consultation for this project with the Duckwater Shoshone Tribe, Fallon Paiute-Shoshone Tribe, Inter-Tribal Council of Nevada, Pyramid Lake Paiute Tribe, Te-Moak Tribe, Walker River Paiute Tribe, Yerington Paiute Tribe, and Yomba Shoshone Tribe. The Navy, in consultation with these Indian Tribes, will identify traditional cultural properties in the FRTC Study Area, assess potential impacts from physical disturbance to such resources, and develop mitigations as appropriate.

3.9.3.3 Alternative 2 (Preferred Alternative)

3.9.3.3.1 Noise and Vibration

Archaeological Resources

Under Alternative 2, training activities in the FRTC Study Area would be the same as discussed under Alternative 1 but would include an additional increase of 10 percent in training tempo compared to Alternative 1. Anti-Air Warfare and Large Force Exercises would increase under Alternative 2. The estimated number of supersonic events during the busiest month would increase from 458 under the No Action Alternative and Alternative 1 to 503 under the Alternative 2 (Appendix E, Noise Study). High explosive ordnance detonations on B-16 (EOD and Land Demolitions only), B-17, B-19, and B-20 would increase by about 10 percent per year relative to the No Action Alternative and Alternative 1.

The estimated 502 supersonic events during the busiest month is slightly above the parameters (500 supersonic sorties per month or 6,000 sorties per year) defined by Sutherland et al. (1990) as creating negligible to minor damage to caves, rockshelters, or rock formations containing petroglyphs (probability of damage ranging from 0.1 to 1 percent on any given day). The four rockshelters in B-16 and the historic mines sites in B-17 and B-19 are located away from the target areas, and any vibration from ordnance detonations is disrupted by intervening topographic features. Although increased vibrations from sonic booms have the potential to cause structural instability in sensitive natural features associated with archaeological sites located under the Supersonic Operating Area B (e.g., caves, rockshelters, and rock faces containing petroglyphs and pictographs) (National Bureau of Standards 1971; Sutherland et al. 1990), procedures are in place for the identification, evaluation, and protection of such resources as defined in the PA (Naval Air Station Fallon et al. 2011). NAS Fallon employs one full-time cultural resource manager who regularly monitors the condition of such resources. Archaeological sites would continue to be managed in accordance with current federal law, Navy policy, the PA (Naval Air Station Fallon et al. 2011), and the ICRMP (U.S. Department of the Navy 2013) under Alternative 2.

Architectural Resources

Under Alternative 2, training activities in the FRTC Study Area would be the same as discussed under Alternative 1 but would include an additional increase of 10 percent in training tempo compared to Alternative 1. The estimated number supersonic events during the busiest month would increase from 458 under the No Action Alternative and Alternative 1 to 503 under the Alternative 2 (Appendix E, Noise Study), which is slightly above the parameters (500 supersonic sorties per month or 6,000 sorties per

year) defined by Sutherland et al. (1990) as creating negligible to minor damage to adobe or stone structures with no roofs (probability of damage ranging from 0.1 to 1 percent on any given day) and negligible damage to adobe walls (probability of damage ranging from 0.01 to 0.1 percent on any given day). No architectural resources sensitive to vibration effects are located within B-16, B-17, B-19, or B-20. Although increased vibrations from sonic booms have the potential to cause degradation of sensitive historic resources (Sutherland et al. 1990) such as adobe structures in the Dixie Valley Settlement Area and mine shafts and adits under the Supersonic Operating Area B, procedures are in place for the identification, evaluation, and protection of such resources as defined in the PA (Naval Air Station Fallon et al. 2011). NAS Fallon employs one full-time cultural resource manager who regularly monitors the condition of such resources. Architectural resources would continue to be managed in accordance with current federal law, Navy policy, the PA (Naval Air Station Fallon et al. 2011), and the ICRMP (U.S. Department of the Navy 2013) under Alternative 2.

Native American Resources

Under Alternative 2, training activities in the FRTC Study Area would be the same as discussed under Alternative 1 but would include an additional increase of 10 percent in training tempo compared to Alternative 1. In accordance with EO 13175; Presidential Memorandum dated April 29, 1994; DoD American Indian and Alaska Native Policy; and Section 106 of the NHPA, the Navy will be continuing consultation for this project with the Duckwater Shoshone Tribe, Fallon Paiute-Shoshone Tribe, Inter-Tribal Council of Nevada, Pyramid Lake Paiute Tribe, Te-Moak Tribe, Walker River Paiute Tribe, Yerington Paiute Tribe, and Yomba Shoshone Tribe. The Navy, in consultation with these Indian Tribes, will identify traditional cultural properties in the FRTC Study Area, assess potential noise and visual impacts to such resources, and develop mitigations as appropriate.

3.9.3.3.2 Physical Disturbance

Archaeological Resources

Under Alternative 2, training activities in the FRTC Study Area would be the same as discussed under Alternative 1 but includes an additional increase of 10 percent in training tempo above that identified in Alternative 1. Continued use of high explosives at designated target areas within the training ranges that have been used historically for this purpose are not considered a source of new ground disturbance as the areas have been previously disturbed and intact archaeological sites will not occur. This particular activity is exempt from Section 106 review in accordance with the PA Appendix 4 (Naval Air Station Fallon et al. 2011). Upgrades to the Electronic Warfare Threat System do not involve any new construction or ground-disturbing activities associated with maintenance or operations. Ground-based training activities would continue to occur at existing locations. Protective measures for NRHP-eligible cultural resources located in these training areas have been previously implemented in accordance with the PA (Naval Air Station Fallon et al. 2011) and the ICRMP (U.S. Department of the Navy 2013). NAS Fallon employs one full-time cultural resource manager who regularly monitors the condition of such resources.

Architectural Resources

Under Alternative 2, training activities in the FRTC Study Area would be the same as discussed under Alternative 1 but includes an additional increase of 10 percent in training tempo above that identified in Alternative 1. No demolitions or alterations to structures eligible for or listed in the NRHP are included in this alternative. Therefore, no NRHP-eligible architectural resources would be impacted by physical disturbance resulting from training activities under Alternative 2.

Native American Resources

Under Alternative 2, training activities in the FRTC Study Area would be the same as discussed under Alternative 1 but includes an additional increase of 10 percent in training tempo above that identified in Alternative 1. In accordance with EO 13175; Presidential Memorandum dated April 29, 1994; DoD American Indian and Alaska Native Policy; and Section 106 of the NHPA, the Navy will be continuing consultation for this project with the Duckwater Shoshone Tribe, Fallon Paiute-Shoshone Tribe, Inter-Tribal Council of Nevada, Pyramid Lake Paiute Tribe, Te-Moak Tribe, Walker River Paiute Tribe, Yerington Paiute Tribe, and Yomba Shoshone Tribe. The Navy, in consultation with these Indian Tribes, will identify traditional cultural properties in the FRTC Study Area, assess potential impacts from physical disturbance to such resources, and develop mitigations as appropriate.

3.9.3.4 Proposed Management Practices, Monitoring, and Mitigation Measures

3.9.3.4.1 Proposed Best Management Practices

Management practices discussed in Section 3.9.1.2 (Regulatory Framework and Management Practices) would continue to be implemented under Alternative 1 or 2, if selected. Cultural resources would continue to be managed in accordance with the NHPA, the Archaeological Resources Protection Act, the American Indian Religious Freedom Act, NAGPRA, and appropriate Navy Instructions. The PA with the Nevada SHPO, BLM, and the Advisory Council on Historic Preservation; the MOU with the Fallon Paiute-Shoshone Tribe, the Nevada SHPO, the USFWS, and the Nevada State Museum; and the ICRMP would continue to be implemented. Any inadvertent discovery of sensitive archaeological materials on the FRTC Study Area would be handled in accordance with the Navy's best management practices, which include provisions for stopping work and notifying the appropriate parties. If human remains are inadvertently discovered, then the procedures established under the NAGPRA and OPNAVINST 11170.2 series, *Navy Responsibilities Regarding Undocumented Human Burials*, would be followed.

3.9.3.4.2 Proposed Monitoring

The need for additional monitoring beyond that included in current and proposed best management practices has not yet been determined.

3.9.3.4.3 Proposed Mitigation Measures

The need for mitigation measures beyond that included in current and proposed best management practices has not yet been determined.

3.9.3.5 Summary of Effects and Conclusions

Table 3.9-2 summarizes the effects of the alternatives on cultural resources. The Navy's effects determinations and NEPA conclusions are pending Section 106 of the NHPA consultations with the Nevada SHPO and Indian Tribes.

Table 3.9-2: Summary of Effects of Training Activities on Cultural Resources

Alternative and Stressor	Summary of Effects
No Action Alternative	
Noise and Vibration	The current level of supersonic events (458 during busiest month) is within the parameters (500 supersonic sorties per month or 6,000 sorties per year) defined by Sutherland et al. (1990) as creating negligible to minor damage to caves, rockshelters, or rock formations containing petroglyphs (probability of damage ranging from 0.1 to 1 percent on any given day). Procedures are in place for the identification, evaluation, and protection of such resources as defined in the Programmatic Agreement (PA) (Naval Air Station Fallon et al. 2011).
Physical Disturbance	Protective measures for National Register of Historic Places (NRHP)-eligible cultural resources located in existing ground-based training areas are implemented in accordance with the PA.
Regulatory Determination	The Navy's effects determinations are pending consultation with the SHPO and Native American Tribes.
Alternative 1	
Noise and Vibration	Same as No Action Alternative.
Physical Disturbance	Same as No Action Alternative.
Regulatory Determination	The Navy's effects determinations are pending consultation with the SHPO and Native American Tribes.
Alternative 2	
Noise and Vibration	The estimated 502 supersonic events during the busiest month is slightly above the parameters (500 supersonic sorties per month or 6,000 sorties per year) defined by Sutherland et al. (1990) as creating negligible to minor damage to caves, rockshelters, or rock formations containing petroglyphs (probability of damage ranging from 0.1 to 1 percent on any given day) and represents a 10 percent increase above the No Action Alternative and Alternative 1. Procedures are in place for the identification, evaluation, and protection of such resources as defined in the Programmatic Agreement (PA) (Naval Air Station Fallon et al. 2011).
Physical Disturbance	Same as No Action Alternative.
Regulatory Determination	The Navy's effects determinations are pending consultation with the SHPO and Native American Tribes.

3.10 PUBLIC HEALTH AND SAFETY

3.10.1 INTRODUCTION

3.10.1.1 Overview

Public health and safety issues are defined as those elements of the Proposed Action that directly affect the health and safety of the public in the areas within and adjacent to the Fallon Range Training Complex (FRTC). The United States (U.S.) Department of the Navy's (Navy's) policy is to use every possible precaution in planning and executing all activities in order to prevent injury to people or damage to property. Public safety or health concerns are minimized by these precautions and because the public normally does not have access to Navy-controlled areas, where the most dangerous activities take place.

Proposed Action effects that do not directly affect an individual's health or safety are not considered in this assessment. Also, concerns that affect single individuals and isolated incidents may not rise to the level of a public health or public safety issue. The resource to be evaluated is the collective health and safety of groups of individuals in the areas adjacent to FRTC training areas. Noise effects are not addressed in this section but are analyzed in Section 3.4 (Noise [Airborne]).

3.10.1.2 Regulatory Framework and Management Practices

The inclusion of an analysis of impacts on public health and safety is supported by the National Environmental Policy Act (NEPA); the regulations issued by the Council on Environmental Quality; Executive Orders (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, and EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*; and available guidance on NEPA and environmental justice. For the analysis associated with EOs 12898 and 13045, see Section 3.7 (Socioeconomics, Environmental Justice, and Protection of Children).

The FRTC prepared a Range Air Installations Compatible Use Zone Study in 2011 (U.S. Department of the Navy 2011). The main goals of the program are to foster compatibility among air-to-ground weapons training, special use airspace (SUA), and land uses in the vicinity of a training range complex. The study's objectives include avoiding public exposure to hazards associated with weapons delivery, avoiding incompatible land development near training range complex operations, and safeguarding the operational capabilities of the training range complex. The study includes training range safety and noise analyses and provides land use recommendations that are compatible with training range operations and the associated noise levels.

3.10.1.3 Approach to Analysis

Factors used to assess the significance of potential impacts from military readiness activities at the FRTC include two factors: (1) the probability for a training activity to impact public health and safety, and (2) the degree to which those activities could have an impact. The likelihood that the public would be near a training activity determines the potential for exposure to the activity. If the potential for exposure exists, the degree of the potential impacts on public health and safety, including increased risk of injury or loss of life, is determined. If the potential for exposure were zero, then public health and safety would not be affected. Types of activities that raise public safety concerns are those where members of the public are proximate to or within the footprint of a potentially hazardous training activity. Land detonations of explosives in a controlled training environment on Navy property, where a

substantial buffer exists between the training site and adjacent public areas (i.e., outside of a weapons danger zone), are deemed not to be a risk to public safety.

3.10.2 AFFECTED ENVIRONMENT

3.10.2.1 Regional Setting

All military training activities at the FRTC occur either on the ground, in the air, or a combination of both. Four air-to-ground training ranges (Bravo [B]-16, B-17, B-19, and B-20), the Shoal Site, and the Dixie Valley Training Area (DVTA) are shown in Figure 2-1. The surrounding property is vacant. SUA has defined vertical and lateral limits established by the Federal Aviation Administration (FAA) to segregate air activities that may be hazardous to nonparticipating aircraft. Within the FRTC Study Area, SUA overlies approximately 10.4 million acres (ac.) (4.2 million hectares [ha]) of land that includes 9 restricted areas, 15 military operations areas (MOAs), 14 blocks of Air Traffic Control Assigned Airspace (ATCAA), 2 supersonic operating areas, and a Civilian Visual Flight Rules (VFR) corridor (see Figure 2-1).

3.10.2.2 Region of Influence

The region of influence for public health and safety concerns covers the entire FRTC (including both SUA and Navy-controlled lands) and the immediately adjacent lands. Areas of heightened sensitivity to public health and safety concerns within the region of influence include areas where large groups of people may gather, for example, recreational areas and parks.

3.10.2.3 Aircraft Accident Potential

During aviation training activities, pilots typically avoid towns, noise-sensitive areas, and wilderness areas at prescribed vertical or horizontal distances. Pilots also avoid areas where obstructions to air navigation have been identified.

Potential aircraft mishaps are the primary safety concern for military training flights. Naval Air Station (NAS) Fallon maintains detailed emergency and mishap response plans to react to an aircraft accident, should one occur. NAS Fallon has three runways with associated clear zones and accident potential zones.[1] The clear zones lie within NAS Fallon boundaries, and the accident potential zones lie within and beyond the agricultural outlease areas. Helicopter activities require designation of clear zones but not accident potential zones. The clear zone for VFR aircraft is the same as the takeoff safety zone. The takeoff safety zone constitutes the area under the approach/departure surface until that surface is 50–100 feet (ft.) (15.2–30.5 meters [m]) above the landing zone elevation; this zone must be free of obstructions.

Unmanned autonomous systems (UAS) follow the same safety regulations as aircraft. If Navy or other Department of Defense (DoD) UAS are operating inside restricted airspace, they are required to operate under similar aircraft regulations. If operating outside of restricted airspace, Navy and other DoD UAS need to operate under FAA requirements, may require a Certificates of Waiver or Authorization (COA), and generally require either a chase plane or constant visual contact from the ground controller. Additionally, if a Navy or other DoD UAS loses radio or other contact, it is designed to circle in place until it can reacquire the signal. If it cannot, it is programmed to return to a specific point.

In December 2013, the FAA named Nevada as one of six test sites for the integration of commercial

[1] Clear zones and accident potential zones are areas near runways where an aircraft mishap is most likely to occur (if one were to occur) and are not predictors of accidents.

applications of UAS into the National airspace. Use of UAS by commercial or other civilian applications will require new policies and procedures in order to be integrated into the National Airspace System. The FAA is establishing a Center of Excellence to address these issues. It is important to note the distinction between Navy and other DoD use of UAS, which are covered under this EIS, and civilian and commercial use under the Center of Excellence, which is not related to this Proposed Action.

3.10.2.4 Weapons Safety

A surface danger zone (SDZ) is the mathematically predicted, three-dimensional area that a projectile or fragment could travel through and impact the earth, either by direct fire or ricochet. An SDZ is calculated using procedures found in Department of the Army Pamphlet 385-63, *Range Safety.* An SDZ serves only as a human safety buffer downrange from a firing point, and it must be controlled by the training unit.

A weapons danger zone encompasses the ground and airspace for lateral and vertical containment of projectiles, fragments, debris, and components resulting from the firing, launching, or detonation of aviation delivered ordnance. This three-dimensional zone accounts for weapons accuracy, failures, and ricochets based on weapon type delivered by a specific aircraft type. The weapons danger zone represents the minimum safety requirements designed for aviation weapons training on DoD ranges, and it must be controlled by the training unit.

3.10.2.5 Public Access and Proximity

Public access to certain ranges (e.g., B-16, B-17, B-19, and B-20) within the FRTC is restricted for security and to safeguard against potential hazards associated with military activities. It is accomplished through the use of fences and posted signs. Any gate opened for military activities will have a gate watch posted if it remains open for any length of time. Standard operating procedures require that the range safety officer ensure that a range and the associated safety danger zone are clear of trespassers before starting training activities. Safety instructions for the FRTC are found in *Naval Strike and Air Warfare Center Fallon Range Training Complex Operations Manual* (U.S. Department of the Navy 2012). Controlling public access to the FRTC training areas is for safety concerns, to protect the public and military personnel from harm. Other areas that are managed by the Navy (e.g., the DVTA and the Shoal Site) are considered open for public use as well as available for Navy training. Standard operating procedures are also in place to ensure these areas are clear of non-participants before starting training activities (U.S. Department of the Navy 2012).

3.10.2.6 Range Sustainability Environmental Program Assessment

A critical aspect in ensuring the long-term sustainability of military ranges is to understand the environmental conditions at each range and to conscientiously manage these resources in an environmentally sound manner. The Range Sustainability Environmental Program Assessment process is the Navy's approach for assessing and addressing the environmental condition of land-based operational ranges where munitions are used or were used, excluding small arms ranges, within the United States and its territories. Range Sustainability Environmental Program Assessment complies with the environmental requirements of the U.S. DoD Directive 4715.11, *Environmental and Explosives Safety Management on Operational Ranges within the United States*, and DoD Instruction 4715.14, *Operational Range Assessments*, which serve the following purposes:

- Determining whether there has been a release or substantial threat of a release of munitions constituents of potential concern from an operational range to an off-range area

- Determining whether the release or substantial threat of a release of munitions constituents of potential concern from an operational range to an off-range area poses an unacceptable risk to human health or the environment
- Enhancing the Navy's ability to prevent or respond to a release or substantial threat of a release of munitions constituents of potential concern from operational ranges or range complexes to off-range areas that could pose unacceptable risks to human health or the environment
- Using data quality objectives and conceptual site models to develop sampling strategies, where necessary, to fill data gaps and provide necessary information to confirm whether source-receptor interactions exist and whether unacceptable risks to human health or the environment exist

Requirements, procedures, and protective measures necessary for implementing range assessments under the Range Sustainability Environmental Program Assessment are provided in the Navy's Range Sustainability Environmental Program Assessment policy implementation manual (U.S. Department of the Navy 2006). The process includes:

- **Range Condition Assessments.** The goal of the range condition assessment is to determine if further steps are necessary to maintain compliance and whether further analysis is required to assess risks of off-range releases of munitions constituents of potential concern beyond the range boundary. Range condition assessments are required every 5 years at each range regardless of whether a comprehensive range evaluation is conducted. This re-evaluation also is required whenever significant changes (e.g., changes in range operations, site conditions, applicable statutes, regulations, DoD issuances, or other policies) occur that affect determinations made during the previous assessment.
- **Comprehensive Range Evaluations.** A comprehensive range evaluation will be conducted if necessary to assess the potential for the off-range release of munitions constituents of potential concern. The comprehensive range evaluation includes two phases and two decision points. Protective measures may be implemented during either phase, if appropriate. If a comprehensive range evaluation is performed, sampling and testing of appropriate environmental media will be conducted.
- **Sustainable Range Oversight.** The purpose of the sustainable range oversight is to ensure range sustainability while addressing off-range releases of munitions constituents of potential concern through the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process. If munitions constitutents migrate off-range and present an unacceptable risk to human health and the environment, sustainable range oversight would be implemented by the Navy to control the on-range portion of the off-range migration through appropriate range management techniques. The Navy would use its authority under CERCLA to execute the appropriate CERCLA action for the off-range portion. This includes coordinating with the appropriate regulators and stakeholders.

3.10.2.7 Range Planning and Control

Factors considered in evaluating the impact of the training on public safety include proximity of the activity to public areas; access control; schedule (time of day, day of week); frequency, duration, and intensity of activities; range safety procedures; operational control of hazardous activities or events; and safety history. Range users are instructed to discuss planned activities with the range scheduler to ensure that current and applicable range procedures are applied before conducting any activities.

Current range control procedures at the FRTC limit unanticipated interactions with the public. Entrance to controlled training areas within the FRTC is controlled by gates, and signs are posted to warn the public of potentially hazardous activities. Trainers and exercise participants are responsible for ensuring that nonparticipants are not close enough to be at risk during all training activities.

The Naval Strike and Air Warfare Center (NSAWC) manages and schedules airspace for the FRTC, as delegated by the Oakland and Salt Lake Air Route Traffic Control Centers, and FRTC training areas (including SUA, NSAWC working areas, training ranges, and training areas) for use by tenant or transient activities, including joint or combined operations. Fallon Air Traffic Control (Desert Control) is the range coordinator for airspace. The Range Operations Center is the range coordinator for the training ranges.

Military access to all ranges at the FRTC must be scheduled through the NSAWC as an approved range activity. Aircrew and Range Operations Center personnel are jointly responsible for air safety. Aircrews fly over target areas prior to firing ammunition or dropping munitions to ensure that targets are clearly identified and that the target area is clear of nonparticipating aircraft, personnel, ground vehicles, and livestock. Aircrews operating within MOAs and ATCAAs are responsible for abiding by the spatial restrictions specified by Desert Control. All users of the FRTC ground ranges are required to contact the Range Operations Center for authorization before proceeding onto any range. A range training area safety officer is assigned for all live-fire exercises. All personnel involved with a ground event are required to view a ground access brief before using the scheduled range.

3.10.3 Environmental Consequences

This section evaluates how and to what degree the activities described in Chapter 2 (Description of Proposed Action and Alternatives) could impact public health and safety within the Study Area. The analysis focuses on potential impacts and overall changes associated with implementation of all current and proposed military readiness activities at the FRTC. Table 2-4 presents the baseline and proposed training activities for each alternative. Each stressor is introduced and analyzed by alternative. Table 3.0-2 shows the warfare areas and associated stressors that were considered for analysis. The stressors vary in intensity, frequency, duration, and location within the Study Area. The primary stressors applicable to public health and safety in the Study Area are analyzed:

- Physical disturbance
- Secondary stressors (soil and water quality)

Public health and safety is an interdisciplinary issue, and its aspects are intertwined with other environmental topics. Hazardous air pollutants are addressed in Section 3.2 (Air Quality) in accordance with the Clean Air Act's National Emissions Standards for Hazardous Air Pollutants regulations. Human annoyance and the potential for hearing loss from training noise are addressed in Section 3.4 (Noise [Airborne]). The remaining public health and safety issues are addressed in this section. The potential for impacts on public health and safety were evaluated assuming the continued implementation of the Navy's current safety procedures for each training activity or group of similar activities.

