

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