3.10.3.1 No Action Alternative

3.10.3.1.1 Physical Disturbance

Under the No Action Alternative, the frequency and types of FRTC training exercises would remain unchanged. Public health and safety could be impacted by direct physical interactions with Navy activities. Navy munitions, aircraft, and other training materials could have a direct physical encounter

with the public. Military personnel utilizing the ranges for air- or land-based activities are required to verify that the range is clear of nonparticipants before initiating any potentially hazardous activity. During air operations within the FRTC, the military assumes responsibility for separation of aircraft (known as MARSA [Military Assumes Responsibility for Separation of Aircraft]) so local air traffic controllers are not overburdened. These MARSA operations are defined by a letter of agreement between NSAWC and the FAA. When MARSA operations are complete, separation responsibility is relinquished back to air traffic control. In addition, Notices to Airmen advise pilots about when and where Navy training and testing activities are scheduled. Together, these procedures would minimize the potential for adverse interactions between the Navy and the public. Because of standard operating procedures, private and commercial aircraft traversing the FRTC Study Area during training activities are not subject to interactions with Navy aircraft or ordnance.

Training activities would continue to use live and inert ordnance (see Table 2-5). The potential for a direct physical interaction between the public and targets, military munitions, or aircraft would not change from the baseline. The Navy implements strict operating procedures that protect public health and safety. These operating procedures include ensuring clearance of the area before commencing training activities.

Training activities at the FRTC take place in well-defined locations under the close supervision of experienced military personnel. The same policies and procedures that protect training participants from injury or adverse health exposures would protect members of the public. Training materials are transported and stored in accordance with federal, state, and Navy requirements and pose no substantial risk to public safety.

Based on the Navy's implementation of strict operating procedures that protect public health and safety, there would be no impact on public health and safety from physical interactions with training activities. These operating procedures include ensuring clearance of the area before commencing training activities involving physical interactions. Because of the Navy's safety procedures, the potential for training activities to impact public health and safety under the No Action Alternative would be unlikely.

3.10.3.1.2 Secondary Stressors (Soil and Water Quality)

Soil quality can affect public health and safety if contaminated soils are disturbed and there is a potential for wind and water erosion such that it reaches an unacceptable risk to human health or the environment. Analysis in Section 3.1 (Soils) determined that the No Action Alternative would have a negligible impact on public health and safety based on either the localized nature of impacts or the short-term nature of the impacts.

Water quality can affect public health and safety if incidental spills reach groundwater. If a spill were to occur, it would have a negligible impact on public health and safety based on the response procedures in place and the small quantities of materials and wastes used and generated within the FRTC Study Area. Non-explosive practice munitions would have negligible effects on groundwater because potential contaminants are not expected to migrate to groundwater. Predictive modeling and sampling studies conducted as part of Navy Range Sustainability Environmental Program Assessment activities for munitions expenditures at B-17, B-19, and B-20 do not indicate off-range migration of munitions constituents (U.S. Department of the Navy 2008). Because water discharges do not have significant impacts on the local water resources within the FRTC, they do not pose health or environmental risks to the surrounding communities.

3.10.3.2 Alternative 1

3.10.3.2.1 Physical Disturbance

Implementation of Alternative 1 would include an increase in existing military readiness activities and new military readiness activities. Under Alternative 1, training activities would Alternative 1 would adjust and introduce two new training activities, as described in Table 2-2, Ground Light Amplification by Stimulated Emission of Radiation (LASER) Targeting and Dismounted Fire and Maneuver. These additional activities are subject to the same strict operating procedures that protect public health and safety, including procedures to make sure training areas are clear of nonparticipants.
No additional impacts from physical disturbances are expected beyond those described in the No Action Alternative for the increase and additions in training activities because Navy operational procedures and practices are already in place to avoid impacts on public health and safety in the FRTC. Therefore, impacts on public health and safety from physical disturbance as a result of the implementation of Alternative 1 would be negligible.

3.10.3.2.2 Secondary Stressors (Soil and Water Quality)

Soil quality can affect public health and safety if contaminated soils are disturbed and there is a potential for wind and water erosion such that it reaches an unacceptable risk to human health or the environment. Analysis in Section 3.1 (Soils) determined that the no action alternative would have a negligible impact on public health and safety based on either the localized nature of impacts or the short-term nature of the impacts.

Water quality can affect public health and safety if incidental spills reach groundwater. If a spill were to occur, it would have a negligible impact on public health and safety based on the response procedures in place and the small quantities of materials and wastes used and generated within the FRTC Study Area. Non-explosive practice munitions would have negligible effects on groundwater because potential contaminants are not expected to migrate to groundwater. Predictive modeling and sampling studies conducted as part of Navy Range Sustainability Environmental Protective Assessment activities for munitions expenditures at B-17, B-19, and B-20 do not indicate off-range migration of munitions constituents (U.S. Department of the Navy 2008). Because water discharges do not have significant impacts on the local water resources within the FRTC, they do not pose health or environmental risks to the surrounding communities.

3.10.3.3 Alternative 2 (Preferred Alternative)

3.10.3.3.1 Physical Disturbance

Alternative 2 would include all elements of Alternative 1, plus it would increase frequency of training activities by 10 percent. The potential for direct physical interaction between the public and targets, military munitions, or aircraft would be similar to baseline conditions due to the continued implementation of strict operating procedures that protect public health and safety, including procedures to make sure areas are clear of nonparticipants. Because of these strict operating procedures, the potential for impacts on public health and safety from physical disturbances as a result of the implementation of Alternative 2 would be negligible.

3.10.3.3.2 Secondary Stressors (Soil and Water Quality)

No additional impacts are expected from secondary stressors beyond those described in Alternative 1; therefore, impacts on public health and safety from secondary stressors as a result of the implementation of Alternative 2 would be negligible.

3.10.3.4 Proposed Management Practices, Monitoring, and Mitigation Measures

3.10.3.4.1 Proposed Best Management Practices

Current measures in place to ensure that nonparticipants are not endangered by actions at the FRTC would continue (see Section 3.10.2, Affected Environment). Standard operating procedures and range clearance procedures are in place to ensure that training areas are clear of nonparticipants before an activity commences. The following best management practices would continue to be implemented to reduce hazards associated with unexploded ordnance: (1) post signs warning of areas where unexploded ordnance clearance has not been confirmed, (2) restrict movement of personnel using the training range to designated areas known to be free of unexploded ordnance, (3) maintain the Range Sustainability Environmental Program Assessment discussed in Section 3.10.2.6 (Range Sustainability Environmental Program Assessment), and (4) continue Operational Range Clearance activities that remove unexploded ordnance and other materials to reduce munition constituent loading. No additional best management practices are warranted.

3.10.3.4.2 Proposed Monitoring

The Navy has a program in place designed to assess environmental impacts of training operations and to implement measures to protect the environment when needed (see Section 3.10.2.6 [Range Sustainability Environmental Program Assessment]). No additional measures are warranted.

3.10.3.4.3 Proposed Mitigation Measures

No mitigation measures are warranted based on the analysis presented above and continued implementation of management practices.

3.10.3.5 Summary of Effects and Conclusions

Table 3.10-1 summarizes the effects of the No Action Alternative, Alternative 1, and Alternative 2.

Table 3.10-1: Summary of Effects

Stressors	Effects
No Action Alternative	
Physical Disturbances	• Training activities at the Fallon Range Training Complex (FRTC) take place in well-defined locations under the close supervision of experienced military personnel. • The same policies and procedures that protect training participants from injury or adverse health exposures would protect members of the public. • Strict operating procedures are in place, including ensuring clearance of the area before commencing training activities. • Routine training activities conducted within the FRTC pose little risk to public health or safety outside of the training areas.
Secondary Stressors	• No significant impacts on public health and safety are expected.
Impact Conclusion	• The No Action Alternative would not result in significant impacts on public health and safety.
Alternative 1	
Physical Disturbances	• Training activities would increase. The United States Department of the Navy (Navy) would continue to implement range planning and control procedures to avoid public safety issues. • No additional impacts are expected beyond those described in the No Action Alternative because Navy operational procedures and practices are already in place.
Secondary Stressors	• No significant impacts on public health and safety are expected.
Impact Conclusion	• Alternative 1 would not result in significant impacts on public health and safety.
Alternative 2	
Physical Disturbances	• Training activities would increase. The Navy would continue to implement range planning and control procedures to avoid public safety issues. • No additional impacts are expected beyond those described in the No Action Alternative because Navy operational procedures and practices are already in place.
Secondary Stressors	• No significant impacts on public health and safety are expected.
Impact Conclusion	• Alternative 2 would not result in significant impacts on public health and safety.

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4 CUMULATIVE IMPACTS

4.1 INTRODUCTION AND APPROACH TO ANALYSIS

The analysis of cumulative impacts presented in this section follows the requirements of the National Environmental Policy Act (NEPA) and Council on Environmental Quality (CEQ) guidance (Council on Environmental Quality 1997). CEQ regulations provide the implementing regulations for NEPA. The regulations define cumulative impacts as:

> …the impact on the environment which results from the incremental impact of the action when added to the other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 Code of Federal Regulations [C.F.R.] §1508.7).

An action's contribution to the overall impacts in a region of influence is of particular concern. While a single project may have minor impacts, overall impacts may be collectively significant when the project is considered together with other projects on a regional scale. A cumulative impact is the additive effect of all projects in the geographic area (defined in Section 4.2.3). The CEQ provides guidance on cumulative impact analysis in *Considering Cumulative Impacts under the National Environmental Policy Act* (Council on Environmental Quality 1997). This guidance further identifies cumulative impacts as those environmental effects resulting "from spatial [geographic] and temporal [time] crowding of environmental perturbations. The impacts of human activities will accumulate when a second perturbation occurs at a site before the ecosystem can fully rebound from the impacts of the first perturbation." Noting that environmental impacts result from a diversity of sources and processes, this guidance observes that "no universally accepted framework for cumulative impacts analysis exists," while acknowledging that certain general principles have gained acceptance. The CEQ provides guidance on the extent to which agencies of the federal government are required to analyze the environmental impacts of past actions when they describe the cumulative environmental effect of an action. This guidance provides that a cumulative impacts analysis might encompass geographic boundaries beyond the immediate area of an action and a timeframe that includes past actions and foreseeable future actions (Council on Environmental Quality 2005). Thus, the CEQ guidelines observe, "[it] is not practical to analyze cumulative impacts of an action on the universe; the list of environmental impacts must focus on those that are truly meaningful" (Council on Environmental Quality 2005).

4.2 APPROACH TO ANALYSIS

4.2.1 OVERVIEW

Cumulative impacts on each resource addressed in Chapter 3 (Affected Environment and Environmental Consequences) were analyzed for the No Action Alternative, Alternative 1, and Alternative 2 in combination with past, present, and reasonably foreseeable future actions in the relevant geographic area. The cumulative impacts analysis included the following steps, which are described in more detail below:

1) Identify appropriate level of analysis for each resource.
2) Define the geographic boundaries and timeframe for the cumulative impacts analysis.
3) Describe current resource conditions and trends.
4) Identify potential impacts of each alternative that might contribute to cumulative impacts.

5) Identify past, present, and other reasonably foreseeable future actions in the relevant geographic regions that affect each resource.
6) Analyze potential cumulative impacts.

4.2.2 Identify Appropriate Level of Analysis for Each Resource

The cumulative impacts analysis focused on meaningful impacts from past, present, and reasonably foreseeable future actions. The level of analysis for each resource was commensurate with the intensity of the impacts identified in Chapter 3 (Affected Environment and Environmental Consequences). The rationale for the level of analysis applied to each resource is described in the resource-specific sections below.

4.2.3 Define the Geographic Boundaries and Timeframe for Analysis

The geographic boundaries for the cumulative impacts analysis included the Fallon Range Training Complex (FRTC) Study Area (see Figure 2-1), including its ranges and associated special use airspace (SUA). The boundaries for migratory species were expanded to include land and airspace where activities might impact these species throughout their ranges. Primary considerations from outside the FRTC Study Area include impacts associated with air quality, socioeconomics, transportation, cultural land use compatibility, wildlife, and wildfire.

Determining the timeframe for the cumulative impacts analysis requires estimating the length of time the impacts of the Proposed Action would last and considering the specific resource in terms of its history of degradation (Council on Environmental Quality 1997). The Proposed Action includes ongoing and anticipated future military readiness activities. While United States (U.S.) Department of the Navy (Navy) training requirements change over time in response to world events and several other factors, the general types of activities addressed by this Environmental Impact Statement (EIS) are expected to continue indefinitely, and the associated impacts would occur indefinitely. Therefore, the cumulative impacts analysis is not bounded by a specific future timeframe. For past actions, the cumulative impacts analysis only considers those actions or activities that have ongoing impacts. While the cumulative impacts analysis is not limited by a specific timeframe, it should be recognized that available information, uncertainties, and other practical constraints limit the ability to analyze cumulative impacts for the indefinite future. Future actions that are speculative are not considered.

4.2.4 Describe Current Resource Conditions and Trends

The Affected Environment sections of Chapter 3 (Affected Environment and Environmental Consequences) describe current resource conditions and trends and discuss how past and present human activities influence each resource. The current aggregate impacts of past and present actions are reflected in the baseline information presented in that chapter. This information is used in the cumulative impacts analysis to understand how past and present actions are currently impacting each resource and to provide the context for the cumulative impacts analysis.

4.2.5 Identify Potential Impacts of Alternatives 1 and 2 That Might Contribute to Cumulative Impacts

The direct and indirect impacts of the alternatives, presented in Chapter 3 (Affected Environment and Environmental Consequences), were reviewed to identify impacts that are relevant to the cumulative impact analysis. Key factors considered include the current status and sensitivity of the resource and the intensity, duration, and spatial extent of the impacts for each training activity. In general, long-term rather than short-term impacts and widespread rather than localized impacts were considered more

likely to contribute to cumulative impacts. For example, for biological resources, population-level impacts were considered more likely to contribute to cumulative impacts than were individual-level impacts. Negligible impacts were not considered further in the cumulative impacts analysis.

4.2.6 Identify Other Actions and Other Environmental Considerations That Affect Each Resource

A list of other reasonably foreseeable future actions was compiled for the FRTC Study Area and surrounding areas based on the scoping process, communications with other agencies, state and local officials, a review of other military activities, literature review, and other available information. These actions were reviewed to determine if they should be considered further in the cumulative impact analysis. Factors considered when identifying other actions to be included in the cumulative impacts analysis included the following:

- Whether the action is likely or probable (i.e., reasonably foreseeable), rather than merely possible or speculative.
- The timing and location of the other action in relationship to proposed training activities.
- Whether the other action and each alternative would affect the same resources.
- The current conditions, trends, and vulnerability of resources affected by the other action.
- The duration and intensity of the impacts of the other action, and whether the impacts have been truly meaningful, historically significant, or identified previously as a cumulative impact concern.

4.2.7 Analyze Potential Cumulative Impacts

The combined impacts of all other actions, including the current aggregate impacts of past and present actions described in the baseline, were characterized and summarized. The incremental impacts of Alternatives 1 and 2 were then “added to” the combined impacts of all other actions to describe the cumulative impacts that would result if Alternatives 1 and 2 were implemented. The cumulative impact analysis considered additive, synergistic, and antagonistic impacts. A qualitative analysis was conducted in most cases based on the available information. The analysis in Chapter 3 (Affected Environment and Environmental Consequences) indicates that the direct and secondary impacts of Alternatives 1 and 2 would not be materially different. Therefore, the cumulative impacts discussions below apply to both alternatives.

4.3 Other Actions Analyzed in the Cumulative Impacts Analysis

4.3.1 Overview

Table 4-1 lists the other actions and other environmental considerations that were identified for the cumulative impacts analysis, and Figure 4-1 highlights each project’s geographic relation to the FRTC Study Area. The following sections describe each action and environmental consideration carried forward for analysis.

Table 4-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis

Name of Action	Lead Agency or Proponent	Location	Timeframe	Retained for Further Analysis?
Airfield Operations at NAS Fallon	Navy	NAS Fallon, Fallon, Nevada	Ongoing, future	Retained
Range Enhancements at NAS Fallon on Training Range Bravo-16	Navy	FRTC, Fallon, Nevada	Ongoing, future	Retained
Electronic Warfare/Communication Site Improvements	Navy	FRTC, Fallon, Nevada	Future	Retained
Future Range Design Changes at FRTC	Navy	FRTC, Fallon, Nevada	Future	Not retained
Joint Unmanned Aircraft Systems Center of Excellence	U.S. Armed Forces	Creech Air Force Base, Indian Springs, Nevada	Past, ongoing, future	Retained
Geothermal Energy Projects[1]	BLM	Churchill, Lander, Pershing Counties, Nevada	Past, ongoing, future	Retained
Wind Energy Projects[2]	BLM	Churchill, Lander, Pershing Counties, Nevada	Past, ongoing, future	Retained
Solar Energy Projects	BLM	Mineral and Nye counties, Nevada	Past, ongoing, future	Retained
Lahontan Valley Land Sales Project	USFWS	Churchill County, Nevada	Past, ongoing, future	Retained
Bango Refining Facility, Class II Air Quality Operating Permit	Nevada Division of Environmental Protection	Churchill County, Nevada	Past, ongoing, future	Retained

Table 4-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis (continued)

Name of Action	Lead Agency or Proponent	Location	Timeframe	Retained for Further Analysis?
Carson City District Drought Management	BLM	Carson City District	Past, ongoing, future	Retained
3 Bars Ecosystem and Landscape Restoration	BLM	Eureka County, Nevada	Past, ongoing, future	Retained
Isabella Pearl Gold Mine & Processing Facility	BLM	Mineral County, Nevada	Past, ongoing, future	Retained
Grazing Allotment Program	BLM	Carson City, Winnemucca, and Battle Mountain Districts	Past, ongoing, future	Retained
Cove-Helen Underground Mine Project	BLM	Lander County, Nevada	Ongoing, future	Retained
Mount Hope Open Pit Molybdenum Mine	BLM	Eureka County, Nevada	Ongoing, future	Retained
Humboldt-Toiyabe National Forest Management	USDA Forest Service	Mineral and Nye Counties, Nevada	Past, ongoing, future	Retained
Designated Wilderness and Wilderness Study Areas	BLM	Carson City and Battle Mountain Districts	Past, ongoing, future	Retained
Implementation of INRMP	Navy	NAS Fallon	Past, ongoing, future	Retained
Powdered Milk Processing Plant	Dairy Farmers of America	Fallon, Nevada	Ongoing, future	Retained

[1] Includes five specific geothermal energy projects on BLM land. See text for project-specific descriptions.
[2] Includes two specific wind energy projects on BLM land. See text for project-specific descriptions.
Notes: BLM = Bureau of Land Management, FRTC = Fallon Range Training Complex, INRMP = Integrated Natural Resources Management Plan, NAS = Naval Air Station, Navy = United States Department of the Navy, USDA = United States Department of Agriculture, USFWS = United States Fish and Wildlife Service

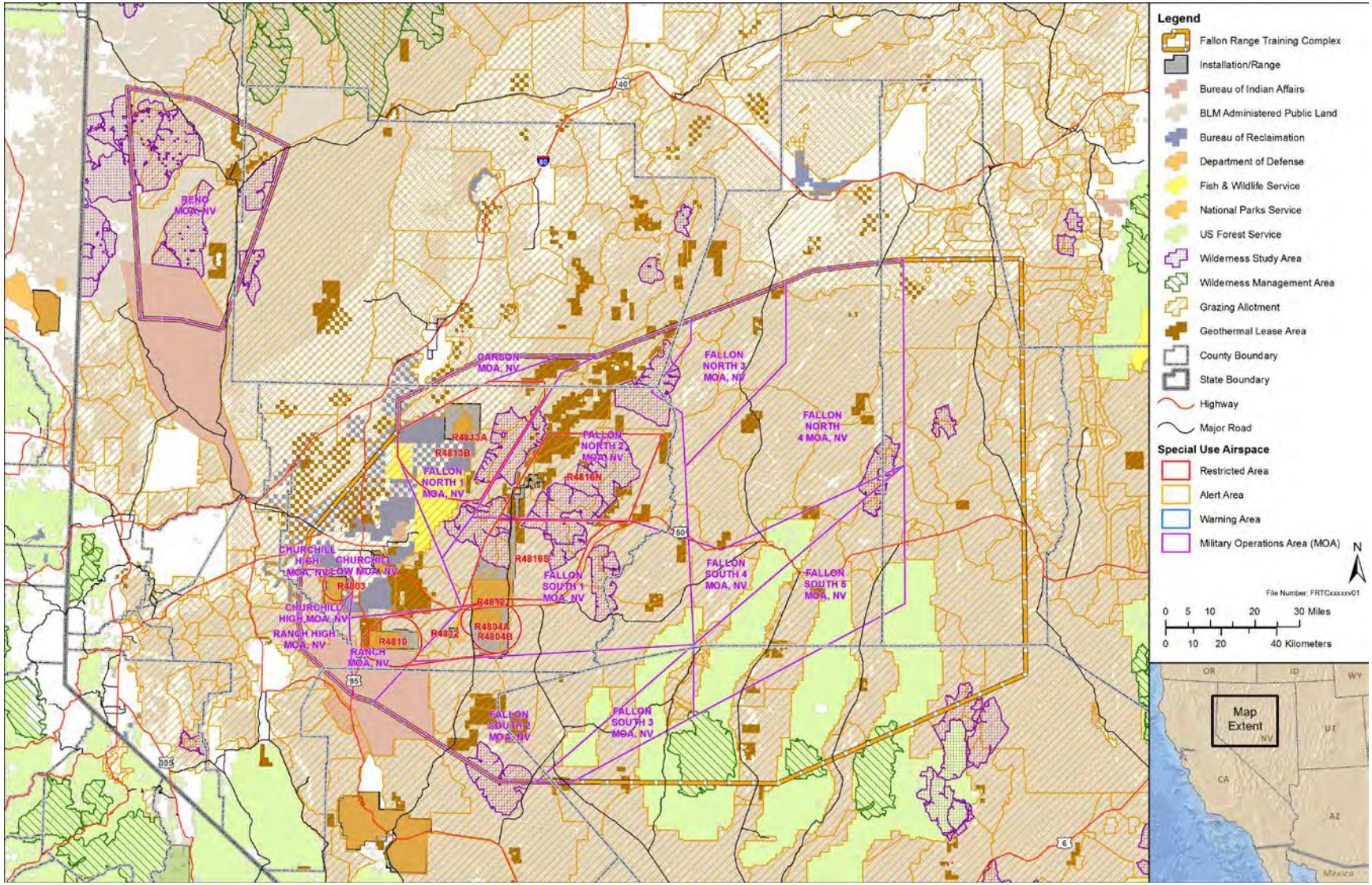

Figure 4-1: Locations of Other Actions and Other Environmental Considerations Identified and Retained for the Cumulative Impacts Analysis

4.3.2 AIRFIELD OPERATIONS AT NAVAL AIR STATION FALLON

In 2013, the Navy evaluated existing and future airfield operations at Naval Air Station (NAS) Fallon in an Environmental Assessment (EA) (U.S. Department of the Navy 2013). Under the Proposed Action, the Navy would maintain current/baseline airfield operations, conduct airfield operations with new types of aircraft, and increase airfield operations to support future potential training conditions. Airfield operations at NAS Fallon currently support advanced tactical training events by carrier air wings and other aviation units. As aircraft transitions occur, carrier air wings and other aviation units would arrive at NAS Fallon to participate in training events with newer aircraft, such as the F-35C Lightning II, EA-18G Growler, and RQ-7B Shadow. The force structure changes analyzed in the EA are consistent with those evaluated in this EIS. The Navy would progressively transition aging aircraft to newer aircraft beginning in 2015, with the transition to be complete by 2028. Training courses with the F-35C would begin in 2017. Proposed facility development required to support aircraft missions at NAS Fallon would include space for aircraft maintenance, crew and equipment, administration, training, and an unmanned aircraft system runway and staging area.

The potential impacts associated with NAS Fallon airfield operations and facility developments include:

- Changes in noise zones (slightly smaller noise zones northeast of NAS Fallon and slightly larger noise zones southwest of NAS Fallon).
- Temporary and localized increases in aircraft operations and construction emissions, but not in excess of the 250 tons per year comparative threshold.
- Slightly positive economic impacts on the Churchill County economy through increased population, payroll, and housing demand.
- Temporary construction-related increases in traffic volumes on area roadways and long-term minor increases in traffic volumes.
- Adverse effect on one archeological site within the new hangar's parking apron to be addressed through a memorandum of agreement to minimize and mitigate the impact.
- Noise zone decrease in the area of the Fallon Paiute Shoshone Reservation.
- Temporary wildlife disturbance during construction phase and during increased airfield operations.
- Common vegetation disturbance during construction and demolition activities and introduction of additional impervious surface (offset by best management practices).
- Potential increases in erosion, runoff, and sedimentation associated with new impervious surfaces.

4.3.3 RANGE ENHANCEMENTS AT NAVAL AIR STATION FALLON TRAINING RANGE BRAVO-16

In 2014, the Navy prepared an EA for additional training activities and enhancements to the existing range infrastructure at Bravo (B)-16 (U.S. Department of the Navy 2014). The cumulative impact analysis for this EIS only addresses the range enhancements at B-16 because training activities at B-16 are analyzed as part of the No Action Alternative for this EIS. As noted in the Finding of No Significant Impact signed in September 2014, potential environmental impacts analyzed in the EA included those for air quality, biological resources, cultural resources, geology and soils, land use, noise, public health and safety, public services and utilities, socioeconomics, transportation and traffic, visual resources, and water resources and hydrology.

In general, the potential impacts associated with range enhancements at B-16 may include:

- Localized loss of recreational opportunities (e.g., horseback riding, camping, off-highway vehicle use, and hunting).
- Temporary and localized generation of emissions such as fugitive dust, and exhaust emissions.
- Disturbance of wildlife and wildlife habitat.
- Direct and permanent impacts on non Endangered Species Act (ESA)-listed vegetation from foot and vehicle traffic.
- With implementation of pre-construction breeding bird surveys and subsequent avoidance of any active nests, there would be no impacts to nesting birds that are protected by the Migratory Bird Treaty Act or listed under the Endangered Species Act during the construction phase.
- Insignificant impacts on cultural resources with the application of avoidance measures and adherence to the terms of a Programmatic Agreement between the Navy and the State Historic Preservation Office regarding road and boundary fencing.
- Soil impacts from re-routing the primary access road and minimized impacts to ground disturbance and wind erosion during construction.
- Temporary construction noise and elevated noise levels above 60 decibels (dB) only within the range boundaries
- Minor increases in vehicle traffic and training flights within the SUA.
- Minor, localized visual resource alterations (e.g., fenceline and tower).
- Increased sedimentation in some ephemeral streams associated with surface-disturbing activities offset by construction measures to minimize soil erosion.

4.3.4 Electronic Warfare/Communication Site Improvements at Fallon Range Training Complex

The Navy is proposing to improve three existing electronic warfare/communication site at FRTC to support ongoing training activities. These projects include:

- White Rock Remote Radio Unit 6. This project would upgrade technology used in the existing B-20 communication system. New communications equipment and a helicopter landing area would be established at a new site on Bureau of Land Management (BLM) land. The Navy has requested right-of-way for the project from BLM, and BLM is expected to complete the NEPA process in 2014 with support from the Navy. Surface distance associated with the improvements would be approximately 2,500 square feet (ft.^{2}) (232 square meters [m^2]).
- Fairview Peak is a BLM-designated communication site that is occupied by several users. Currently the Navy shares a communications facility and tower with other users. Over time, the shared facilities have become crowded and electronic interference has become a problem. The proposal is for the Navy to construct and manage, within the BLM-designated communication site, a facility for Navy use only. The proposed Navy facility would consist of a 60-foot (ft.) tower, a 30 ft. monopole, and two support buildings. The Navy has requested right-of-way (approximately 200 ft. by 75 ft.) for the project from BLM, and BLM will complete the NEPA process with support from the Navy. Surface disturbance would be less than one-third acre (ac).
- Electronic Warfare Site 32. The Navy is proposing to site mobile Electronic Warfare equipment at Electronic Warfare Site 32. This project would involve expansion of the existing parking area at the site to accommodate the mobile Electronic Warfare equipment and employee parking. This project would occur within the existing fenced BLM right-of way at Site 32. The increase in parking area size would be 20 ft. by 120 ft. or 2,400 ft.^{2}.

4.3.5 Future Range Design Changes at Fallon Range Training Complex

The Navy continues to develop and introduce new weapons and aircraft to the fleet. As new systems are fielded for use, additional or changing training requirements emerge. Additionally, the tactics, techniques, and procedures are constantly evaluated against changing threats worldwide.

The Navy is evaluating future range design changes at FRTC to enhance warfighting proficiency, readiness, and realistic training. Options available to meet existing and future training requirements are changes to the land space, airspace, target systems, electronic warfare systems and communications infrastructure, as well as changes to flight patterns and weapons delivery parameters. A cumulative effects analysis based on any potential changes at this time is both speculative and premature. Any significant changes to FRTC based on validated training requirements, including the renewal of the 1999 Land Withdrawal, which expires in November 2021, would be analyzed separately when ripe in accordance with NEPA.

4.3.6 Department of Defense Joint Unmanned Aircraft Systems Center of Excellence

In July 2005, the Joint Requirements Oversight Council established a new Joint Unmanned Aircraft Systems Center of Excellence to focus on unmanned aircraft systems operational issues (U.S. Government Accountability Office 2006). The Center of Excellence is a multi-service unit of the U.S. Armed Forces based at Creech Air Force Base in Indian Springs, Nevada. Lead and deputy positions will rotate among the four military services. The Center of Excellence—assisted by an advisory council composed of representatives from each of the combatant commands, the services, and the Joint Unmanned Aircraft Systems Material Review Board—is responsible for facilitating the development and integration of unmanned aircraft systems common operating standards, capabilities, concepts, doctrine, tactics, techniques, procedures, and training. The Center of Excellence has been charged with developing a joint concept of operations for unmanned aircraft systems. According to center officials, the concept of operations will likely address issues such as interoperability and airspace integration.

In general, the potential impacts associated with unmanned aerial vehicle training activities include:

- Temporary and localized generation of emissions such as particulates and exhaust emissions
- Disturbance of wildlife and wildlife habitat
- Minor increases in training flights within the SUA
- Minor, localized visual resource alterations

The Department of Defense (DoD) Joint Unmanned Aircraft Systems Center of Excellence is not related to the Federal Aviation Administration (FAA) proposal to establish a civilian Center of Excellence for Unmanned Aircraft Systems in fiscal year 2015. The goal of this endeavor is to create a cost-sharing relationship between academia, industry, and government that will focus on research areas of primary interest to the FAA and the U.S. unmanned aircraft systems community (Federal Aviation Administration 2014). A final solicitation seeking proposals was issued on August 12, 2014.

4.3.7 Geothermal Energy Projects

4.3.7.1 Salt Wells Geothermal Energy Projects, Churchill County, Nevada

In 2009, NV Energy (also known as Sierra Pacific Power Company) proposed to build two switching stations, one 230-kilovolt (kV) transmission line, two 60 kV electric line folds, and one substation (Bureau of Land Management 2011a). The new switching station, Bass Flat, would be constructed at the junction of the existing Fort Churchill-to-Austin 230 kV transmission line and the Sierra Pacific Power

Company 230 kV transmission line, leading from the existing Enel Geothermal Power Plant to the Fort Churchill-to-Austin line. The new Pony Express Switching Station would be constructed adjacent to the existing Enel Geothermal Power Plant. In addition, a new Greenwave Substation would be constructed on the south side of Sheckler Road in Fallon, Nevada, and a 230 kV transmission line would connect the proposed Pony Express Switching Station to the proposed Greenwave Substation. The transmission line would be approximately 22 miles (mi.) long. Two 60 kV electric line folds would also be installed on four single-pole structures, connecting the proposed Greenwave Substation to the existing 60 kV lines that connect to the existing Fallon Substation north of Hammond Road.

Ormat Technologies, Inc. proposed to develop the Carson Lake Binary Power Plant and Substation, the Macari Switching Station, a 230 kV transmission line between the Carson Lake Substation and the Macari Switching Station, and an electric line fold for the Sierra Pacific Power Company 230 kV transmission line (Bureau of Land Management 2011a). The power plant would produce up to 40 megawatts (MW) (gross) electricity. These facilities would be developed on a private 80 ac. (0.32-square-kilometer [km^2]) parcel. Up to 13 well pads in addition to the 9 previously approved well pads on Reclamation land, associated pipelines, and roads would also be constructed on federal land.

Gradient Resources (formerly known as Vulcan Power Company [Vulcan]) proposed to develop up to four power plants and associated substations at five possible locations for a maximum production of 120 MW (net) (Bureau of Land Management 2011a). In addition, a 230 kV interconnection transmission line would be constructed to connect the power plant(s) to Vulcan's proposed Bunejug Switching Station and include an electric line fold to the Sierra Pacific Power Company 230 kV transmission line. Vulcan would also construct up to 26 well pads and associated wells, roads, and pipelines in addition to the 20 previously approved well pads (10 well pads were analyzed in EA-NV-030-07-05 and authorized on February 6, 2007, and 10 well pads were analyzed in EA DOI-BLM-NV-C010-2009-0006-EA and authorized on April 24, 2009).

The BLM prepared an EIS analyzing the environmental impacts of the three separate projects proposed by Sierra Pacific Power Company, Ormat, and Vulcan in the Salt Wells area of Nevada. Together, the three projects are referred to as the Salt Wells Energy Projects (Bureau of Land Management 2011a). Cooperating agencies for the EIS were the U.S. Bureau of Reclamation (BOR), Churchill County, City of Fallon, NAS Fallon, Nevada Division of Minerals, and Nevada Department of Wildlife.

Potential impacts of geothermal projects, including the Salt Wells Energy Projects described in this section and the Brady Hot Springs, Jersey Valley, McGinness Hills, and Dixie Valley projects described below, are primarily related to construction and include the following:

- Fugitive dust generation (mitigated through implementation of a fugitive dust control plan)
- Surface water degradation (mitigated through implementation plans for the protection of streams, wetlands, springs, and canals; these plans include best management practices that minimize potential for soil erosion, including a storm water pollution prevention plan)
- Impacts associated with wetland and water body crossings
- Impacts on migratory birds (e.g., golden eagles) (mitigated through implementation of avian protection plans)
- Impacts on cultural resources (mitigated through mitigation and monitoring strategies as detailed in programmatic agreements between BLM, BOR, State Historic Preservation Office [SHPO], and the energy companies)

- Impacts on Native American religious concerns (mitigated through coordination with the local tribes and alteration of the timing of construction activities to eliminate any impacts)
- Impacts on existing livestock grazing activities (mitigated by proactively ensuring that barriers are maintained to prevent the movement of livestock off range)
- Impacts on recreation (mitigated through cooperation with off-road race coordinators)
- Temporary noise impacts

4.3.7.2 Brady Hot Springs Well 15-12 Hydro-Stimulation, Churchill County, Nevada

An EA was prepared to disclose and analyze environmental effects of developing and testing a geothermal reservoir by using enhanced geothermal system technologies, as proposed by Brady Power Partners, a subsidiary of Ormat Nevada, Inc. (Bureau of Land Management 2013a). A geothermal sundry notice and Brady's 15-12 proposed stimulation action plan were submitted to the BLM Winnemucca District Office and Humboldt River Field Office on January 5, 2012, and September 24, 2012, respectively. The proposed project is located north of the Hot Springs Mountains, approximately 50 mi. northeast of Reno, in Churchill County, Nevada. The project would be on an existing production well and drill pad (Well 15-12) on federal geothermal lease NVN 065558 held by Ormat Nevada, Inc. The purpose of the action is to provide Ormat Nevada, Inc. opportunity to conduct enhanced geothermal system activities on its federal lease at the Brady Hot Springs power plant in order to improve commercial viability of target geothermal well 15-12 and the overall productivity of the well field.

4.3.7.3 Jersey Valley Geothermal Project, Pershing County, Nevada

Ormat Nevada, Inc., through its subsidiaries, proposed to construct and operate three geothermal power production facilities and associated power transmission lines in northern Nevada (Department of Energy 2011). The power production facilities include the Tuscarora Geothermal Power Plant Facility (Tuscarora Facility) in Elko County, the Jersey Valley Geothermal Development Facility (Jersey Valley Facility) in Pershing County, and the McGinness Hills Geothermal Facility (McGinness Hills Facility) in Lander County. The Hot Sulphur Springs Transmission Line would connect the Tuscarora Facility to NV Energy's Humboldt Substation in Elko County.

The Proposed Action is expected to achieve 122 MW produced by the three geothermal power facilities, pursuant to a continuous construction plan for two phases of each facility (Department of Energy 2011). Total net output for the three facilities would be 63 net MW for Phase I and 59 MW for Phase II. Phase I is based on geologic resources that are currently known to be sufficient. Phase II would add capacity as more information is gained regarding additional geologic resources that are expected at each site. The Tuscarora Facility is not further discussed because it is outside of the FRTC Study Area.

The Jersey Valley Facility is in Pershing County, approximately 50 mi. south of Winnemucca, Nevada (Department of Energy 2011). Phase I of the facility is a 14 net MW geothermal power generating plant with a 27.5 mi. transmission line. Phase II is expected to add 10 net MW, for a total of 24 MW. Power generated at this facility would be sent to the NV Energy Bannock Switch in Lander County, southwest of Battle Mountain, Nevada. The Jersey Valley Facility is on both private lands and public land administered by the BLM Mount Lewis Field Office. Construction of the Jersey Valley facility and transmission line was completed in November 2010, and power production was initiated in December 2010.

4.3.7.4 McGinness Hills Geothermal Project, Lander County, Nevada

The McGinness Hills Facility is in Lander County approximately 10 mi. northeast of Austin, Nevada (Department of Energy 2011). This facility will include a total of 60 net MW from two geothermal power

generating plants and a 9 mi. transmission line. This includes 30 MW for Phase I and 30 MW for Phase II. The facility would deliver the power to NV Energy's Frontier Substation. This facility would be on both private land and public lands administered by the BLM Mount Lewis Field Office and in the U.S. Forest Service (USFS), Austin/Tonopah Ranger District.

Under the McGinness Hills Geothermal Exploration Project, which was analyzed by the BLM in an April 2009 EA (NV063-EA08-093 McGinness Hills Geothermal Exploration Project, Lander County, Nevada), eight wells have been drilled from seven pads, associated access roads have been constructed on BLM land, and five additional wells and associated access roads have been constructed on private land (Department of Energy 2011). No other construction has started on the facility or the transmission line.

4.3.7.5 Dixie Valley Geothermal Projects, Churchill County, Nevada

In 2009, TGP Dixie Development Company proposed to explore the geothermal resource potential of the Coyote Canyon and Dixie Meadows lease areas in Dixie Valley, which are primarily on federal lands managed by the BLM (Bureau of Land Management 2010a). An operations plan to drill and test up to 15 exploration wells at the Coyote Canyon project area and to drill and test up to 15 exploration wells at the Dixie Meadows project area was submitted to the BLM Stillwater Field Office in September 2009. A revised operations plan was submitted in October 2009. Because both geothermal drilling projects have similar timing, geography, and types of actions, BLM analyzed the two proposals in one EA. The geothermal leases held by TGP Dixie Development Company for the Coyote Canyon exploration project contain 7,681 ac. (31.08 km^2). The geothermal leases held by TGP for the Dixie Meadows exploration project contain 3,960 ac. (16.03 km^2). The proposed action for Dixie Meadows also includes an area known as the Lamb Mineral Interests (760 ac. [3.08 km^2]). TGP Dixie Development Company owns the mineral rights for this land, along with the right to surface use in exercise of mineral rights. The Navy owns the land surface.

4.3.8 Wind Energy Projects

The DoD and the BLM have entered into a wind energy protocol that sets requirements for the coordination and military review of wind energy development proposals on public lands (Department of Defense and Bureau of Land Management 2008). Once notified of a proposed wind energy development, NAS Fallon undertakes coordination with internal Navy stakeholders to determine the impact of proposed development on the FRTC mission (U.S. Department of the Navy 2012). NAS Fallon also works with the project proponent to identify mitigation that would allow for project approval. A formal review process for renewable energy projects is currently being developed; for these projects NAS Fallon undertakes coordination in accordance with Section 358 – Siting Clearinghouse.

In general, the potential impacts associated with wind energy projects in the FRTC region include:

- Temporary disturbance and permanent loss of desert vegetation and introduction of noxious weeds
- Disturbance of wildlife and wildlife habitat
- Degradation of visual resources
- Interference with grazing land management
- Noise and air pollutant emissions
- Flight safety and electromagnetic interference
- Impacts on threatened and endangered species and migratory birds

4.3.8.1 Round Mountain Wind Energy Testing Site and Monitoring Project, Nye County, Nevada

In 2009, GreenWing Energy America Corporation (GreenWing) proposed to install three meteorological towers on public lands (approximately 15,319 ac. [61.99 km^2]) under the jurisdiction of the BLM, administered by the Tonopah Field Office (Bureau of Land Management 2010b). The Proposed Action area is in northwestern Nye County, Nevada, near the town of Carvers in Big Smoky Valley.

The purpose of the Proposed Action was to provide GreenWing access to a limited number of appropriate locations to gather sufficient wind speed, direction, and other meteorological data to ascertain whether there is sufficient and sustained wind energy to develop a renewable wind energy project capable of generating marketable electrical energy for commercial purposes (Bureau of Land Management 2010b). Each meteorological tower would be approximately 197 ft. (60 meters [m]) high, with a series of guy wires extending from the top of the tower to the ground approximately 164 ft. (50 m) from the base. Construction of the meteorological towers is expected to require five or six personnel working approximately 3 days on each tower, for a total of 9 days. The meteorological towers would remain in continuous operation until sufficient data was collected to determine the suitability of a wind energy project or until the 3-year right-of-way authorization expired.

4.3.8.2 Spring Valley Wind Energy Facility, White Pine County, Nevada

Although outside of the FRTC Study Area, the Spring Valley Wind Energy Facility is notable in that it was the first wind farm approved on Nevada public land. The BLM approved the project in 2010 (Bureau of Land Management 2010c). The facility is 30 mi. east of Ely, in White Pine County, Nevada. Seventy-five turbines at the facility produce 149.1 MW of electricity, enough electricity to power approximately 45,000 Nevada homes. The facility created approximately 225 construction jobs and, upon operation in 2012, up to 12 permanent operations jobs. Several different turbines are used at the facility, but the typical heights range from 410 to 428 ft. (125 to 130.5 m) (Bureau of Land Management 2010d).

Executive Order (EO) 13212, signed in 2001, states that the production and transmission of energy in a safe and environmentally sound manner is essential to the well-being of the American people (Bureau of Land Management 2010c). A report from the Department of Energy (DOE) postulates that wind power can provide 20 percent of the nation's electricity by 2030. The DOE report finds that achieving a 20 percent wind contribution to U.S. electricity supply would produce many benefits:

- Reduce carbon dioxide (CO_2) emissions from electricity generation by 25 percent in 2030
- Reduce natural gas use by 11 percent
- Reduce water consumption associated with electricity generation by 4 trillion gallons by 2030
- Increase annual revenues to local communities to more than $1.5 billion by 2030
- Support roughly 500,000 jobs in the United States, with an average of more than 150,000 workers directly employed by the wind industry

4.3.9 Solar Projects in the Southwestern United States

Beginning in 2008, the BLM and the DOE began jointly preparing a programmatic EIS to evaluate actions that the agencies are considering taking to further facilitate utility-scale solar energy development in six southwestern states (Arizona, California, Colorado, Nevada, New Mexico, and Utah) (Bureau of Land Management and Department of Energy 2012). For the BLM, this included the evaluation of a new Solar Energy Program applicable to solar development on BLM-administered lands. For the DOE, it included the evaluation of new guidance to further facilitate utility-scale solar energy development and maximize the mitigation of associated environmental impacts. The proposed Solar Energy Program furthers the

BLM's ability to meet the goals of EO 13212 and the Energy Policy Act of 2005; it also has been designed to meet the requirements of Secretarial Order 3285A1 regarding the identification and prioritization of specific locations best suited for utility-scale solar energy development on public lands.

Under the solar energy development program alternative, the BLM proposed categories of lands to be excluded from utility-scale solar energy development (about 79 million ac. [319,702 km^2] proposed for exclusion) and identified specific locations well suited for utility-scale production of solar energy (i.e., solar energy zones) where the BLM proposed to prioritize development (about 285,000 ac. [1,553 km^2] in Solar Energy Zones) (Bureau of Land Management and Department of Energy 2012). In Nevada, 9,076,145 ac. (36,730 km^2) were identified as being in variance areas and 60,395 ac. (244 km^2) were identified as developable acreage in solar energy zones. None of the solar energy zones are within the FRTC Study Area, but some variance areas are within the Study Area. A substantial portion of Nevada was deemed not available or excluded from solar development (31,684,298 ac. [128,222 km^2]). As part of the variance process, the BLM will consult the DoD to minimize or eliminate impacts on military operations and encourage compatible development. This consultation will include both general discussions for early planning and detailed assessments of specific proposals at the local level. The BLM will accept formal DoD submissions once they have been vetted through both the military departments and the DoD Siting Clearinghouse.

Potential impacts related to construction and operations of solar projects may include:

- Water depletion affecting specially designated areas and lands with wilderness characteristics
- Interference with recreational uses (e.g., desert racing and other off-highway vehicle use)
- Project fencing-related impacts on free flow of big game mammalian species.
- Potential impacts on National Register of Historic Places (NRHP)-listed cultural resources and Native American sacred sites
- Interference with grazing permittee's pasture land, fences, and improvements
- Temporary disturbance and permanent loss of wash and playa habitats
- Noise and air pollutant emissions

4.3.10 Lahontan Valley Land Sale

Since 1990, the U.S. Fish and Wildlife Service (USFWS) has been acquiring water rights for wetlands in Northern Nevada's Lahontan Valley, including wetlands within Stillwater National Wildlife Refuge and Carson Lake and Pasture (U.S. Fish and Wildlife Service 2010). The primary acquisition authority from Congress, Public Law 101-618, was analyzed and implemented in the 1996 Final EIS and Record of Decision – Water Rights Acquisition for Lahontan Valley Wetlands. The USFWS continues to acquire water rights from willing sellers, and in many cases, land and other real estate is included in the transaction. Not all of the real estate purchased is suitable to keep in the National Wildlife Refuge System. The USFWS proposes to sell lands outside the refuge, both those it has already acquired and those it may acquire in the future. At present, the USFWS owns 65 parcels with about 5,891 ac. (23.84 km^2) of land that would be eligible for sale.

The USFWS anticipates acquiring a similar number of parcels and acreage during the remainder of its Lahontan Valley water rights purchase program. The total acreage of lands and the exact locations of the properties that will be offered for sale are not fully known. Because the existing water rights acquisition program may last for another 15 years or more, the need to sell acquired land is expected to continue for a similar period.

Land sale revenues would be deposited into the Lahontan Valley and Pyramid Lake Fish and Wildlife Fund and used for additional water rights purchases for Lahontan Valley wetlands, payment of annual operations, and maintenance charges for water delivery and other authorized expenditures. These revenues would help offset the need for future federal appropriations to acquire and maintain water rights for Lahontan Valley wetlands.

Potential impacts related to the land sales project may include:

- Minor unknown erosion and introduction of noxious weeds
- Minor unknown air quality impacts
- Minor unknown impacts on vegetation
- Minor positive impacts on agricultural products, income and employment, farmlands, recreation, land use, social values, and Indian trust assets
- Minor adverse impacts on cultural resources and municipal/community services

4.3.11 Bango Refining Facility, Class II Air Quality Operating Permit

In 2008, an application was submitted to the Nevada Division of Environmental Protection by Bango Oil, LLC requesting a revision of Class II Air Quality Operating Permit AP2992-1473 (Nevada Division of Environmental Protection 2009). The Nevada Division of Environmental Protection issued the revised Class II Air Quality Operating Permit AP2992-1473, with appropriate restrictions. On May 13, 2011, Bango Refining NV, LLC again submitted a Class II application to the Nevada Division of Environmental Protection, Bureau of Air Pollution Control, requesting a revision of Class II Air Quality Operating Permit #AP2992-1473.01 (Nevada Division of Environmental Protection 2011). The permit application was deemed administratively complete on May 27, 2011. The revised permit is for continued operation of a used oil and recycled fuel oil re-refining facility that will process used oil and recycled fuel oil into value-added products. The permit was originally issued on January 25, 2005 and renewed on July 8, 2011. The revised permit includes several system and equipment modifications, including those to Oil Heater #1, RFO Re-Refining Unit #1, Oil Heater #2, Cooling Tower #1, Oil Heater #3, RFO Re-Refining Unit #2, Cooling Tower #2, Oil Heater #4, Cooling Tower #3, and several new system additions (Nevada Division of Environmental Protection 2011).

Bango Refining NV, LLC is at 22211 Bango Road, Fallon, Churchill County, Nevada (Nevada Division of Environmental Protection 2011), approximately at Universal Transverse Mercator 324.48 kilometers (km) east by 4,374.15 km north, Zone 11 (Section 23, Township 19 North, Range 26 East in Hydrographic Area 101). The changes to the facility-wide emissions result in a net increase of 13.69 tons/year for particulate matter and particulate matter less than or equal to 10 micrometers (µm) in diameter (PM_{10}), a net increase of 8.51 tons/year for nitrogen oxides (NO_x), a net decrease of 46.41 tons/year for sulfur dioxide, a net increase of 12.58 tons/year for carbon monoxide (CO), and a net increase of 1.63 tons/year for volatile organic compounds.

4.3.12 Carson City District Drought Management

The BLM Carson City District prepared an EA to address potential environmental consequences associated with different management actions carried out during drought (Bureau of Land Management 2013b). The Carson City District manages approximately 4.8 million ac. (194,249 km^2) of public land within Washoe, Carson City, Storey, Lyon, Douglas, Mineral, Churchill, and Nye Counties in Nevada, and Plumas, Lassen, and Alpine Counties in California. The Carson City District has two field offices that administer these public lands: the Sierra Front Field Office and the Stillwater Field Office. The Carson

City District also administers six grazing allotments for the Winnemucca and Battle Mountain BLM Districts.

The effects of drought are often far reaching, impacting the environment and economy of an area. The EA focuses primarily on the environmental impacts of drought and potential responses that could be implemented to alleviate impacts on sensitive resources. Specific impacts depend on drought severity but often include:

- Increased number and severity of fires
- Lack of forage and drinking water
- Decreased vigor and production of plants
- Damage to plant species
- Increased wind and water erosion of soils
- Reduction and degradation of fish and wildlife habitat
- Increased death loss of wildlife, wild horses and burros, and livestock

Implementation of the BLM drought management program is expected to positively affect these drought-related issues by allowing rapid response during drought conditions. Appropriate rapid drought response actions are used to alleviate the impacts of authorized uses and activities on natural resources that are at risk of being adversely affected by drought. The potential response actions (and associated impacts) include the following:

- Temporary changes in livestock season of use (socioeconomic impacts)
- Reductions in livestock animal unit months or livestock grazing duration (socioeconomic impacts)
- Targeted grazing (socioeconomic impacts)
- Wild horse and burro removals (biological resources impacts)
- Temporary water hauls (land use impacts)
- Above-ground pipelines and fences (soil impacts)
- Temporary closures to off-highway vehicles (land use and recreation impacts)
- Restriction of seed collection of forest and vegetative resources (land use impacts)

4.3.13 The 3 Bars Ecosystem and Landscape Restoration Project

The 3 Bars ecosystem is approximately 749,810 ac. (3,034 km^2) in central Eureka County, northwest of Eureka, Nevada (Bureau of Land Management 2013c). The ecosystem is administered by the BLM Mount Lewis Field Office. It is a shrub-steppe ecosystem with important resource values, including habitat for a diversity of plants and animals as well as traditional use areas for several American Indian tribes. The 3 Bars ecosystem provides important habitat for greater sage-grouse, mule deer, Lahontan cutthroat trout, and numerous other fish and wildlife species, including migratory birds, and for wild horses.

As stated in its draft EIS, the BLM proposes to treat vegetation using manual, mechanical, and biological control methods as well as fire (both prescribed and wildland fire for resource benefit) (Bureau of Land Management 2013c). Treatments would address multiple resource issues and aid in restoring functionality to key elements of the 3 Bars ecosystem. The BLM has identified site-specific treatment projects that it proposes to implement over the life of the project to restore and manage the 3 Bars ecosystem. Treatment projects were identified through an iterative process involving the BLM and other federal and state cooperating agencies. Treatments would focus on four priority vegetation

management concerns—riparian, quaking aspen, pinyon-juniper, and sagebrush—with an emphasis on improving greater sage-grouse priority habitats.

The 3 Bars ecosystem provides critical habitat for greater sage-grouse, a bird species that is being considered for federal listing as threatened or endangered under the ESA (Bureau of Land Management 2013c). Through sagebrush and other habitat restoration on the 3 Bars ecosystem, the BLM would help to reduce the likelihood that the greater sage-grouse will be federally listed in the future. Upon implementation, the management action is expected to positively impact the 3 Bars ecosystem and sage-grouse habitat through the following project purposes:

- Improve woodland, rangeland, and riparian health, productivity, and functionality
- Increase stream flows and restore channel morphology in degraded streams
- Improve stream habitat for fish and wildlife by implementing physical treatments that include installing large woody debris, rock clusters, and check dam, and using temporary fences to exclude livestock and wild horses
- Improve the health of aspen, mountain mahogany, and other mountain tree and shrub stands to benefit wildlife as well as the health of Native Americans who use these plants for medicinal and other purposes
- Manage pinyon-juniper woodlands to promote healthy, diverse stands within persistent woodlands
- Slow the expansion of pinyon-juniper into sagebrush and riparian plant communities
- Slow the spread of noxious weeds and other invasive non-native vegetation, including cheatgrass
- Protect and enhance habitat for fish and wildlife, including species of concern such as raptors, greater sage-grouse, and Lahontan cutthroat trout
- Restore fire as an integral part of the ecosystem; reduce the risk of large-scale wildfire; reduce extreme, very high, and high wildfire risks to moderate risk or less; and develop fuel breaks within the treatment and adjacent areas
- Protect life, property, and community infrastructure, and protect fish and wildlife habitat from devastating wildfire effects

Potential impacts from the ecosystem management actions include the following:

- Short-term air quality impacts related to prescribed burn treatments
- Short-term risks to terrestrial and aquatic vegetation (treatments would cause vegetation to return to an early successional stage)
- Water quality and soil impacts from accidental spills of fuels and lubricants
- Soil and erosion impacts stemming from mechanical treatments
- Short-term fish and wildlife impacts from sedimentation and treatment runoff
- Short-term impacts on livestock and wild horses from treatment noise, disturbance, loss of forage and water, and reduced water quality
- Cultural resources impacted by fire and equipment, mitigated by pre-treatment cultural resource surveys
- Short-term recreational impacts stemming from discoloration of treated vegetation, noise, and smoke
- Long-term recreational benefits from healthier vegetation, fewer noxious weeds, and reduced risk of wildfire

- Short-term socioeconomic impacts related to temporary area closures during prescribed burns
- Long-term socioeconomic benefits from improved ecosystem health and functionality

4.3.14 Isabella Pearl Gold Mine and Processing Facility

In 2011, the Isabella/Pearl LLC proposed to develop a cyanide heap leach gold mine and processing facility at the west end of the Santa Fe mining district in the Walker Lane gold belt about 9 mi. northeast of Luning, Nevada, in Mineral County (Bureau of Land Management 2011b). Proposed new development for the Isabella-Pearl deposits would consist of the following:

- Open-pit mining, crushing, and heap leaching of approximately 3–4 million tons of ore over 18–24 months
- Mining and processing 236,930 tons of ore per month over 16 months following 4–6 months of preproduction development and construction
- Shipping ore concentrates offsite to a permitted facility to complete the final processing
- Shipping sulfide ore offsite to a facility permitted to complete the final processing, or encapsulating it on site

Facilities will include open pits that will merge into a single pit; waste rock dump; hauling equipment (100-ton capacity); crushing and conveying equipment; heap leach pad divided into two cells; carbon adsorption-desorption-reactivation plant; pregnant solution pond; barren solution/storm water pond; sulfide ore stockpile pad; mine equipment shop; contractor storage yard; mobile offices and laboratories (atomic absorption analysis). Power to the project will be supplied by onsite diesel generators, and production water will be from onsite wells.

The scheduled mine life is approximately 3–4 years. Initial site preparation and construction would take place over 6–8 months, followed by approximately 16 months of active mining, then reclamation and closure activities over 6–8 months. The project is anticipated to employ 100–125 people.

In general, potential impacts related to the mineral extraction projects may include:

- Localized and permanent habitat alteration and wildlife dislocation
- Fugitive dust generation and vehicle/equipment emissions
- Potential mercury releases into the environment
- Surface and groundwater quality impacts and impacts on aquatic life
- Surface road/transportation systems degradation
- Short-term positive economic benefits

4.3.15 Bureau of Land Management Grazing Program

There are about 45 million ac. (182,109 km^2) of public rangelands in Nevada. These rangelands are divided into 745 grazing allotments. There are 550 operators, or permittees, with a total of 635 permits to graze livestock. For the BLM districts most notably within the FRTC Study Area, Table 4-2 presents the statistics for allotments, acres, and operators as of 2010.

Table 4-2: Allotment Statistics for Bureau of Land Management Districts Winnemucca, Carson City, and Battle Mountain (2010)

Data Pertains to Within Allotments	Winnemucca	Carson City	Battle Mountain
Public Acres	9,277,772	5,208,826	12,121,928
Percent of Total	20.68%	11.61%	27.03%
Other Acres*	1,906,203	458,440	732,118
Percent of Total	32.96%	7.93%	12.66%
Total Acres	11,183,975	5,667,266	12,854,046
Percent of Total	22.09%	11.19%	25.39%
Number of Operators**	95	52	70
Percent of Total	18.30%	10.02%	13.49%
Number of Allotments	104	114	93
Percent of Total	13.10%	14.36%	11.71%

* Includes "private," "other federal," and "state" in one total.
** Unique entities as entered into Rangeland Administration System. Some operators hold permits in more than one district.
Source: Bureau of Land Management 2010e

Public land grazing is managed to achieve the fundamentals of rangeland health as indicated by soil and site stability, hydrologic function, and biotic integrity. Potential impacts and challenges to successfully manage public land grazing include:

- Potential to exacerbate drought conditions
- Introduction of noxious weeds and invasive species (habitat alteration)
- Competition for water and other habitat resources with native wildlife

4.3.16 Cove Helen Underground Mine Project

According to a 2013 EA for the project, Au-Reka Gold Corporation, a wholly owned subsidiary of Premier Gold Mines Limited, plans to conduct surface exploration and underground drilling and bulk sampling activities at the Cove-Helen Underground Mine Project in north-central Nevada approximately 26 mi. (42 km) south of Battle Mountain, Nevada, in Lander County (Bureau of Land Management 2013d). The project is on public lands administered by the BLM Mount Lewis Field Office that consists of seven claims owned by Newmont McCoy Cove Limited and leased to Au-Reka Gold Corporation. The site is accessed by traveling south from Battle Mountain approximately 22 mi. (35 km) on Nevada State Route 305 and then west approximately 7 mi. on the McCoy/Cove Mine Road to the Project site.

Echo Bay Mines, Ltd. first conducted mining in the area at the McCoy/Cove Mine between 1987 and 2001 (Bureau of Land Management 2013d). In 2003, Newmont McCoy Cove Limited acquired the mining claims, but the property has been in closure since 2006. Victoria Resources, Inc. discovered the Helen Zone in 2007 during a surface exploration drilling program and has since sold the Project to Au-Reka Gold Corporation. Based on preliminary drilling information, the Helen Zone is a gold ore deposit consisting of an upper high-grade zone and a lower high-grade zone.

A Plan of Operations #NVN-088795/Nevada Reclamation Permit Application was submitted to the BLM and the Nevada Division of Environmental Protection Bureau of Mining Regulation and Reclamation in accordance with BLM Surface Management Regulations 43 C.F.R. 3809, as amended, and Nevada reclamation regulations at Nevada Administrative Code (NAC) 519A (Bureau of Land Management

2013d). Au-Reka Gold Corporation proposes to conduct activities that would consist of the following: surface exploration activities, underground portal, and workings construction; surface support facilities construction; mining and diamond drilling; bulk sample collection; development water management; and portal and workings closure and reclamation. A maximum of 120,000 tons of ore would be removed and tested over the life of the project. This ore would be transported offsite to either the Jarrett Canyon or Newmont Carlin Mill 6 facility for metallurgical testing. Au-Reka Gold Corporation would locate the majority of the new surface support facilities in previously disturbed areas or reclaimed surfaces, including using the former locations of the rapid infiltration basins associated with the former McCoy/Cove Mine operations.

The project area measures approximately 2,474 ac. (10.01 km^2) in which all of the proposed surface and underground activities would occur (Bureau of Land Management 2013d). The plan proposes to create 465.32 ac. (1.88 km^2) of project-related disturbance, which includes 330.27 ac. (1.34 km^2) of surface facility disturbance, 30.11 ac. (0.12 km^2) of existing disturbance (currently the responsibility of Newmont to reclaim), 4.94 ac. (0.02 km^2) of existing notice-level surface exploration disturbance (#NVN-087927), and an additional 100.00 ac. (0.40 km^2) of surface exploration disturbance.

Potential environmental impacts associated with the Cove Helen underground mining project may include:

- Emissions of fugitive dust and vehicle and other equipment emissions
- Potential cultural resource impacts
- Soil erosion and surface water sedimentation
- Inadvertent wildland fire generation
- Regulated waste generation and potential petroleum spills
- Noxious weed dispersal
- Nest disturbance of migratory birds during exploration activities
- BLM special status species impacts on pale kangaroo mouse (*Microdipodops pallidus*), dark kangaroo mouse (*Microdipodops megacephalus*), and sand cholla (*Opuntia pulchella*).

4.3.17 Mount Hope Molybdenum Open Pit Mine, Eureka County, Nevada

The Mount Hope project is on public land administered by the BLM and on private land (Bureau of Land Management 2012). The project is a proposed molybdenum mine that includes a power transmission line, a water well field, and all associated mine processing facilities in central Nevada, about 23 mi. northwest of Eureka, Nevada. The 80-year project would have an 18- to 24-month construction phase, 44 years of mining and ore processing, 30 years of reclamation, and 5 years of post-closure monitoring. The Mount Hope ore body contains approximately 966 million tons of molybdenite (molybdenum disulfide) ore that would produce approximately 1.1 billion pounds of recoverable molybdenum during the ore processing time frame. About 1.7 billion tons of waste rock would be produced by the end of the 32-year mine life, and approximately 1.0 billion tons of tailings would be produced by the end of the 44 years of ore processing. Optimal development of the molybdenum deposit, to meet the market conditions and maximize molybdenum production, would use open pit mining and would process the mined ore using a flotation and roasting process. The surface disturbance associated with the proposed activities totals 8,355 ac. (33.81 km^2) on both public and private lands.

Potential environmental impacts associated with the Mount Hope mining project may include

- Emissions of fugitive dust and vehicle and other equipment emissions

- Potential cultural resource impacts
- Soil erosion and surface water sedimentation as mitigated by implementation of the Mount Hope Project Waste Rock Management Plan
- Regulated waste generation and potential petroleum spills
- Socioeconomic impacts in terms of potential increased demand for county-provided services
- Avian species nesting impacts through surface disturbance activities
- The spread of noxious weeds as managed through a Noxious Weed Plan
- Accidental wildland fire ignition

4.3.18 HUMBOLDT-TOIYABE NATIONAL FOREST MANAGEMENT

The USFS Austin and Tonopah Ranger Districts manage the 1.2 million ac. (0.5 million hectare) of the Humboldt-Toiyabe National Forest that underlie the FRTC airspace for development of mineral resources, dispersed recreation, and intensive wildlife uses. The Toiyabe National Forest includes three designated wilderness areas. The Arc Dome Wilderness Area and portions of the Alta-Toquima and Table Mountain Wilderness Areas are within the FRTC Study Area. These lands are managed in accordance with the 1986 Humboldt and Toiyabe National Forest Land and Resource Management Plans and subsequent amendments through January 2009. As of May 2009, work on the Forest Plan revision for Humboldt-Toiyabe National Forest was suspended to focus on other forest priorities.

4.3.19 DESIGNATED WILDERNESS AND WILDERNESS STUDY AREAS

Nevada's geographic boundary includes 45 wilderness areas and 64 wilderness study areas (Bureau of Land Management 2007). These wilderness areas and wilderness study areas are listed under the field office with primary administrative jurisdiction.

- The number of acres in wilderness areas within the State of Nevada is 2,056,545 (approximately 136,788 acres within the FRTC Study Area).
- The number of acres in wilderness study areas within the State of Nevada is 2,552,457 (approximately 884,409 acres within the FRTC Study Area).

Figure 4-2 illustrates Wilderness Management Areas, Wilderness Study Areas and National Wildlife Refuges in whole or in part within the FRTC Study Area. Table 4-3 lists these areas along with the acreage of each contained within the FRTC Study Area.

Legislation creating designated wilderness areas in Nevada includes the following:

- **Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area Act of 2000.** Public Law 106-554, passed on December 21, 2000, was amended on November 6, 2001. The National Conservation Area Act of 2000 created 10 wilderness areas in and contiguous with the national conservation area. Seven are entirely within the boundaries of the Winnemucca Field Office. Two other wilderness areas are partly within the Winnemucca Field Office. One other is entirely within the Surprise Field Office, and the remaining parts of the other two are also within the Surprise Field Office.
- **Clark County Conservation of Public Land and Natural Resources Act of 2002.** This bill designated 17 wilderness areas in Clark County, Nevada, and expanded one existing wilderness Area. Of these, 13 are managed in whole or in part by the BLM.

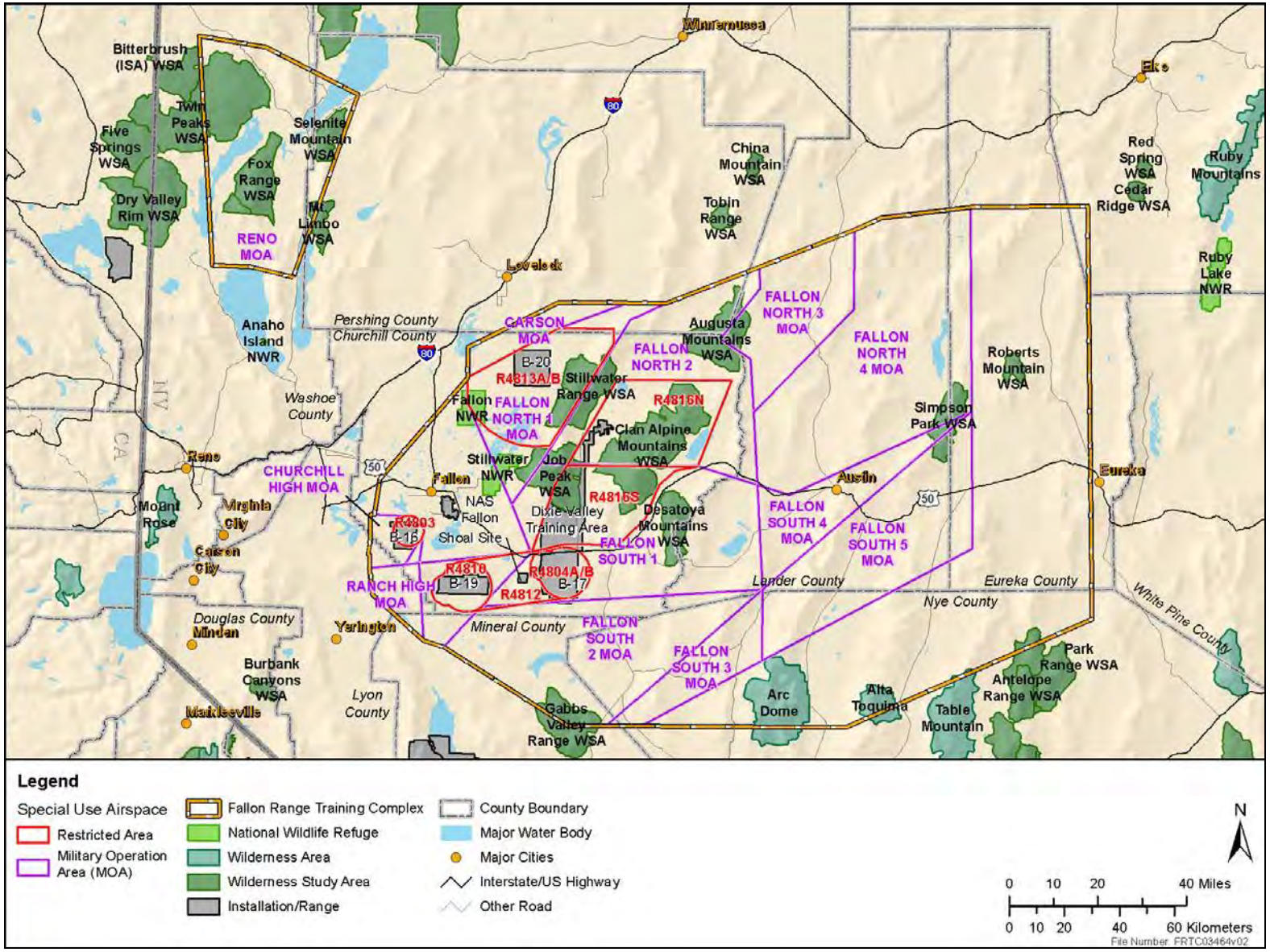

Figure 4-2: Wilderness Areas and Wilderness Study Areas Within or Near the FRTC Study Area

- **Lincoln County Conservation, Recreation, and Development Act of 2004.**
  Public Law 108-424 was passed on November 30, 2004. It created 14 new wilderness areas in Lincoln County.
- **White Pine County Conservation, Recreation, and Development Act of 2006.**
  On December 20, 2006, Public Law 109-432 created in Nevada 12 new wilderness areas and expanded 2 existing wilderness areas. Eight of those areas are managed by the BLM Ely Field Office.

Table 4-3: Acreage of Wilderness Areas and Wilderness Study Areas Overlapping the FRTC Study Area

Area Name	Acreage
National Wildlife Refuges	
Fallon National Wildlife Refuge	28,137.21
Stillwater National Wildlife Refuge	24,847.14
Wilderness Areas	
Alta Toquima	26,166.35
Arc Dome	108,620.04
Table Mountain	2,001.34
Wilderness Areas	
Antelope Range	9,862.95
Augusta Mountains	88,724.27
Buffalo Hills	628.61
Clan Alpine Mountains	193,768.69
Desatoya Mountains	50,108.38
Fox Range	74,444.72
Gabbs Valley Range	34,990.74
Job Peak	88,609.95
Mt. Limbo	3,724.40
Pole Creek	9,855.31
Poodle Mountain	136,246.17
Roberts Mountain	15,045.50
Selenite Mountain	32,207.17
Simpson Park	49,760.59
Stillwater Range	94,571.79
Twin Peaks	1,860.12

Wilderness study areas are evaluated and determined to be suitable or not suitable for wilderness designation. For example, in the Winnemucca Field Office region for 15 wilderness study areas, only 50,750 ac. (205 km^2) are recommended suitable and 469,752 ac. (1,901 km^2) are recommended not suitable.

Proposed legislation to create wilderness in Nevada includes House of Representatives 5205: Northern Nevada Land Conservation and Economic Development Act. This bill was reported by Committee on July 30, 2014, and was passed by the House of Representatives on September 15, 2014. A vote on the bill had not yet been held in the Senate as of November 10, 2014. The bill would designate 26,000 ac. of federal land managed by the BLM as wilderness in Humboldt County, Nevada. The Pine Forest Range

Wilderness in Humboldt County is outside of the FRTC Study Area. The bill would designate 47,449 ac. of federal land managed by the USFS as wilderness in Lyon County, Nevada. The Wovoka Wilderness in Lyon County is outside of the FRTC Study Area. The bill would not restrict or preclude low-level military overflights of either Wilderness, flight testing and evaluation, or the designation or creation of new units of SUA or the establishment of military flight training routes over either Wilderness.

4.3.20 Implementation of Integrated Natural Resources Management Plan

The most recent update to the Integrated Natural Resources Management Plan (INRMP) for NAS Fallon was completed in July 2014. The plan fulfills the requirements for the INRMP in accordance with the Sikes Act (16 U.S. Code 670a et seq.), as amended, DoD Instruction 4715.03, and Chief of Naval Operations Instruction 5090.1D. The INRMP was prepared and reviewed in coordination with U.S. Department of Interior, USFWS, and Nevada Department of Wildlife. The purpose of INRMP is to provide NAS Fallon with a viable framework for future management of natural resources on lands it owns or controls.

4.3.21 Milk Processing Plant in Fallon, Nevada

As of the end of 2013, the Dairy Farmers of America were finishing construction of a 90,000 $ft.^2$ (776.2 m^2) milk processing plant in Fallon, Nevada's New River Industrial Park. The powdered milk processing plant is expected to boost the local economy through creation of 44 full-time jobs and hundreds of indirect jobs (Capital Press 2012). The plant will be capable of processing 2 million pounds of milk each day for worldwide distribution. The regional dairy herd is expected to double; the economic impact of that alone is $25 million. Churchill, Washoe, Lyon, and Pershing counties are expected to benefit economically.

4.4 Cumulative Impacts Analysis

4.4.1 Soils

The analysis in Section 3.1 (Soils) indicates that the No Action Alternative, Alternative 1, and Alternative 2 would result in long-term, minor, and localized impacts on soils. Ground-disturbing activities during training would increase soil susceptibility to erosion, compaction, and displacement. Direct effects would occur in previously disturbed areas along roads and on ranges. The effects of lead or explosive contaminants on soils from the use of high-explosive munitions would be long term and localized. Concentrations of lead or explosives in soils would not represent a substantial threat of a release to an off-range area that poses unacceptable risk to human health or the environment. It is not anticipated that the Proposed Action would have significant impacts on soils.

Actions listed in Table 4-1 that would affect soils within the FRTC Study Area include military and nonmilitary construction projects, the grazing allotment program, mining, and the construction phase of energy development projects (e.g., geothermal, solar, and wind). Updating and implementing regional conservation plans, such as the BLM Carson City Consolidated Resource Management Plan, drought management, and forest management plans, would contribute to the minimization of cumulative impacts over the long-term through certain habitat modifications, annual unit monitoring, and stream stabilization. Short-term, negligible soil disturbance is associated with implementation of certain drought response actions and restoration of the 3 Bars ecosystem. Resource management plans and other federally sponsored projects in the FRTC Study Area each undergo separate environmental review, which will ensure that significant impacts related to soils would be avoided, minimized, or compensated to the extent practicable.

Therefore, when combined with past, present, and reasonably foreseeable future projects, implementation of the Proposed Action would not result in significant cumulative impacts on soils.

4.4.2 AIR QUALITY

4.4.2.1 Impacts of the Alternatives That Might Contribute to Cumulative Impacts

As discussed in Section 3.2 (Air Quality), all of the Alternatives would result in air pollutant emissions, and emissions would increase under Alternatives 1 and 2 (see Tables 3.2-4 and 3.2-5). The increases in emissions would be attributable to mobile sources, primarily additional aircraft overflights and operation of vehicles and equipment on the ranges. The air pollutants emitted in the greatest quantities would be NO_x, suspended PM_{10}, suspended particulate matter less than or equal to 2.5 µm in diameter, and CO. In addition, vehicle use and ordnance expenditure under the No Action Alternative, Alternative 1, and Alternative 2 would generate fugitive dust and combustion emissions. These emissions would not contribute to long-term changes in air quality because the emissions would be intermittent and temporary given the nature and duration of training activities (see Section 2.4, No Action Alternative – Current Training Activities at Fallon Range Training Complex, and Table 2-6).

4.4.2.2 Impacts of Other Actions

Most of the other actions listed in Table 4-1 would result in some air pollutant emissions. Many of the other actions would involve construction. Construction projects would generate fugitive dust and combustion emissions during the construction phase and would contribute incrementally to air quality impacts. However, these emissions would not contribute to long-term changes in air quality because the emissions would be intermittent and temporary. For example, construction-related emissions for the energy production facilities may occur over a few months of the construction phase. Once in operation, alternative energy projects (e.g., solar, wind, and geothermal) result in long-term regional emissions reduction as they displace other forms of energy production. As discussed in Section 4.3, changes to the Bango refining facility's recently approved state permit will result in a net increase in particulate matter, nitrogen oxides, carbon monoxide, and volatile organic compound emissions, and a net decrease for sulfur dioxide emissions. In addition, proposed projects and land uses on BLM lands (including certain drought response actions taken by BLM) could generate fugitive dust within the FRTC Study Area. The 3 Bars ecosystem restoration program is likely to involve the use of mechanical dust-creating treatments and prescribed fires. As described in the EIS for this program, the treatments will result in short-term emissions but long-term benefits through the reduction of wildfire risk.

According to the Carson City District Drought Management EA (Section 4.3.12), during summer wild horse and burro gathers, roads, and corrals may become dusty, depending upon the soils and specific conditions at the gather area (Bureau of Land Management 2013b). The BLM contracting officer's representative, project inspector, and the contractor mitigate any potential impacts from dust by slowing speeds on dusty roads and watering down corrals and alleyways. The BLM and the contractor proactively control dust in and around the holding facility and the gather corrals. Winter gathers may be used to minimize fugitive dust and stress on the wild horses.

Additionally, past, present, and reasonably foreseeable future actions cumulatively affecting air quality have been identified as smoke, ash, and debris from wildland fires/prescribed burns, fugitive dust from mining activities and off-highway vehicle use of unimproved roads, combustion engine emissions, wind erosion of disturbed areas, and herbicide applications. The Sand Mountain Recreation Area in Churchill County is a popular destination for off-highway vehicle use (Bureau of Land Management 2013e). The

number of off-highway vehicles may increase the level of dust locally, but with few nearby sources of emissions besides Highway 50 traffic, it should not pose any health risks to air quality.

4.4.2.3 Cumulative Impacts on Air Quality

Land training activities proposed under the No Action Alternative, Alternative 1, and Alternative 2 would generate fugitive dust and combustion emissions. While these emissions would not contribute to long-term changes in air quality, the potential for localized cumulative impacts exists if the activities were to overlap in time and space. The primary concern would be simultaneous generation of fugitive dust. Other ongoing and foreseeable projects that generate fugitive dust within the FRTC Study Area include mining, construction of energy generation facilities, grazing, drought management, and ecosystem restoration activities. Fugitive dust generation associated with these projects is typically localized and short term. Some of these projects may coincidentally overlap in time but not in space with fugitive dust generated on land training ranges. Due to the localized and short duration of land training activities, fugitive dust emissions, in combination with other foreseeable dust emission sources, would not result in substantial impacts in a localized area. The Proposed Action, in combination with other foreseeable dust-generating sources and projects, would not produce significant cumulative air quality impacts.

One long-term emission source identified for cumulative impact analysis is the Bango refinery stationary source. The Bango refinery is in Hydrographic Area 101, which contains 2,022 mi^2 (5,237 km^2). The recent changes to the facility-wide emissions were below public notice thresholds pursuant to NAC 445B.3457.5. According to air impact studies, the Bango facility has demonstrated compliance with the Nevada and National Ambient Air Quality Standards and compliance with the allowable Prevention of Significant Deterioration increment consumption for nitrogen oxides in Hydrographic Area 101. The analysis demonstrated that the emissions from the source would not cause or contribute to a violation of any applicable federal or state ambient air quality standards.

It is not anticipated that air emissions from other past, present, and future actions, when considered incrementally with the No Action Alternative, Alternative 1, and Alternative 2, would exceed any regulatory standards. This is especially true in a region already in attainment for all criteria pollutants. The aircraft training activities associated with the Proposed Action and other regional construction and land use management projects could produce a short-term additive amount of emissions if they are concurrent. A small portion of the proposed aircraft flight training activities take place within SUA over Hydrographic Area 101 (co-located with the Bango refinery), but the great majority of the flight training activities (and associated emissions) take place elsewhere across the vast FRTC Study Area SUA. Due to the mobile nature and short duration of aircraft operations, combustive emissions from these sources, in combination with ongoing and future emission sources, would not result in substantial impacts in a localized area.

Therefore, when past, present, and reasonably foreseeable future projects are analyzed together with the Proposed Action, there would be no significant cumulative impacts on regional air quality from implementation of the Proposed Action.

4.4.3 WATER QUALITY

The analysis presented in Section 3.3 (Water Quality) indicates that the No Action Alternative, Alternative 1, and Alternative 2 would have negligible impacts on water resources. In no instances would military deposited materials have a significant impact on surface or ground water quality on the FRTC ranges. Current best management practices would continue to be implemented, including spill prevention, control, and countermeasures. The Proposed Action carries the potential for incidental

spills, primarily from refueling activities during certain training activities. The Proposed Action involves soil disturbance and compaction associated with ground training and ordnance deliveries to B-16, B-17, B-19, B-20, Dixie Valley, and the Shoal Site. These activities can disturb or compact soils, thus increasing runoff intensity and sediment loads in local watercourses. The potential for these activities to substantially affect surface waters is low, however, because the areas of disturbance would be small, disturbance events would be infrequent, and intense rainfall capable of generating substantial surface flows is very infrequent. The potential for groundwater contamination on the FRTC Study Area ranges would continue to be evaluated through the Range Sustainability Environmental Program Assessment process and during 5-year range condition assessment updates. Continued implementation of the operational range clearance plan would also substantially reduce potential impacts on groundwater.

Other actions listed in Table 4-1 that may impact water quality within the FRTC Study Area through erosion and sedimentation include military and nonmilitary construction projects, mineral extraction, the grazing allotment program, and the construction phase of energy development projects (e.g., geothermal, solar, and wind). Negligible water quality degradation is associated with implementation of certain drought response actions and restoration of the 3 Bars ecosystem (via accidental spills of petroleum products). Resource management plans and other federally sponsored projects in the FRTC Study Area each undergo separate environmental review, which will ensure that significant impacts related to water quality impacts would be avoided, minimized, or compensated to the extent practicable.

Generally restricted to the individual land range area targets and off-road networks, the Proposed Action would potentially impact only a small fraction of the FRTC Study Area surface or ground water quality. Other actions within the FRTC Study Area (e.g., livestock grazing and other multiple uses, including off-road vehicle use) would potentially impact water quality across much larger portions of the FRTC Study Area through land disturbance, soil erosion, and surface runoff. The addition of the Proposed Action to past, present, and reasonably foreseeable actions would minimally increase the cumulative impacts on water quality on the regional scale.

Therefore, when combined with past, present, and reasonably foreseeable future projects, implementation of the Proposed Action would not result in significant cumulative impacts on water quality on a local or regional scale.

4.4.4 NOISE

The analysis presented in Section 3.4 (Noise [Airborne]) indicates that sensitive receptors could be affected by acoustic stressors. Potential impacts include localized disturbances, which are brief events after which normal environmental conditions would return quickly (ambient). The impacts of the No Action Alternative, Alternative 1, and Alternative 2 would be cumulative with other actions that cause acoustic disturbances to sensitive receptors. Based on the analysis presented in Section 3.4 (Noise [Airborne]) and the reasons summarized below, the incremental contribution of Alternatives 1 and 2 to cumulative impacts would be low for the following reasons:

- Sound impacts from training activities under Alternative 1 are minor to negligible on lands outside of the Target Areas and are partially mitigated by the training schedule.
- Aircraft training activities within the FRTC occur primarily during the day, whereas individuals are most sensitive to sound at night.
- The areas surrounding the FRTC SUA are primarily rural, natural, agricultural, or industrial, and so very few members of the public are exposed to sound from FRTC training activities.

Future development, consisting of the specific projects listed in Section 3.4 (Noise [Airborne]), along with regional growth of urban areas, mining, and regional increases in solar and geothermal energy development, would incrementally increase average sound levels during construction as well as during operation. Construction related to new development of energy sources or industry (e.g., powdered milk processing facility) would result in short-term increases in daytime sound levels near those projects. In rural portions of Churchill, Lander, and Eureka Counties, vehicle noise from increased traffic on local roads and regional highways would be the largest sources of increased noise. Daytime sound levels would likely increase more than nighttime sound levels. Substantial increases in sources of intrusive sound are not expected.

Noise associated with NAS Fallon existing and future airfield operations were assessed in the 2013 EA. The results of that noise analysis show shrinkage of noise zones northeast of NAS Fallon because the F-35C climbs out faster than the FA-18C/D/E/F. However, the noise contours expand southwest of the installation as they would be dominated by FA-18E/F operations. The expansion of the noise contours to the southeast would increase the noise exposure of existing populations by 1 dB Day Night Average Sound Level (DNL), from 85 dB to 86 dB. As a result, about 20 individuals (an increase of 9 individuals) would be exposed to noise levels greater than 80 A-weighted dB (dBA) 24-hour equivalent continuous sound level (Leq24). While living in areas that are subjected to elevated noise levels for long periods of time could induce hearing loss to people residing in those areas, no research results to date have definitively related permanent hearing impairment to aviation noise. The EA analysis also indicated that future changes in airfield operations at NAS Fallon would potentially result in minor increases in speech, classroom, and sleep disturbance.

Range complex noise issues are ameliorated by cooperative agreements with county governments. For example, Churchill County range compatibility buffers are defined by Churchill County as 3 mi. and 5 mi. buffers within the official zoning maps (U.S. Department of the Navy 2012). The range compatibility buffers for training ranges B-16 and B-19 are based on the boundary of withdrawal land closed to public access. The buffer for training range B-17 is based on the range boundary before the 1999 Military Land Withdrawal Act. These buffer zones delineate areas within which Churchill County will not implement proposed development without consulting NAS Fallon. Furthermore, these areas are identified by Churchill County for purchase of conservation or restrictive easement or other mechanism to minimize residential development within buffer zones. The Churchill County range compatibility buffers are considered important for protecting the training range assets from land use incompatible with current and future FRTC priority mission areas.

Overall, cumulative increases in long-term average sound levels in rural portions of Churchill, Lander, and Eureka Counties from planned and proposed projects would not be significant. Additionally, the increase in training activities associated with the Proposed Action would not increase long-term community sound levels above 65 dBA beyond the FRTC Study Area boundary. It is assumed that construction-related noise impacts generated from other projects would be short in duration and dominated by the noise generated from aircraft operations either around the airfield or in the SUA. The potential for the construction-related noise to overlap in both temporal and geographic extent of impact is remote.

Therefore, when past, present, and reasonably foreseeable future projects are analyzed together with the Proposed Action, significant cumulative impacts on the noise environment from the implementation of Alternative 1 or 2 would not occur.

4.4.5 BIOLOGICAL RESOURCES

4.4.5.1 Impacts of the Alternatives That Might Contribute to Cumulative Impacts

The analysis presented in Section 3.5 (Biological Resources) concluded that the combined effects of noise stressors, energy stressors, and physical disturbance and strike stressors under the Proposed Action would not have significant impacts on biological resources, including special status species. Certain land-based training activities may result in minimal direct impacts on non-federally listed rare plant and wildlife species from habitat loss. However, the Proposed Action would not adversely affect sediments, water, or air quality and, therefore, would not indirectly impact terrestrial species or habitats.

Noise (from aircraft and weapons firing, launch, and impact) may elicit physiological and behavioral responses under the Proposed Action. Exposed individuals would be expected to quickly recover from these responses, and exposure would be intermittent and infrequent. The short-term behavioral responses are not expected to affect the fitness of individuals. Therefore, population-level effects would not occur. Noise would have short-term minor effects on special status species, which would be widespread throughout the lands underneath the FRTC. Short-term behavioral responses to energy stressors (i.e., electromagnetic radiation and lasers) are not expected to affect the fitness of individuals. Therefore, population level effects would not occur. Energy stressors would have short-term effects on special status species, which would be widespread throughout the lands underneath the FRTC SUA. The intensity of effects of disturbance and strike stressors on wildlife species may be considered minor. Though individual animals may be impacted by disturbance or strike, it is not anticipated that population-level effects would occur.

4.4.5.2 Impacts of Other Actions

Other past, present, and reasonably foreseeable future actions that could impact biological resources include the geothermal energy projects, various wind and solar energy projects, and mineral extraction. The expected impacts may include temporary disturbance, habitat loss and degradation, habitat fragmentation, and incidental mortality. Estimates of annual avian mortality from wind turbines range from 10,000 to more than 500,000 (Frosch 2013). The wind turbine permitting process is designed to minimize avian mortality through choice of location and project design.

Mineral extraction projects result in localized habitat loss and can lead to more widespread habitat loss where surface or groundwater supplies are impacted by chemical runoff. Livestock overgrazing can denude the landscape of vegetative cover and contribute to soil erosion, sedimentation, and habitat degradation. Biological resources are also impacted over the short term through implementation of the 3 Bars ecosystem restoration program involving prescribed burns and mechanical treatments.

Certain ongoing and future actions listed in Table 4-1 that would provide long-term benefits for regional habitats would also benefit biological resources. These actions include the Lahontan Valley land sales, drought management, 3 Bars ecosystem and landscape restoration, BLM and USFS management plans, wilderness designations, and implementation of the *NAS Fallon Integrated Natural Resources Management Plan*. These projects, plans, and programs offset certain short-term habitat degradation by establishing ecosystem alterations or changes to management practices that promote or restore a more natural or healthy ecosystem capable of sustaining a more diverse population of biological resources.

4.4.5.3 Cumulative Impacts on Biological Resources

Past actions have resulted in significant impacts on regional habitats. Corresponding significant impacts on wildlife populations occurred as these habitats were converted to agriculture, grazing, and other human uses. Wildfire and noxious weed and invasive plant infestations have also contributed to the impacts on wildlife. Cumulative impacts of future actions on biological resources were considered in local and regional contexts. The Proposed Action would result in localized adverse effects on biological resources.

Ongoing and future natural resources management activities on Navy-owned land, BLM land, and USFS land would protect and benefit biological resources in the region, including the federal candidate species, greater sage-grouse (*Centrocercus urophasianus*), the non-federally listed rare wildlife species such as the prairie falcon (*Falco mexicanus*), Brazilian free-tailed bat (*Tadarida brasiliensis*), pallid bat (*Antrozous pallidus*), and birds protected under the Migratory Bird Treaty Act. Expansion of the Stillwater National Wildlife Refuge would protect important habitat for migratory waterfowl, shorebirds, colony nesting birds, and marsh birds.

Future actions within the FRTC Study Area, including the geothermal projects, solar and wind energy projects, transmission line projects, and mineral extraction are expected to impact wildlife and wildlife habitat in the FRTC Study Area and in the region. Estimating the area of habitat that would be impacted by other actions is not possible based on available information. Future wind energy projects may not be built without sufficient transmission line infrastructure. Energy projects and mineral extraction projects have generally localized impacts on habitat and are often offset by the requirement for project mitigation. It is expected that given the rigorous process of site evaluation and mitigation measures or best management practices, other future actions would affect a relatively small percent of important habitats.

Restorative projects are ongoing and reasonably foreseeable, including those projects to restore the 3 Bars ecosystem in Eureka County and drought response actions (including grazing allotment management) to minimize habitat impacts during moderate or severe drought conditions. These ambitious management plans across BLM districts and ecosystems have the potential to reverse past habitat losses on a regional scale.

Cumulatively, while individual plants and wildlife species may be affected by any project, the overall distribution or abundance of populations and habitats and ecosystem functions and values would not be significantly affected. Other ongoing and reasonably foreseeable construction projects are likely to result in localized habitat loss and minor impacts on biological resources, while regional projects are likely to offset some past habitat loss and improve habitat for biological resources. The Proposed Action may elicit behavioral responses in wildlife, and individual animals may be impacted by acoustic, energy, physical disturbance, and strike. However, species would not be impacted at a population level. Although the Proposed Action involves an increase in training activities, the impacts on biological resources would be similar to those already in place since NAS Fallon was built in 1942.

Therefore, when added to the impacts from the identified cumulative projects, there would be no significant cumulative impacts on biological resources from implementation of any of the alternatives.

4.4.6 LAND USE AND RECREATION

4.4.6.1 Impacts of the Alternatives That Might Contribute to Cumulative Impacts

As discussed in Section 3.6 (Land Use and Recreation), lands underneath the FRTC SUA would experience aircraft overflights under the No Action Alternative, Alternative 1, and Alternative 2. However, at the flight altitudes expected and confinement of flight training to the established SUA, no changes to historical land uses or recreational activities are expected in these areas. Existing land uses would remain compatible with operations in Range Compatibility Zones I, II, and III under the Proposed Action.

4.4.6.2 Impacts of Other Actions

Proposed construction and airfield operations evaluated in the NAS Fallon Airfield Operations EA were considered to be consistent with current and proposed land uses at NAS Fallon (U.S. Department of the Navy 2013). Areas adjacent to NAS Fallon were expected to experience an overall decrease in noise greater than 65 dB day-night average sound level. No significant impacts on land use and recreation were expected from implementation of the proposed action to maintain current/baseline airfield operations, conduct airfield operations with new types of aircraft, and increase airfield operations to support future potential training conditions.

Proposed naval special warfare training in B-16 would be compatible with existing and future land uses and would enhance, rather than interfere with, the mission of the base. Implementation of proposed naval special warfare training on B-16 would result in a change of land use on withdrawn BOR land, where public access would be restricted for exclusive military use. While this change would prohibit public recreational activities in a 1,035 ac. (4.219 km^2) unfenced area south of Sand Canyon Road and would result in an impact on the existing user (public), this area is already withdrawn for Navy use and represents only a small fraction of land available in the region for recreational uses.

The BLM administers nearly 48 million ac. of public land in Nevada (Bureau of Land Management 2013f). BLM public lands make up about 67 percent of Nevada's land base. The USFS manages over 7 percent of Nevada's land base. In fact, approximately 83 percent of all land in Nevada is federal land (University of Nevada Reno 2001). The Federal Land Policy and Management Act of 1976 mandates that multiple use and sustained yield principles govern the management of public lands. The concept of multiple-use directs the BLM to manage public lands to best meet the present and future needs of the American people. The Federal Land Policy and Management Act (Section 103) defines multiple use as "a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources" and sustained yield as "the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the public lands consistent with multiple use." Under the principles of multiple use as mandated by the Federal Land Policy and Management Act, other uses of the land such as mining, grazing, recreation, or fluid minerals leasing are allowed.

The entire state of Nevada has been recognized as having geothermal potential (Bureau of Land Management and U.S. Forest Service 2008). Seventy-one geothermal projects have recently been initiated throughout the state of Nevada (University of Nevada Reno 2013). Over half of these are within the FRTC Study Area. Various long-term or short-term impacts on land use and recreation can occur during the geothermal exploration, drilling operations, and utilization phases.

4.4.6.3 Cumulative Impacts on Land Use and Recreation

Cumulative impacts on land use and recreation would be determined significant if proposed training or other area projects alter or disrupt area land use to the extent that there is a loss of usability, routine activities would no longer be feasible, or either the historical or designated land use would be modified. Under Alternatives 1 and 2, there would be a moderate increase in aircraft overflights in comparison to the No Action Alternative. However, overall noise levels within the FRTC Study Area are not expected to increase in comparison to historical levels. Therefore, land uses and recreation sensitive to noise are not expected to be significantly impacted. Most regional projects only have temporary land use impacts during the construction phase. The special warfare training on B-16 project would result in a change of land use on withdrawn BOR land, where public access would be restricted for exclusive military use. Recreational land uses may be temporarily restricted under certain BLM drought responses actions and during certain 3 Bars ecosystem restoration activities. The activities proposed are compatible with existing land uses, zoning in the region, and the multiple use mandate of Federal Land Policy and Management Act. Because there would be no change to training locations, training range, or airspace boundaries, and land uses would remain compatible with training activities under the Proposed Action, the Proposed Action would not contribute incrementally to land use and recreation impacts within the FRTC Study Area.

Therefore, when added to the impacts from the identified cumulative projects, there would be no significant cumulative impacts on land use and recreation resources from implementation of any of the alternatives.

4.4.7 Socioeconomics, Environmental Justice, and Protection of Children

The analysis presented in Section 3.7 (Socioeconomics, Environmental Justice, and Protection of Children) indicates that increases in training activities would not change the current socioeconomic conditions (employment, housing, and population growth) within the Study Area because the Navy would maintain baseline levels of personnel already employed at NAS Fallon that are attributed to military readiness activities. Therefore, regional and community economics, employment, housing, and population growth would not change as attributed to this factor. Loss of revenue or employment changes to human activities in the FRTC Study Area would not be expected under the Proposed Action. Air quality, water quality, noise, and safety resource impacts would not result in disproportionately high and adverse human health or environmental effects on minority and low-income populations and would not present risks to children. Based on the analysis presented in Section 3.7 (Socioeconomics, Environmental Justice, and Protection of Children) the contribution of Alternatives 1 and 2 to cumulative impacts would be low.

Future development, consisting of the specific projects listed in Section 4.3 (Other Actions Analyzed in the Cumulative Impacts Analysis), along with regional growth of urban areas, regional increases in solar and geothermal energy development, mineral extraction, and the establishment of the powdered milk processing facility would increase economic benefits, especially where the projects use local resources. Construction related to new development would result in short-term increases in the use of local workforce.

Overall, cumulative increases in long-term economic benefits in Study Area counties from planned and proposed projects would not be significant. Therefore, further analysis of cumulative impacts on socioeconomics is not warranted.

4.4.8 TRANSPORTATION

The analysis in Section 3.8 (Transportation) indicates that the impacts of the No Action Alternative, Alternative 1, and Alternative 2 on transportation would be negligible. The nominal volume of additional traffic accessing NAS Fallon (or BLM and state routes within the FRTC Study Area) during operation of the proposed training ranges would have less than significant impact on the level of service of U.S. Route 50, BLM roads, and state routes within the FRTC Study Area.

The restricted areas, military operations areas, and air traffic control assigned airspace within the FRTC under the No Action Alternative, Alternative 1, and Alternative 2 limit the amount of commercial aviation traffic through the SUA. However, flight publications and Notices to Airmen would allow general aviators the opportunity to plan around military readiness activities, and general aviators would still be allowed to operate under visual flight rules within the military operations areas. Any impacts on nonmilitary aviation activities would be less than significant impacts on commercial or general aviation activities because the airspace may be available for use by nonparticipating aircraft when all or part of the airspace is not needed by the using agency.

Construction and operation of the regional energy and mineral extraction projects would have minimal cumulative impacts on transportation because the projects are generally consistent with the land use patterns within the region and do not alter local transportation routes. Given the persistently high unemployment rates in 2013, new energy, industrial, agricultural, or mineral extraction projects within the Study Area are not likely to require substantial in-migration of workforce personnel. The needed workforce may be obtained from the existing pool of working-age individuals. Transportation systems are not expected to change substantially in the foreseeable future within the FRTC Study Area to accommodate commerce and county populations.

The incremental impacts of the Proposed Action would not represent any appreciable contribution to cumulative transportation impacts when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts on transportation resources would not be significant. Therefore, further analysis of cumulative impacts on transportation is not warranted.

4.4.9 CULTURAL RESOURCES

The analysis in Section 3.9 (Cultural Resources) indicates that vibrations from sonic booms under Alternative 1 and Alternative 2 have the potential to cause structural instability in sensitive natural features associated with archaeological sites (e.g., caves, rockshelters, and rock faces containing petroglyphs and pictographs) and sensitive historic architectural resources (e.g., adobe structures, and mine shafts and adits) beneath Supersonic Operating Area B. However, procedures are in place for the identification, evaluation, and protection of such resources as defined in the Programmatic Agreement (PA) between NAS Fallon, the Nevada SHPO, BLM, and the Advisory Council on Historic (Naval Air Station Fallon et al. 2011). No new ground disturbance, or demolition or alteration of architectural resources, are associated with Alternative 1 or Alternative 2. Continued use of high explosives at designated target areas within the training ranges that have been used historically for this purpose are not considered a source of new ground disturbance, as the areas have been previously disturbed and intact archaeological sites would not occur. This particular activity is exempt from Section 106 of the National Historic Preservation Act (NHPA) review in accordance with the PA (Naval Air Station Fallon et al. 2011). Protective measures for NRHP-eligible cultural resources located in existing ground-based training areas have been previously implemented in accordance with the PA and the Integrated Cultural Resources

Management Plan (ICRMP) (U.S. Department of the Navy 2013), and would continue to be implemented under Alternatives 1 and 2.

The Navy will be conducting consultation with Native American Tribes to identify traditional cultural properties in the FRTC Study Area, assess potential impacts from noise and physical disturbance to such resources, and develop mitigations as appropriate. The Navy will consult with the Nevada SHPO in accordance with Section 106 of NHPA. The Navy's Section 106 effects determinations are pending consultation with the SHPO and Native American Tribes. Procedures are in place for the identification, evaluation, and protection of cultural resources at FRTC as defined in the PA (Naval Air Station Fallon et al. 2011), and NAS Fallon employs one full-time cultural resource manager who regularly monitors the condition of such resources. Cultural resources would continue to be managed in accordance with current federal law, Navy policy, the PA, and the ICRMP (U.S. Department of the Navy 2013) under Alternatives 1 and 2.

Construction of regional energy and mineral extraction projects has minimal impact on cultural resources because the projects generally require SHPO consultation and operator stipulations for the avoidance and minimization of cultural resource impacts. The Salt Wells Energy project was considered to result in indirect effects on the visual landscape and setting of the Newlands Project resources. However, treatment measures outlined in the Programmatic Agreement for the Salt Wells Energy Projects were expected to mitigate adverse effects on these resources. Range enhancements at B-16 would result in localized disturbances at B-16. However, the project area already experiences considerable use from Navy training activities. With implementation of the B-16 project construction and conservation measures, significant effects on cultural resources would be avoided. Cultural resources surveys completed for the Mount Hope molybdenum mine in Eureka County documented 242 cultural sites within the 8,355 ac. (33.81 km^2) mine project footprint, including 80 prehistoric and 142 historic sites, and an additional 352 sites within the larger area of potential effects. Implementation of the Mount Hope Project would result in adverse impacts on 83 eligible sites, and these impacts would be considered significant. Under the programmatic agreement developed between the mine proponent and SHPO, the mine proponent would develop, and submit to the BLM for approval, a treatment plan to address the potential direct impacts on the 83 officially eligible sites. The proponent would implement the treatment plan before any surface disturbance of eligible sites within the area of direct impacts. All adverse effects under the NHPA and direct and indirect impacts under the NEPA to known eligible properties identified within the project area and to properties discovered during construction activities would be mitigated in accordance with the programmatic agreement and the treatment plan prepared for the project.

The update and implementation of regional conservation plans, such as the BLM Carson City Consolidated Resource Management Plan, would contribute to the minimization of cumulative effects. The plan update is undergoing separate review under the NEPA and the NHPA. These reviews and NEPA review for other proposed projects in the area would ensure that significant effects on cultural resources associated with those actions would be avoided, minimized, or compensated, to the extent practicable.

At the 3 Bars Project site in Eureka County, the BLM would conduct surveys before treatments to determine whether there are additional cultural sites in these areas that could be impacted by treatment actions; existing and newly found sites would be mitigated in accordance with the *Programmatic Agreement between the Mount Lewis Field Office of the Bureau of Land Management and the Nevada State Historic Preservation Officer regarding National Historic Preservation Act Compliance*

for the 3 Bars Ecosystem and Landscape Restoration Project, Eureka County, Nevada before hazardous fuel treatment work begins.

The Navy's Section 106 effects determinations are pending consultation with the SHPO and American Indian Tribes. Procedures are in place for the identification, evaluation, and protection of cultural resources at FRTC as defined in the PA (Naval Air Station Fallon et al. 2011), and NAS Fallon employs one full-time cultural resource manager who regularly monitors the condition of such resources. Cultural resources would continue to be managed in accordance with current federal law, Navy policy, the PA, and the ICRMP (U.S. Department of the Navy 2013) under Alternatives 1 and 2. Therefore, the incremental impacts of the Proposed Action are not expected to contribute appreciably to cumulative cultural resource impacts when added to other past, present, and reasonably foreseeable future actions.

Effects of the Proposed Action on cultural resources would be resolved through the Section 106 consultation process with the Nevada SHPO and Native American Tribes. Therefore, when past, present, and reasonably foreseeable future projects are analyzed together with the Proposed Action, implementation of Alternative 1 or 2 would not result in significant cumulative impacts on cultural resources.

4.4.10 Public Health and Safety

The analysis in Section 3.10 (Public Health and Safety) indicates that the impacts of the No Action Alternative, Alternative 1, and Alternative 2 on public health and safety would be negligible. Routine training activities conducted within the FRTC pose little risk to public health or safety outside of the training areas. Activities using live ammunition do not project hazardous effects offsite because of their size and because safety zones are established specifically to control these effects. Aircraft sorties used during proposed training activities would increase, but public safety is expected to be maintained because air activities would be conducted in accordance with regulations for the use of aircraft targets, restricted areas, military operations areas, air traffic control assigned airspace, and supersonic operating areas scheduled by NAS Fallon as well as through the continued issuance of Notice to Airmen. During flights, pilots avoid areas where obstructions to air navigation have been identified. Given the use of military training routes, vigilance by military pilots to avoid any obstructions or other planes, and the avoidance of flights over public areas, aircraft activities would have no significant impacts on public safety. Notices to Airmen, the policy that the military assumes responsibility for separation of aircraft, and range clearance verification would minimize the potential for adverse interactions between the Navy and the public.

All air-to-ground training occurs on the four Naval Strike and Air Warfare Center bombing ranges (B-16, B-17, B-19, and B-20), which are fenced and signed. Training is monitored by camera or observation aircraft. The Navy-managed land in the Dixie Valley Training Area and at the Shoal Site is not fenced or signed. These lands are considered open for public use as well as available for Navy training. These types of training activities do not use live ammunition and do not pose a threat to the public. Navy activity on BLM-managed lands is managed in close cooperation with the BLM. Naval Strike and Air Warfare Center funds a BLM liaison position to ensure that conflicts are avoided with other permitted activities or uses on these lands and to ensure that no adverse and/or irreversible impacts occur from these activities on public lands. BLM guidance and Navy standard operating procedures ensure no impacts on the other users of the public lands.

The Proposed Action and other activities performed and proposed by surrounding commercial, industrial, and recreational interests do not normally increase the risk of impacts on health and public

safety resources. Risks are often inherent in the activity. Grazing, agriculture, woodland product harvest activities, and recreation are associated with health and safety risks, including risks of injury from livestock, installing and maintaining improvements, applying pesticides on cropland, using saws and other hand tools to harvest woodland products, exposure to poisonous vegetation or vegetation with thorns, exposure to harmful snakes and other wildlife, or accidents from recreational activities such as off-highway vehicle use. Projects associated with utilities construction and distribution include road development, powerlines, communication sites, wind generation facilities, railroads, and related projects. All of these projects have associated occupational and public health and safety risks during the construction phase, and some would have associated risks during the operational phase. It is assumed that industry standard operating procedures and other procedures would be implemented to minimize health and safety risks. Numerous health and safety risks are associated with resource extraction activities.

For the 3 Bars project, human health concerns are associated with herbicide exposure scenarios, including public exposure by direct spray, dermal contact with foliage, swimming, and ingestion; and some occupational exposures that predominantly involve contact with accidental releases of herbicides. Herbicides that could be used by the BLM generally have negligible or minor risks to workers and the public. In all cases, human health risks can be avoided by following standard operating procedures, including application of herbicides with appropriate protective equipment, prevention of spills and other accidental releases, and prevention of public access to sprayed areas for the appropriate time interval.

Alternative energy project developers would coordinate with the Navy to meet the requirements and height restrictions for accident potential zone areas, thus reducing airspace safety concerns. The B-16 range enhancement project would enhance public health and safety by closing Navy-withdrawn lands to restrict the public from accessing areas that would be within an SDZ for small arms.

Members of the public living or working within the FRTC Study Area may live near other projects, may visit or drive through areas where other projects are occurring, or may be hired to implement other projects that have been identified. Therefore, it is likely that members of the public who would potentially be exposed to FRTC training activity health and safety risks would also be exposed to human health and safety risks associated with other past, present, and reasonably foreseeable actions, resulting in cumulative health and safety risks. However, the incremental impacts of the Proposed Action do not represent an appreciable contribution to cumulative health and safety risks when added to other past, present, and reasonably foreseeable future actions.

The Proposed Action would contribute incrementally to the overall health and safety risks in the FRTC Study Area, but the contribution would not be appreciable. Therefore, when past, present, and reasonably foreseeable future projects are analyzed together with the Proposed Action, implementation of Alternative 1 or 2 would not result in significant cumulative impacts on public health and safety.

4.5 CLIMATE CHANGE

4.5.1 INTRODUCTION

Climate change is a global issue, and greenhouse gas emissions are a concern from a cumulative perspective because individual sources of greenhouse gas emissions are not large enough to have an appreciable impact on climate change. This greenhouse gas analysis considers the incremental contribution of Alternatives 1 and 2 to total estimated U.S. greenhouse emissions as compared to the No Action Alternative.

Greenhouse gases are compounds that contribute to the greenhouse effect, a natural phenomenon in which these gases trap heat within the surface-troposphere (lowest portion of the earth's atmosphere) system, causing heating (radiative forcing) at the surface of the earth. Scientific evidence indicates a trend of increasing global temperature over the past century due to an increase in greenhouse gas emissions from human activities (U.S. Environmental Protection Agency 2009). The climate change associated with this global warming is predicted to produce negative environmental, economic, and social consequences across the globe. The average global temperature since 1900 has risen by 1.5 degrees Fahrenheit (°F) (0.8 degrees Celsius [°C]) and is predicted to increase by up to 11.5°F (6.4°C) by 2100 (Karl et al. 2009).

Predictions of long-term negative environmental impacts due to global warming include sea level rise, changes in ocean pH and salinity, changing weather patterns with increases in the severity of storms and droughts, changes to local and regional ecosystems (including the potential loss of species), shrinking glaciers and sea ice, thawing permafrost, a longer growing season, and shifts in plant and animal ranges.

4.5.2 REGULATORY FRAMEWORK

Federal agencies address emissions of greenhouse gases by reporting and meeting reductions mandated in laws, EOs, and policies. The most recent of these are EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, of October 5, 2009, and EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, of January 26, 2007.

EO 13514 shifts the way the government operates by (1) establishing greenhouse gases as the integrating metric for tracking progress in federal sustainability, (2) requiring a deliberative planning process, and (3) linking to budget allocations and Office of Management and Budget scorecards to ensure goal achievement.

The targets for reducing greenhouse gas emissions discussed in EO 13514 for Scope 1 (direct greenhouse gas emissions from sources that are owned or controlled by a federal agency) and Scope 2 (direct greenhouse gas emissions resulting from the generation of electricity, heat, or steam purchased by a federal agency) have been set for the DoD at a 34 percent reduction of greenhouse gas from the 2008 baseline by 2020. Scope 3 targets (greenhouse gas emissions from sources not owned or directly controlled by a federal agency but related to agency activities such as vendor supply chains, delivery services, and employee travel and commuting) were set at a 13.5 percent reduction. EO 13514, *Strategic Sustainability Performance Plan*, submitted to the CEQ on June 2, 2010, contains a guide for meeting these goals.

EO 13423 established a policy that federal agencies conduct their environmental, transportation, and energy-related activities in support of their respective missions in an environmentally economic way. It included a goal of improving energy efficiency and reducing greenhouse gas emissions of the agency through reduction of energy intensity by 3 percent annually through the end of Fiscal Year 2015, or 30 percent by the end of Fiscal Year 2015, relative to the baseline of the agency's energy use in Fiscal Year 2003.

The Navy is committed to improving energy security and environmental stewardship by reducing reliance on fossil fuels. The Navy is actively developing and participating in energy, environmental, and climate change initiatives that will increase use of alternative energy and help conserve the world's resources for future generations. The Navy Climate Change Roadmap identifies actions the Environmental Readiness Division is taking to implement EO 13514 (U.S. Department of the Navy 2010).

The Navy's Task Force Energy is responding to the Secretary of the Navy's energy goals through energy security initiatives that reduce the Navy's carbon footprint. The climate change roadmap (5-year roadmap) action items, objectives, and desired impacts are organized to focus on strategies, policies, and plans; operations and training; investments; strategic communications and outreach; and environmental assessment and prediction.

4.5.3 GREENHOUSE GAS EMISSIONS IN THE UNITED STATES

Greenhouse gas emissions occur from both natural processes and human activities. The primary long-lived greenhouse gases directly emitted by human activities are CO_2, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Although CO_2, CH_4, and N_2O occur naturally in the atmosphere, their concentrations have increased by 38 percent, 149 percent, and 23 percent, respectively, from the preindustrial era (1750) to 2007–2008 (U.S. Environmental Protection Agency 2009).

To estimate total greenhouse gas emissions, each greenhouse gas is assigned a global warming potential; that is, the ability of a gas or aerosol to trap heat in the atmosphere. The global warming potential rating system is standardized to CO_2, which has a value of 1. For example, CH_4 has a global warming potential of 21, which means that it has a global warming effect 21 times greater than CO_2 on an equal-mass basis (Intergovernmental Panel on Climate Change 2007). To simplify greenhouse gas analyses, total greenhouse gas emissions from a source are often expressed as the equivalent of CO_2 (CO_2 Eq.). The CO_2 Eq. is calculated by multiplying the emissions of each greenhouse gas by its global warming potential and adding the results together to produce a single, combined emission rate representing all greenhouse gases. While CH_4 and N_2O have much higher global warming potentials than CO_2, CO_2 is emitted in much higher quantities, so it is the overwhelming contributor to CO_2 Eq. from both natural processes and human activities. Global warming potential-weighted emissions are presented in terms of equivalent emissions of CO_2, using units of teragrams (Tg) (1 million metric tons, or 1 billion kilograms) of carbon dioxide equivalents (Tg CO_2 Eq.).

In 2011, the United States generated an estimated 6,702.3 Tg CO_2 Eq. (U.S. Environmental Protection Agency 2013). The 2011 inventory data (U.S. Environmental Protection Agency 2013) show that CO_2, CH_4, and N_2O contributed from fossil fuel combustion processes from mobile and stationary sources (all sectors) include approximately:

- 5,612.9 Tg CO_2,
- 587.23 Tg CH_4, and
- 356.9 Tg N_2O.

The 6,702.3 Tg CO_2 Eq. generated in 2011 is a decrease from the 6,810.3 Tg CO_2 Eq. generated in 2010 (U.S. Environmental Protection Agency 2013). Among domestic transportation sources, light-duty vehicles (including passenger cars and light-duty trucks) represented 61 percent of CO_2 emissions, medium- and heavy-duty trucks 22 percent, commercial aircraft 7 percent, and other sources 11 percent. Across all categories of aviation, CO_2 emissions decreased by 20.8 percent (38.9 Tg) between 1990 and 2011. This includes a 59 percent (20.3 Tg) decrease in emissions from domestic military operations. To place military aircraft in context with other aircraft CO_2 emissions, in 2011, commercial aircraft generated 114.6 Tg CO_2 Eq., military aircraft generated 12.2 Tg CO_2 Eq., and general aviation aircraft generated 19.4 Tg CO_2 Eq. Military aircraft represent roughly 8.6 percent of emissions from the overall jet fuel combustion category.

4.5.4 CUMULATIVE GREENHOUSE GAS IMPACTS

Table 4-4 presents greenhouse gas emissions estimates for the Proposed Action and compares the values to 2011 U.S. greenhouse gas emission. Greenhouse gas emissions would increase as result of increased fixed-wing aircraft overflights, vehicle and equipment use on the new ranges, and the associated increases in fuel consumption in the Study Area. As shown in Table 4-4, greenhouse gas emissions under Alternative 1 would increase by 30,584 metric tons CO_2 Eq. over the No Action Alternative. Greenhouse gas emissions under Alternative 2 would increase by 108,111 metric tons CO_2 Eq. over the No Action Alternative. Greenhouse gas emissions from the No Action Alternative, Alternative 1, and Alternative 2 would represent a very small percentage of total U.S. greenhouse gas emissions.

Table 4-4: Comparison of Greenhouse Gas Emissions for Training Activities Conducted within the Fallon Range Training Complex to United States 2011 Greenhouse Gas Emissions

Alternative	Annual Greenhouse Gas Emissions (metric tons CO_2 Eq.)	Annual Greenhouse Gas Emissions (teragrams CO_2 Eq.)	Percentage of U.S. 2011 Greenhouse Gas Emissions
No Action Alternative	740,799	0.74	0.01%
Alternative 1	771,383	0.77	0.01%
Alternative 2	848,910	0.85	0.01%
U.S. 2011 Greenhouse Gas Emissions		6,702.3	

Notes: CO_2 Eq. = carbon dioxide equivalent, U.S. = United States
Source: U.S. Environmental Protection Agency 2013

Other actions contributing to greenhouse gas emissions in the FRTC Study Area include construction projects, NAS Fallon airfield operations, ongoing industrial operations, and certain BLM land management practices. Construction projects, such as those at NAS Fallon and geothermal, solar, and wind energy projects, would contribute greenhouse gas emissions during the construction phase, but these emissions would be short term and temporary. Longer-term greenhouse gas emissions would be associated with the powdered milk processing plant and Bango refinery operations. In 2013, greenhouse gas emissions were estimated for NAS Fallon airfield operations (U.S. Department of the Navy 2013). Baseline greenhouse gas emissions associated with airfield operations were estimated at 66,564 metric tons (73,374 tons) of CO_2 Eq. per year. By 2028, after the proposed replacement of legacy aircraft and with additional aircraft operations, the greenhouse gas emissions associated with airfield operations were estimated at 86,328 metric tons (95,160 tons) of CO_2 Eq. per year.

Certain BLM management actions considered at the 3 Bars project area in Eureka County are expected to contribute greenhouse gas emissions. The use of chainsaws, and vehicles to transport workers, would be the primary sources of CO_2 emissions common to all 3 Bars project alternatives. These emissions would have a negligible effect on global climate change. Treatments would help improve ecosystem health and reduce the risk of wildfire and associated smoke emissions, to the benefit of the global climate. Under the 3 Bars project preferred alternative, prescribed fire and wildland fire for resource benefit, and use of equipment for mechanical treatments and to transport workers, would be the primary sources of CO_2 emissions. Based on modeling, the acreage treated on the 3 Bars Project area would comprise about 4 percent of acres treated by the BLM annually in Nevada and would contribute about 19,115 tons (17,341 metric tons) of CO_2 to the atmosphere annually. The actual amount of emissions could vary from modeling estimates based on differences in the acreage and types of vegetation treated under each method. However, in the context of CO_2 emissions from BLM treatments

in Nevada, and from other sources of CO_2 emissions in the region, CO_2 emissions for the 3 Bars project would be negligible. Treatments to improve the health and resiliency of native vegetation, thin and remove pinyon-juniper, and control cheatgrass and other noxious weeds and other invasive nonnative vegetation should help reduce the occurrence of wildfire and associated CO_2 emissions from wildfire smoke.

The effects of changing climate on future fire regimes and CO_2 emissions are difficult to predict, not only due to uncertainties associated with future climate but because of interactive effects between climate change, biological factors, vegetation treatment activities, and politics.

Individual sources of anthropogenic greenhouse gas emissions are not large enough to have an appreciable effect on climate change. Therefore, emissions of greenhouse gases from the Proposed Action alone would not cause appreciable global warming that would lead to climate change. These emissions would increase the atmosphere's concentration of greenhouse gases and, in combination with past and future emissions from all other sources, contribute incrementally to the global warming that produces the adverse effects of climate change. Therefore, an appreciable impact on global climate change would, if currently accepted predictions are accurate, only occur when proposed greenhouse gas emissions combine with other greenhouse gas emissions from other man-made activities on a global scale.

4.6 Summary of Cumulative Impacts

Analyses presented in this chapter and Chapter 3 (Affected Environment and Environmental Consequences) indicate that the incremental contribution of the No Action Alternative, Alternative 1, or Alternative 2 to cumulative impacts on soils, air quality, water quality, noise (airborne), biological resources, land use and recreation, socioeconomic resources, transportation, cultural resources, and public health and safety would not rise to the level of significance. The No Action Alternative, Alternative 1, or Alternative 2 would make an incremental contribution to greenhouse gas emissions, representing approximately 0.01, 0.01, and 0.01 percent of U.S. 2011 greenhouse gas emissions, respectively.

5 BEST MANAGEMENT PRACTICES, MONITORING, AND MITIGATION MEASURES

5.1 INTRODUCTION

5.1.1 OVERVIEW

National Environmental Policy Act (NEPA) regulations require that an Environmental Impact Statement (EIS) include discussion of measures where required as a means to mitigate adverse environmental impacts. The intention of mitigation is to reduce the adverse effects of an action on the environment. Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations 1508.20) identify five ways to mitigate environmental effects:

- Avoiding the impact altogether
- Minimizing impacts
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action
- Compensating for the impact by replacing or providing substitute resources or environments

5.1.2 APPROACH

The process of identifying ways to reduce potential environmental effects of the Proposed Action started early in the planning process for the proposed range enhancements and continued through preparation of the Final EIS. For example, sensitive resources were identified during development of conceptual plans for the proposed range enhancements. In addition, several existing Navy environmental programs and plans include established procedures, practices, or management actions that would restore, reduce, or eliminate perceived environmental risks of the Proposed Action. In accordance with the Department of Defense (DoD) and United States (U.S.) Department of the Navy (Navy) policies, these plans are reviewed and revised on a regular basis, and would be updated to reflect changes at the Fallon Range Training Complex (FRTC) if the Proposed Action were implemented.

Accordingly, impact restoration, reduction, or elimination measures are addressed in this EIS within the framework of existing Navy environmental programs and plans, where appropriate. For the purposes of this EIS, these and other measures are referred to as best management practices (BMPs). A BMP may encompass the installation of structural devices or the implementation of non-structural practices or activities, prohibitions of practices, operating procedures, maintenance procedures, and/or other management techniques. The Navy also currently employs standard practices or standard operating procedures (SOPs) to provide for the safety of personnel and equipment, as well as the success of the training and testing activities. In many cases, SOPs result in incidental environmental, socioeconomic, and cultural benefits, but they serve the primary purpose of providing for safety and mission success, and are implemented regardless of their secondary benefits. Implementation of both BMPs and SOPs has been considered in the Chapter 3 (Affected Environment and Environmental Consequences) environmental analyses for each resource.

If the analyses in Chapter 3 (Affected Environment and Environmental Consequences) indicated that potential impacts could not be avoided, minimized, or rectified to an acceptable level, then the Navy developed additional measures to reduce or eliminate the impact over time or compensate for the impact by replacing or providing substitute resources or environments. For the purposes of this EIS, such measures are referred to as proposed mitigation measures. As described in the Office of the Chief of

Naval Operations Instruction5090.1D, the Navy is responsible for describing each proposed mitigation measure, its anticipated benefit, how the mitigation measures efficacy will be evaluated, implementation and monitoring methods, the responsible party, and the estimated completion date. The final mitigation and implementation methods will be committed to as part of the EIS decision-making process (the Record of Decision).

5.1.3 MONITORING

Environmental monitoring involves systematic sampling of physical and biological resources to derive knowledge of the environment, its resources, and processes or activities that affect them. Monitoring can be conducted for a number of purposes, including establishing environmental baselines and trends, informing decision-making for management actions, assessing the effects of natural and human influences, assessing the effectiveness of BMPs and mitigation measures, and ensuring compliance with environmental regulations. Monitoring is an important component of the Navy's natural resources management strategy implemented under the *Integrated Natural Resources Management Plan* (*INRMP*) and *Environmental Assessment for Naval Air Station, Fallon* (U.S. Department of the Navy 2014). Necessary updates to *INRMP* and associated monitoring programs would be accomplished during routine annual reviews conducted in cooperation with U.S. Fish and Wildlife Service (USFWS) and Nevada Department of Wildlife. This process will help to ensure that a comprehensive and consistent approach to monitoring is accomplished for the Navy-administered lands at the FRTC.

5.1.4 MITIGATION AND MONITORING REPORTING AND TRACKING

Results from mitigation and monitoring reporting will be used to support negotiations with regulatory agencies to ensure only effective mitigation measures are employed, to assist in adaptive management efforts, and to track completion of mitigation the action proponent has committed to implement in an environmental planning decision document.

5.2 SOILS

5.2.1 CURRENT REQUIREMENTS AND BEST MANAGEMENT PRACTICES

- Soils are managed from a natural resources perspective under the *Naval Air Station Fallon Integrated Natural Resources Management Plan* (U.S. Department of the Navy 2014). Actions focus on minimizing soil erosion.
- Potential soil contamination is addressed in the range condition assessment and subsequent 5-year reviews, in accordance with the *Range Sustainability Environmental Program Assessment Policy Implementation Manual* (U.S. Department of the Navy 2006).

5.2.2 PROPOSED BEST MANAGEMENT PRACTICES, MONITORING, AND MITIGATION MEASURES

5.2.2.1 Proposed Best Management Practices

The current BMPs listed in Section 3.1.1.2.2 (Management Practices) would continue to be implemented under Alternatives 1 and 2, and existing programs and plans would be updated to reflect new conditions. The following BMPs would be implemented to avoid and minimize potential impacts on soils under Alternatives 1 and 2:

- Incidental fuel spills would be avoided during training by conducting all refueling activities in a secondary containment area.
- Drip pads would be placed under equipment when parked to avoid soil contamination from leaking fluids.

- Range condition assessment 5-year reviews would continue to be conducted, and appropriate steps would be taken, if necessary, to prevent or respond to a release or substantial threat of a release of munitions constituents of potential concern to off-range areas that could pose unacceptable risks to human health or the environment.
- Wind and water erosion would be minimized by adhering to standard operating procedures to operate vehicles on existing roads and two-track trails (unless otherwise noted in standard operating procedures or in the event of emergency).

5.2.2.2 Proposed Monitoring

No specific monitoring needs were identified for soils. However, the need for soil sampling, analysis, or monitoring would continue to be considered during range condition assessment 5-year reviews conducted under the Navy's Range Sustainability Environmental Program Assessment.

5.2.2.3 Proposed Mitigation Measures

No mitigation measures are warranted for soils based on the analysis presented in Section 3.1.3 (Environmental Consequences), implementation of current BMPs, and implementation of proposed BMPs.

5.3 AIR QUALITY

5.3.1 CURRENT REQUIREMENTS AND BEST MANAGEMENT PRACTICES

Equipment used by military units in the Study Area, including aircraft and vehicles, are properly maintained in accordance with applicable Navy requirements. Operating equipment meets federal and state emission standards, where applicable.

5.3.2 PROPOSED BEST MANAGEMENT PRACTICES, MONITORING, AND MITIGATION MEASURES

5.3.2.1 Proposed Best Management Practices

The Navy proposes the following BMPs to avoid and minimize impacts to air quality under Alternative 2:

- When warranted, water or another dust palliative product would be used as necessary to minimize generation and downwind migration of fugitive dust, especially on dry, windy days.
- Generation of dust would be minimized by adhering to standard operating procedures to operate vehicles on existing roads and two-track trails (unless otherwise noted in standard operating procedures or in the event of emergency).
- Vehicles participating in training exercises that occur on unpaved surfaces would minimize fugitive dust generation by traveling at slow speeds.
- Aircraft, ground vehicles, and military equipment would be maintained in accordance with engine manufacturer specifications to optimize efficiency and limit emissions.

5.3.2.2 Proposed Monitoring

No specific monitoring needs were identified for air quality.

5.3.2.3 Proposed Mitigation Measures

No mitigation measures are warranted for air quality based on the analysis presented in Section 3.2.3 (Environmental Consequences) and implementation of existing BMPs.

5.4 WATER QUALITY

5.4.1 CURRENT REQUIREMENTS AND BEST MANAGEMENT PRACTICES

The following requirements and BMPs apply to water resources at the FRTC:

- Incidental spills that could contaminate groundwater are avoided and minimized. Navy personnel receive initial and periodic refresher training in the proper storage, handling, and management of hazardous materials.
- Potential groundwater contamination issues are addressed in the range condition assessment and subsequent 5-year reviews, in accordance with the Range Sustainability Environmental Program Assessment Policy implementation.
- The FRTC has an operational range clearance plan in compliance with DoD Directive 4715.11, *Environmental and Explosives Safety Management*. The operational range clearance plan provides for safe management and removal of unexploded ordnance, and recycling of training munitions, munitions debris, and range scrap that has been rendered safe.
- Ground training activities avoid streams, ponds, and Army Corps of Engineers' jurisdictional wetlands.

5.4.2 PROPOSED BEST MANAGEMENT PRACTICES, MONITORING, AND MITIGATION MEASURES

5.4.2.1 Proposed Best Management Practices

The current BMPs listed in Section 3.3.1.2.2 (Management Practices) would continue to be implemented under Alternatives 1 and 2, and existing programs and plans would be updated to reflect new conditions. The following BMPs would be implemented to avoid and minimize potential impacts on water quality under Alternatives 1 and 2:

- Incidental fuel spills would be avoided by conducting all refueling activities in a secondary containment area.
- Drip pads would be placed under equipment when parked to avoid soil contamination from leaking fluids.
- A spill prevention, control, and countermeasures plan would be developed if quantities of fuel or other petroleum products above the spill prevention, containment, and countermeasures quantity threshold were stored. The plan would help to ensure rapid and effective response to incidental spills and avoid contaminant migration to groundwater.
    - Any spills would be managed and cleaned up in accordance with applicable state and federal regulatory requirements. If the spill exceeded 42 gallons (159 liters) of regulated material, the event would be immediately reported.
    - The operational range clearance plan would be updated and implemented to address any new requirements for the ranges.
    - Range condition assessment 5-year reviews would continue to be conducted, and appropriate steps would be taken, if necessary, to prevent or respond to a release or substantial threat of a release of munitions constituents of potential concern to off-range areas that could pose unacceptable risks to human health or the environment.
    - Assessments would be conducted for the digital multi-purpose training range (Alternative 1 only), multi-purpose machine gun range, and both convoy live fire ranges in accordance with the Army's Operational Range Assessment Program. These assessments would first determine qualitatively if munitions constituents were leaving the operational range footprint and whether pathways existed for human or ecological

receptors. A quantitative assessment would be conducted if the qualitative assessment were inconclusive. The assessments would be conducted on a 5-year review cycle, even if the initial qualitative assessment identified no issues.

5.4.2.2 Proposed Monitoring

No specific monitoring needs where identified for water quality. However, the need for groundwater sampling, analysis, or monitoring would continue to be considered during range condition assessment 5-year reviews conducted under the Navy's Range Sustainability Environmental Program assessment program.

5.4.2.3 Proposed Mitigation Measures

No mitigation measures are warranted for water quality based on the analysis presented in Section 3.3.3 (Environmental Consequences), implementation of current management practices, and implementation of proposed BMPs.

5.5 NOISE

5.5.1 CURRENT REQUIREMENTS AND BEST MANAGEMENT PRACTICES

Activities at the FRTC comply with numerous established acoustic control procedures to ensure that neither participants nor non-participants engage in activities that would endanger life or property. Aircraft SOPs are largely oriented toward safety, which also provide significant noise abatement benefits. For example, many SOPs involve flight routing and minimum altitudes. Each of these procedures increases the range of the noise source from human receptors, thus reducing noise impacts. Each of these procedures increases the range of the noise source from human receptors, thus reducing noise impacts. As stated in Chapter 18 of Office of the Chief of Naval Operations Instruction (OPNAVINST) 5100.23 (Navy Safety and Occupational Health Program Manual), noise control and abatement programs are developed to minimize noise impacts whenever practicable through implementation of operational alternatives that do not degrade mission requirements or aircraft safety.

Navy occupational noise exposure prevention procedures are required at the FRTC for those military personnel who might be exposed to occupational hearing hazards (e.g., military aircraft operations or land detonations) to meet all applicable Occupational Safety and Health Administration and Navy occupational noise exposure regulations. As these measures are designed to minimize occupational hearing hazards, there is no risk of hearing impacts from occupational noise exposure.

Additionally, The FRTC Range Operations Manual specifies a number of noise-sensitive areas, either as coordinate points or areas defined by buffers from coordinate points, as shown in Figure 3.4-8. Pilots overflying these areas are instructed to maintain altitudes of no lower than 3,000 feet above ground level.

5.5.2 PROPOSED BEST MANAGEMENT PRACTICES, MONITORING, AND MITIGATION MEASURES

5.5.2.1 Proposed Best Management Practices

The current BMPs listed in Section 5.5.1 (Current Requirements and Best Management Practices) would continue to be implemented under Alternatives 1 and 2, and existing programs and plans would be updated to reflect new conditions.

5.5.2.2 Proposed Monitoring

No specific monitoring needs were identified for noise based on the analysis presented in Section 3.4.2 (Environmental Consequences).

5.5.2.3 Proposed Mitigation Measures

No specific mitigation needs were identified for noise based on the analysis presented in Section 3.4.2 (Environmental Consequences).

5.6 WILDLIFE

5.6.1 CURRENT REQUIREMENTS AND BEST MANAGEMENT PRACTICES

Following is a summary of current requirements and practices applicable to vegetation and wildlife at FRTC:

- Current requirements and BMPs applicable to wildlife and vegetation at FRTC are described in the *Integrated Natural Resources Management Plan (INRMP) and Environmental Assessment for Naval Air Station Fallon, Nevada* (U.S. Department of the Navy 2014). Actions focus on minimizing disturbance, controlling invasive plants, and restoring native habitats.
- As part of its Bird/Animal Aircraft Strike Hazard (BASH)-oriented wildlife management program to reduce or eliminate wildlife attractants near runways and taxiways, Naval Air Station (NAS) Fallon implements various habitat management and modification techniques including, but not limited to the removal of food sources, mowing tall grasses, relocating perching and nesting structures, controlling weeds to minimize seeds and bird attractants, and preventing standing water in areas near the flightline. The BASH program manages risk by addressing specific aviation safety hazards associated with wildlife near airfields through coordination among all the entities supporting the aviation mission (U.S. Department of Defense 2010).

5.6.2 PROPOSED BEST MANAGEMENT PRACTICES, MONITORING, AND MITIGATION

5.6.2.1 Proposed Best Management Practices

The current BMPs listed in Section 3.5.2.6 (Current Requirements and Management Practices) would continue to be implemented under Alternatives 1 and 2, and existing programs and plans would be updated to reflect new conditions.

5.6.2.2 Proposed Monitoring

No specific monitoring needs were identified for wildlife based on the analysis presented in Section 3.5.3 (Environmental Consequences).

5.6.2.3 Proposed Mitigation Measures

No specific mitigation needs were identified for wildlife based on the analysis presented in Section 3.5.3 (Environmental Consequences).

5.7 LAND USE AND RECREATION

5.7.1 CURRENT REQUIREMENTS AND BEST MANAGEMENT PRACTICES

Current requirements and BMPs applicable to land use within the FRTC Study Area are agency specific and are discussed in respective subsections in Section 3.6.2.3 (Existing Land Use at the Fallon Range Training Complex).

Based on the FRTC Range Air Installations Compatible Use Zones Study (U.S. Department of the Navy 2011), land uses within the FRTC Study Area are compatible with current training activities. Land compatibility is based on Navy guidelines outlined in the joint Navy and U.S. Marine Corps instruction, OPNAVINST 3550.1A, Range Air Installations Compatible Use Zones Program (U.S. Department of the Navy 2008). The study includes training range safety and noise analyses and provides land use recommendations that are compatible with training range operations and their associated noise levels. Noise associated with training activities, as well as compatibility of noise levels with existing land use and sensitive noise receptors, is addressed further in Section 3.4 (Noise [Airborne]) of this EIS. Safety associated with land use is of interest in areas proximate to training ranges Bravo (B)-16, B-17, B-19, and B-20, where air-to-ground delivery of ordnance occurs. Accordingly, range compatibility zones are developed for all targets. Range compatibility zones translate aviation and ordnance delivery safety concerns into degrees of safety that can be reasonably attained on the ground.

5.7.2 Proposed Best Management Practices, Monitoring, and Mitigation Measures

5.7.2.1 Proposed Best Management Practices

Management practices in place for other resources (e.g., noise, vegetation, biological resources), which affect land use at the FRTC, would continue to be implemented. These management practices would also serve to avoid and minimize impacts on land use. No additional management practices are warranted for land use and recreation based on the analysis presented in Section 3.6.3 (Environmental Consequences).

5.7.2.2 Proposed Monitoring

No monitoring measures are warranted for land use and recreation based on the analysis presented in Section 3.6.3 (Environmental Consequences), implementation of current management practices, and implementation of proposed BMPs for other resources.

5.7.2.3 Proposed Mitigation Measures

No mitigation measures for are warranted for land use and recreation based on the analysis presented in Section 3.6.3 (Environmental Consequences), implementation of current management practices, and implementation of proposed BMPs.

5.8 Socioeconomics, Environmental Justice, and Protection of Children

5.8.1 Current Requirements and Best Management Practices

There are no current mitigation measures related to socioeconomics, environmental justice, or the protection of children. However, mitigation measures in place for other resources (e.g., air quality, water quality, noise, and public health and safety) ensure that nonparticipants are not affected by actions within the FRTC Study Area.

5.8.2 Proposed Best Management Practices, Monitoring, and Mitigation Measures

5.8.2.1 Proposed Best Management Practices

No adverse socioeconomic effects were identified; therefore, no proposed management practices for socioeconomics, environmental justice, or the protection of children are warranted. However, BMPs for other resources that affect environmental justice (e.g., air quality, water quality, and noise) would be implemented.

5.8.2.2 Proposed Monitoring

No specific monitoring needs were identified for socioeconomics, environmental justice, or the protection of children.

5.8.2.3 Proposed Mitigation Measures

No mitigation measures are warranted for socioeconomics, environmental justice, or the protection of children based on the analysis presented in Section 3.7.3 (Environmental Consequences) and implementation of proposed BMPs.

5.9 TRANSPORTATION

5.9.1 CURRENT REQUIREMENTS AND BEST MANAGEMENT PRACTICES

These precautions minimize the potential for interaction between military and civilian activities by communicating hazardous training and testing activities to all vessels, aircraft, and operators. Safely conducting activities in the controlled training and testing areas is ensured through implementation of the Navy's safety policies and procedures that include but are not limited to the following:

- Abiding by Visual Flight Rules and Instrument Flight Rules
- Scheduling activities through Naval Strike and Air Warfare Center
- Ensuring that the entire hazard zone is clear before commencing hazardous activities
- Coordinating with Range Safety Officers prior to expending military munitions
- Ensuring clearance of appropriate safety zones

5.9.2 PROPOSED BEST MANAGEMENT PRACTICES, MONITORING, AND MITIGATION MEASURES

5.9.2.1 Proposed Best Management Practices

BMPs are not proposed beyond the established SOPs already in place for separation of civilian and military aircraft.

5.9.2.2 Proposed Monitoring

Proposed monitoring is not proposed beyond the established Federal Aviation Administration controls already in place for the safety of aviation resources in the Study Area.

5.9.2.3 Proposed Mitigation Measures

Proposed mitigation measures are not proposed beyond the established SOPs already in place for separation of civilian and military aircraft.

5.10 CULTURAL RESOURCES

5.10.1 CURRENT REQUIREMENTS AND BEST MANAGEMENT PRACTICES

Cultural resources at the FRTC Study Area are managed in accordance with the National Historic Preservation Act (NHPA), the Archaeological Resources Protection Act, the American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act (NAGPRA), and appropriate Navy Instructions. The Navy also abides by a Programmatic Agreement (PA) with the Nevada State Historic Preservation Office (SHPO), Bureau of Land Management (BLM), and the Advisory Council on Historic Preservation that requires the identification, evaluation, and treatment of historic properties on lands managed by NAS Fallon to ensure protection of cultural resources and coordination between the Navy and the Nevada SHPO (Naval Air Station Fallon et al. 2011). The PA contains stipulations that address

cultural resource staffing, coordination and information exchange with the SHPO, standard procedures, special procedures, public participation, dispute resolution, training of nonprofessional staff, reports and monitoring, reviews, amendments, suspension, termination, execution, and implementation. In addition, the Navy abides by a Memorandum of Understanding (MOU) concerning Native American human skeletal remains and associated artifacts signed in 1991 by NAS Fallon, the Fallon Paiute-Shoshone Tribe, the Nevada SHPO, the USFWS, and the Nevada State Museum (Naval Air Station Fallon et al. 1991).

An Integrated Cultural Resources Management Plan (ICRMP) was completed in 2013. The document provides guidance to staff at NAS Fallon to ensure that all laws, regulations, policies, and directives related to cultural resources are appropriately followed while fulfilling the installation's mission. The integrated cultural resources management plan also provides standard operating procedures for routine actions that may affect cultural resources (U.S. Department of the Navy 2013).

Any inadvertent discovery of sensitive archaeological materials on the FRTC Study Area would be handled in accordance with the Navy's BMPs, which include provisions for stopping work and notifying the appropriate parties. If human remains are inadvertently discovered, then the procedures established under the NAGPRA and OPNAVINST 11170.2 series, *Navy Responsibilities Regarding Undocumented Human Burials*, would be followed.

5.10.2 Proposed Management Practices, Monitoring, and Mitigation Measures

5.10.2.1 Proposed Best Management Practices

BMPs discussed in Section 3.9.1.2 (Regulatory Framework and Management Practices) would continue to be implemented under Alternative 1 or 2, if selected. Cultural resources would continue to be managed in accordance with the NHPA, the Archaeological Resources Protection Act, the American Indian Religious Freedom Act, NAGPRA, and appropriate Navy Instructions. The PA with the Nevada SHPO, BLM, and the Advisory Council on Historic Preservation; the MOU with the Fallon Paiute-Shoshone Tribe, the Nevada SHPO, the USFWS, and the Nevada State Museum; and the ICRMP would continue to be implemented. Any inadvertent discovery of sensitive archaeological materials on the FRTC Study Area would be handled in accordance with the Navy's BMPs, which include provisions for stopping work and notifying the appropriate parties. If human remains are inadvertently discovered, then the procedures established under the NAGPRA and OPNAVINST 11170.2 series, *Navy Responsibilities Regarding Undocumented Human Burials*, would be followed.

5.10.2.2 Proposed Monitoring

The need for additional monitoring beyond that included in current and proposed BMPs is pending completion of consultation with SHPO.

5.10.2.3 Proposed Mitigation Measures

The need for mitigation measures beyond that included in current and proposed BMPs is pending completion of consultation with SHPO.

5.11 Public Health and Safety

5.11.1 Current Requirements and Best Management Practices

Specific and documented procedures are in place to ensure that nonparticipants are not endangered by training actions. It is recommended that training units include safety and medically trained personnel.

The presence of fences and signs around bombing areas and the use of strict SOPs helps to protect the public from potentially hazardous training activities. Monitoring of training events serves to identify potential public health and safety risks and avoid them.

5.11.2 Proposed Best Management Practices, Monitoring, and Mitigation Measures

5.11.2.1 Proposed Best Management Practices

Current measures in place to ensure that nonparticipants are not endangered by actions at the FRTC would continue. SOPs and range clearance procedures are in place to ensure that training areas are clear of nonparticipants before an activity commences. The following BMPs would continue to be implemented to reduce hazards associated with unexploded ordnance: (1) post signs warning of areas where unexploded ordnance clearance has not been confirmed and (2) restrict movement of personnel using the training range to designated areas known to be free of unexploded ordnance, (3) maintain the Range Sustainability Environmental Program Assessment discussed in Section 3.10.2.6 (Range Sustainability Environmental Program Assessment), and (4) continue Operational Range Clearance activities which remove unexploded ordnance and other materials to reduce munitions constituent loading. No additional BMPs are warranted.

5.11.2.2 Proposed Monitoring

The Navy has a program in place designed to assess environmental impacts of training operations and to implement measures to protect the environment when needed (see Section 3.10.2.6 [Range Sustainability Environmental Program Assessment]). No additional measures are warranted.

5.11.2.3 Proposed Mitigation Measures

No mitigation measures for other resources that affect public health and safety (e.g., noise, air quality) were proposed for the action alternatives. No additional mitigation measures for public health and safety are warranted. If needed, protective measures can be implemented at any point during that process to ensure public safety, sustain range operations, and maintain environmental compliance (see Section 3.10.2, Affected Environment).

6 OTHER CONSIDERATIONS REQUIRED BY THE NATIONAL ENVIRONMENTAL POLICY ACT

6.1 POSSIBLE CONFLICTS WITH OBJECTIVES OF FEDERAL, STATE, AND LOCAL PLANS, POLICIES, AND CONTROLS

Implementation of the Proposed Action for the Fallon Range Training Complex (FRTC) Environmental Impact Statement (EIS) would not conflict with the objectives or requirements of federal, state, regional, or local plans, policies, or legal requirements. The United States Department of the Navy (Navy) consulted with regulatory agencies as appropriate during the National Environmental Policy Act (NEPA) process and before implementation of the Proposed Action to ensure requirements are met. Table 6-1 summarizes environmental compliance requirements that may apply. Agency correspondence can be found in Appendix B (Regulatory Correspondence), and supporting documentation can be found on the FRTC EIS website at www.FRTCEIS.com.

6.2 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

In accordance with the Council on Environmental Quality regulations (Part 1502), this EIS analyzes the relationship between the short-term impacts on the environment and the effects those impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. This means that choosing one option may reduce future flexibility in pursuing other options, or that committing a resource to a certain use often may eliminate the possibility for other uses of that resource.

The majority of activities addressed in this EIS would be categorized as long term. For example, although the use of training areas for individual training activities may be of short duration, the training areas would continue to receive increased and repeated use for the foreseeable future. Because the Proposed Action includes an increase in training frequency, areas designated for training would accommodate a higher level of operational uses in the long term that would, in turn, affect the long-term productivity of environmental resources in those areas. Addressing such shortfalls through planning and accommodation of future training tempo requirements and deployment schedules will allow the Navy to more readily facilitate long-term resource management strategies while achieving the near-term goal of providing the capacity and capabilities to fully support required training tasks and meet the Title 10 mandate to be organized, trained, and equipped for prompt and sustained combat.

Table 6-1: Summary of Environmental Compliance for the Proposed Action

Plans, Policies, and Controls	Status of Compliance
National Environmental Policy Act of 1969 (42 U.S.C. §4321 et seq.) Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 C.F.R. §§1500–1508) Department of the Navy Procedures for Implementing NEPA (32 C.F.R. §775)	This EIS was prepared in compliance with NEPA (42 U.S.C. §4321 et seq.), Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (Title 40 C.F.R. §§1500–1508), and Navy Procedures for Implementing NEPA (32 C.F.R. §775).
Endangered Species Act (16 U.S.C. §1531 et seq.)	Based on the analysis presented in Section 3.5 (Biological Resources), the Navy has determined that stressors associated with the Proposed Action would have no effect on species listed or proposed for listing under the Endangered Species Act or their designated or proposed critical habitat. Therefore, the Navy is not required to consult or conference with the U.S. Fish and Wildlife Service (USFWS).
Migratory Bird Treaty Act (16 U.S.C. §§703–712)	Based on the analysis in Section 3.5 (Biological Resources), the Navy has determined that military readiness activities under the Proposed Action would not have a significant adverse effect on a population of a migratory bird species, as defined in the Final Rule authorizing the DoD to take migratory birds during military readiness activities (50 C.F.R. Part 21).
Bald and Golden Eagle Protection Act (16 U.S.C. §§668–668d)	Based on the analysis in Section 3.5 (Biological Resources), the Navy has determined that the Proposed Action would not result in “taking” of bald or golden eagles, their nests, or their eggs as defined by this act.
Clean Air Act (42 U.S.C. §7401 et seq.) Clean Air Act General Conformity Rule (40 C.F.R. §93[B])	The air quality analysis conducted for this EIS indicates that the Proposed Action would not cause National Ambient Air Quality Standards to be exceeded. The Study Area is not within a nonattainment or maintenance area. Therefore, the General Conformity Rule does not apply.
Clean Water Act (33 U.S.C. §§1251–1387)	Based on the analysis presented in Section 3.3 (Water Quality), the Navy has determined that the Proposed Action would have no substantial effect on the quality or quantity of surface waters or underground aquifers. The Proposed Action would include no point or non-point discharges into surface waters, nor would it include dredging or filling of surface waters. Therefore, the Proposed Action would be in compliance with the federal Clean Water Act.

Table 6-1: Summary of Environmental Compliance for the Proposed Action (continued)

Plans, Policies, and Controls	Status of Compliance
Resource Conservation and Recovery Act (42 U.S.C. §6901 et seq.)	Small quantities of hazardous waste would continue to be generated at the FRTC under the Proposed Action. Hazardous wastes would continue to be safely disposed of in accordance with hazardous waste standard operating procedures through local vendors.
The Sikes Act of 1960 (16 U.S.C. §§670a–670o, as amended by the Sikes Act Improvement Act of 1997, Pub. L. No. 105-85)	In accordance with the Sikes Act, an integrated natural resources management plan has been prepared and implemented at the FRTC in cooperation with the USFWS and the Nevada Department of Wildlife. The plan is reviewed by the parties annually as to operation and effect, and it is updated as necessary.
National Historic Preservation Act (16 U.S.C. §470 et seq.)	In accordance with Section 106 of the National Historic Preservation Act, the Navy will make an effects determination on historic properties pending the completion of consultation with Native American tribes and concurrence by the Nevada State Historic Preservation Office with a finding of "No Historic Properties Affected."
Archaeological Resources Protection Act (16 U.S.C. §470aa–mm)	No impacts on archaeological sites would occur as a result of the implementation of the Proposed Action because no archaeological resources are in the area of potential effects. In the event of inadvertent discovery of sensitive archaeological materials during training, the Navy would ensure that measures are taken promptly to protect the find from disturbance, assess the significance of the discovery, and implement appropriate mitigating measures for significant resources. Inadvertent discovery of sensitive archaeological materials would be handled in accordance with the appropriate standard operating procedures, which includes provisions for notifying the Nevada State Historic Preservation Office, Native American tribes, and other appropriate parties of the discovery.
Native American Graves Protection and Repatriation Act (NAGPRA) (25 U.S.C. §3001)	No Native American resources or artifacts subject to NAGPRA have been identified in the area of potential effects. If such resources are discovered, the Navy would comply with NAGPRA and continue consultations with federally recognized tribes.
American Indian Religious Freedom Act (AIRFA) (42 U.S.C. §1996)	No Native American resources or artifacts subject to AIRFA have been identified in the area of potential effects. If such resources are discovered, the Navy would comply with AIRFA and continue consultations with federally recognized tribes.
Emergency Planning and Community Right-to-Know Act (42 U.S.C. §11001 et seq.)	The Emergency Planning and Community Right-to-Know Act is applicable to the Proposed Action because small quantities of hazardous materials would be stored on site. Section 312 (Tier Two) reporting applies; this requirement is satisfied by complying with Nevada's counterpart regulations. Under the Proposed Action, the Navy would not manufacture, store, or otherwise use hazardous chemicals above Toxics Release Inventory (Emergency Planning and Community Right-to-Know Act Section 313) reporting thresholds.
Farmland Protection Policy Act (25 U.S.C. §1539 et seq.)	Implementation of the Proposed Action would not adversely affect prime or unique farmland because no prime or unique farmland would be irreversibly converted to nonagricultural use.

Table 6-1: Summary of Environmental Compliance for the Proposed Action (continued)

Plans, Policies, and Controls	Status of Compliance
Plant Protection Act (7 U.S.C. §§7701–7786)	The Navy would continue to implement invasive plant and weed controls at the FRTC in accordance with the integrated natural resources management plan.
Executive Order (EO) 11990, *Protection of Wetlands*	The Navy would continue to protect wetlands at the FRTC in accordance with EO 11990.
EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*	The Navy addressed requirements of EO 12898 in Section 3.7 (Socioeconomics, Environmental Justice, and Protection of Children) and determined that implementation of the Proposed Action would not result in any disproportionately high and adverse human health or environmental effects on minority or low-income populations.
EO 13007, *Indian Sacred Sites*	No concerns regarding Indian Sacred Sites have been identified in the Study Area based on consultation with Native American Tribes. If concerns are identified, the Navy would comply with EO 13007 and avoid or mitigate impacts to Indian Sacred Sites in consultation with affected tribes.
EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*	The Navy addressed requirements of EO 13045 in Section 3.7 (Socioeconomics, Environmental Justice, and Protection of Children) and determined that implementation of the Proposed Action would not result in health or safety risks that may disproportionately affect children.
EO 13175, *Consultation and Coordination with Indian Tribal Governments*	The Commander, U.S. Pacific Fleet invited the following federally recognized Native American tribes to participate in the NEPA process for this EIS: Duckwater Shoshone Tribe, Fallon Paiute-Shoshone Tribe, Inter-Tribal Council of Nevada, Pyramid Lake Paiute Tribe, Te-Moak Tribe, Walker River Paiute Tribe, Yerington Paiute Tribe, and Yomba Shoshone Tribe. Consultation with these tribes is ongoing in accordance with EO 13175.
EO 13112, *Invasive Species*	EO 13112 requires agencies to identify actions that may affect the status of invasive species and take measures to avoid introduction and spread of these species. The Navy would continue to implement invasive plant and weed controls at the FRTC in accordance with the integrated natural resources management plan, which ensures compliance with EO 13112.
EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*	In accordance with EO 13514, to create a sustainable energy economy and demonstrate the federal government's commitment to reducing greenhouse gas emissions, the Navy is committed to improving energy security and environmental stewardship by reducing reliance on fossil fuels. The Navy is actively developing and participating in energy, environmental, and climate change initiatives that will increase use of alternative energy and help conserve the world's resources for future generations.

Notes: AIRFA = American Indian Religious Freedom Act, C.F.R. = Code of Federal Regulations, DoD = Department of Defense, EIS = Environmental Impact Statement, EO = Executive Order, FRTC = Fallon Range Training Complex, NAGPRA = Native American Graves Protection and Repatriation Act, Navy = United States Department of the Navy, NEPA = National Environmental Policy Act, U.S. = United States, U.S.C. = United States Code, USFWS = United States Fish and Wildlife Service

6.3 Irreversible or Irretrievable Commitment of Resources

NEPA requires that environmental analysis include identification of "any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented." Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the uses of these resources have on future generations. Irreversible effects primarily

result from the use or destruction of a specific resource (e.g., energy or minerals) that cannot be replaced within a reasonable time. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., the disturbance of a cultural site).

Military training activities would increase at the FRTC under the Proposed Action, but these activities would continue to be conducted in the same locations where they currently take place. The only irretrievable commitment of resources associated with increased training activities would be fossil fuel consumption, which would increase proportionately with training activities. As outlined in Table 6-1, the effects of fuel consumption under the Proposed Action are minimized by the Navy's commitment to improving energy security in accordance with Executive Order 13514. Irreversible and irretrievable commitment of resources under the Proposed Action would be negligible.

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8.5 CHAPTER 5 – BEST MANAGEMENT PRACTICES, MONITORING, AND MITIGATION MEASURES

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8.6 CHAPTER 6 – OTHER CONSIDERATIONS REQUIRED BY THE NATIONAL ENVIRONMENTAL POLICY ACT

There are no references for this section.

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9 DISTRIBUTION LIST

The following is a list of public officials, government agencies, Native American Tribes and Nations, and representatives from organizations and private companies who attended public meetings, provided comments during the Environmental Impact Statement (EIS) process, or have been identified by the Navy to be on the distribution list for the Fallon Range Training Complex (FRTC) EIS. This list will be updated following completion of the current election cycle and prior to public release of the Draft EIS.

Information Repositories

Austin Branch Library
88 Main St.
Austin, NV 89310

Carson City Library
900 N. Roop St.
Carson City, NV 89701

Churchill County Library Annex
507 S. Maine St.
Fallon, NV 89406

Crescent Valley Branch Library
5045 Tenabo Ave., Suite 103
Crescent Valley, NV 89821

Eureka Branch Library
80 S. Monroe St.
Eureka, NV 89316

Gabbs Community Library
602 Third St.
Gabbs, NV 89409

Federal Regulatory Agencies

Federal Aviation Administration, Oakland Center

Federal Aviation Administration, Salt Lake City Center

Federal Aviation Administration, Western Pacific Region

Federal Aviation Administration, Western Service Center

Natural Resource Conservation Service, Fallon Services Center

U.S. Bureau of Indian Affairs, Branch of Real Estate Services

U.S. Bureau of Indian Affairs, Western Nevada Agency

U.S. Bureau of Land Management, Battle Mountain District Office

U.S. Bureau of Land Management, Carson City Office

U.S. Bureau of Land Management, Nevada State Office

U.S. Bureau of Land Management, Stillwater Field Office

U.S. Bureau of Land Management, Winnemucca District Office

U.S. Bureau of Reclamation, Lahontan Basin Office

U.S. Department of Commerce, Reno Export Assistance Center

U.S. Environmental Protection Agency, Region 9, Communities and Ecosystems

U.S. Fish and Wildlife Service, Nevada Office

U.S. Fish and Wildlife Service, Nevada Realty Field Office

U.S. Fish and Wildlife Service, Stillwater National Wildlife Refuge

U.S. Forest Service, Humboldt-Toiyabe National Forest

U.S. Forest Service, Office of Communication

U.S. Geological Survey, Nevada Water Sciences

State Regulatory Agencies

Nevada Bureau of Air Quality Planning

Nevada Department of Agriculture

Nevada Department of Business and Industry, Carson City Office

Nevada Department of Conservation and Natural Resources

Nevada Department of Conservation and Natural Resources, Division of Forestry

Nevada Department of Conservation and Natural Resources, Division of Environmental Protection

Nevada Department of Conservation and Natural Resources, Division of State Lands

Nevada Department of Conservation and Natural Resources, Division of State Parks

Nevada Department of Conservation and Natural Resources, Division of Water Resources

Nevada Department of Conservation and Natural Resources, National Heritage Program

Nevada Department of Education, Public Instruction, Carson City Office

Nevada Department of Health and Human Services

Nevada Department of Tourism and Cultural Affairs, Division of Museums and History

Nevada Department of Tourism and Cultural Affairs, Nevada Arts Council

Nevada Department of Transportation

Nevada Department of Transportation, District 1

Nevada Department of Transportation, District 2

Nevada Department of Transportation, District 3

Nevada Department of Wildlife, Fallon Office

Nevada Department of Wildlife, Western Region Headquarters

Nevada Division of Forestry

Nevada Indian Commission

Nevada Legislative Counsel Bureau

Nevada Public Utilities Commission, Las Vegas Office

Nevada State Clearinghouse, Nevada Division of State Lands

Nevada State Division of Minerals, Carson City Office

Nevada State Division of Minerals, Southern Nevada Operations

Nevada State Division of Public and Behavior Health

Nevada State Historic Preservation Office, Nevada Department of Conservation and Natural Resources

Nevada Water Resources Association

Local Agencies

Churchill County

Churchill County Emergency Management

Churchill County Farm Bureau

Churchill County Museum

Churchill County Planning Commission

Churchill County Planning Department

Churchill County Road Department

Churchill County School District

Churchill County Volunteer Fire Department

City of Fallon

City of Winnemucca Volunteer Fire Department

Elko County

Elko County Planning Board

Eureka County

Eureka County Natural Resources Advisory Commission

Eureka County Planning Commission

Eureka County Sheriff's Office

Lander County

Lander County Commission

Lander County Conservation District

Lander County Planning and Economic Development

Lander County Public Lands Advisory

Lander County Public Works Department

Lander County School District

Lyon County

Lyon County Planning Department

Mineral County

Mineral County Airport Land Advisory Board

Mineral County Public Works Department

Mineral County Wildlife Advisory Board

Nevada Association of Counties

Nye County Emergency Management

Nye County Planning Department

Pershing County Natural Resources Advisory Commission

Pershing County Planning Department

Truckee Carson Irrigation District

Washoe County Community Services Department

Washoe County Department of Water Resources, Resources Planning and Management

Washoe County Sierra Fire Protection District

Native American Tribes and Nations

Duckwater Shoshone Tribe of the Duckwater Reservation

Inter-Tribal Council of Nevada

Paiute-Shoshone Tribe of the Fallon Reservation and Colony

Pyramid Lake Paiute Tribe of the Pyramid Lake Reservation

Te-Moak Tribe of Western Shoshone Indians of Nevada

Walker River Paiute Tribe of the Walker River Reservation

Yerington Paiute Tribe of the Yerington Colony and Campbell Ranch

Yomba Shoshone Tribe of the Yomba Reservation

Federal Elected Officials

U.S. House of Representatives, District 2 NV, Hon. Mark Amodei

U.S. Senate, NV, Hon. Dean Heller

U.S. Senate, NV, Hon. Harry Reid

State Elected Officials

State of Nevada, Governor, Hon. Brian Sandoval

Nevada State Assembly, District 24, Hon. David Bobzien

Nevada State Assembly, District 25, Hon. Pat Hickey

Nevada State Assembly, District 26, Hon. Randy Kirner

Nevada State Assembly, District 27, Hon. Teresa Benitez-Thompson

Nevada State Assembly, District 30, Hon. Michael Sprinkle

Nevada State Assembly, District 31, Hon. Jill Dickman

Nevada State Assembly, District 32, Hon. Ira Hansen

Nevada State Assembly, District 33, Hon. John Ellison

Nevada State Assembly, District 34, Hon. Victoria Seaman

Nevada State Assembly, District 35, Hon. Brent Jones

Nevada State Assembly, District 36, Hon. James Oscarson

Nevada State Assembly, District 37, Hon. Wesley Duncan

Nevada State Assembly, District 38, Hon. Robin Titus

Nevada State Assembly, District 39, Hon. Jim Wheeler

Nevada State Senate, District 13, Hon. Debbie Smith

Nevada State Senate, District 14, Hon. Donald Gustavson

Nevada State Senate, District 15, Hon. Greg Brower

Nevada State Senate, District 16, Hon. Ben Kieckhefer

Nevada State Senate, District 17, Hon. James Settelmeyer

Nevada State Senate, District 19, Hon. Pete Goicoechea

Local Elected Officials

Churchill County, District 1, Mr. Harry Scharmann

Churchill County, District 2, Mr. Pete Olsen

Churchill County, District 3, Mr. Carl Erquiaga

City of Fallon, Mayor, Hon. Ken Tedford

City of Fallon, City Council, Ward 1, Ms. Kelly Frost

City of Fallon, City Council, Ward 2, Mr. Bob Erickson

City of Fallon, City Council, Ward 3, Mr. James Richardson

City of Winnemucca, Mayor, Hon. Di An Putnam

City of Winnemucca, City Manager, Mr. Steve West

City of Winnemucca, City Council, Seat 1, Mr. Michael Owens

City of Winnemucca, City Council, Seat 2, Ms. Teresa Mavity

City of Winnemucca, City Council, Seat 3, Mr. Ken Tipton

City of Winnemucca, City Council, Seat 4, Mr. Jim Billingsley

City of Winnemucca, City Council, Seat 5, Ms. Paige Brooks

Crescent Valley Advisory Board, Clerk, Ms. Dawn Gann

Crescent Valley Advisory Board, Chair, Ms. Vickie Etchinek

Crescent Valley Advisory Board, Member, Ms. Lynda Stidham

Elko County, District 1, Mr. Demar Dahl

Elko County, District 2, Mr. Delmo Andreozzi

Elko County, District 3, Mr. Glen Guttry

Elko County, District 4, Mr. Cliff Eklund

Elko County, District 5, Mr. Grant Gerber

Eureka County Board of Commissioners, Mr. Michael Sharkozy

Eureka County Board of Commissioners, Chair, Mr. J.J. Goicoechea

Eureka County Board of Commissioners, Vice-Chair, Mr. Jim Ithurralde

Lander County, District 1, Mr. Doug Mills

Lander County, District 2, Mr. Art Clark

Lander County, District 3, Ms. Patsy Waits

Lander County, District 4, Mr. Steven Steinmetz

Lander County, District 5, Mr. Dave Mason

Lyon County, District 1, Mr. Bob Hastings

Lyon County, District 2, Ms. Don Alt

Lyon County, District 3, Mr. Ray Fierro

Lyon County, District 4, Mr. Joe Mortensen

Lyon County, District 5, Mr. Greg Hunewill

Mineral County Board of Commissioners, Mr. Paul MacBeth

Mineral County Board of Commissioners, Chair, Mr. Jerrie Tipton

Mineral County Board of Commissioners, Vice-Chair, Mr. Cliff Cichowlaz

Nye County, County Manager, Ms. Pam Webster

Nye County Board of Commissioners, Chair, Mr. Andrew Borasky

Nye County Board of Commissioners, Vice-Chair, Mr. Dan Schinhofen

Nye County, District 1, Ms. Lorinda Wichman

Nye County, District 2, Mr. Frank Carbone

Nye County, District 3, Ms. Donna Cox

Pershing County Board of Commissioners, Mr. Darin Bloyed

Pershing County Board of Commissioners, Chair, Mr. Pat Irwin

Pershing County Board of Commissioners, Vice-Chair, Ms. Carol Shank

Storey County, County Manager, Mr. Pat Whitten

Storey County Board of Commissioners, Chair, Mr. Jack McGuffey

Storey County, District 1, Mr. Marshall McBride

Storey County, District 3, Mr. Lance Gilman

Washoe County, County Manager, Mr. John Slaughter

Washoe County Board of Commissioners, Chair, Mr. Vaughn Hartung

Washoe County Board of Commissioners, Vice-Chair, Ms. Bonnie Weber

Washoe County, District 1, Ms. Marsha Berkbigler

Washoe County, District 2, Mr. David Humke

Washoe County, District 3, Ms. Kitty Jung

Nongovernmental Organizations

Association of Naval Aviation

Battle Mountain Chamber of Commerce

Bear Yuba Land Trust

Canvasback Gun Club

Carson Valley Chukar Club

Churchill Arts Council

Churchill Economic Development Authority

Disabled American Veterans, NV

Fallon Chamber of Commerce

Fallon Convention and Tourism Authority

Fallon Horseman's Association

Fallon Lions Club

Fleet Reserve Association, Fallon Branch 192

Friends of Black Rock High Rock

Friends of Nevada Wilderness

Friends of the Churchill County Library

Great Basin Bird Observatory

Greater Austin Chamber of Commerce

Lahontan Audubon Society

Lahontan Valley Environmental Alliance

Marine Corps League, Fallon Chapter

National Pony Express Association, Nevada State Division

Navy League of Fallon

Nevada Bighorns Unlimited

Nevada Bowhunters Association

Nevada Concerned Citizens

Nevada Farm Bureau Federation

Nevada Historical Society

Nevada Trappers Association

Nevada Wildlife Federation, Northern Nevada

Ormsby Sportsmen's Association

Oregon-California Trails Association

Pyramid Lake Fisheries

Red Rock Audubon Society

Retired Public Employees of Nevada

Rotary Club of Sparks

Rotary Club, District 5190

Ruby Lake National Wildlife Refuge

Sierra Club, Toiyabe Chapter

Trails West Inc.

The Mule Deer Foundation, Nevada Region

The Nature Conservancy in Nevada

Veterans of Foreign Wars, Fallon Post

Western Nevada Resource Conservation & Development

Private Companies

AMP Resources

Nevada Geothermal Specialists LLC

Ormat Technologies, Inc.

Southwest Gas Corporation

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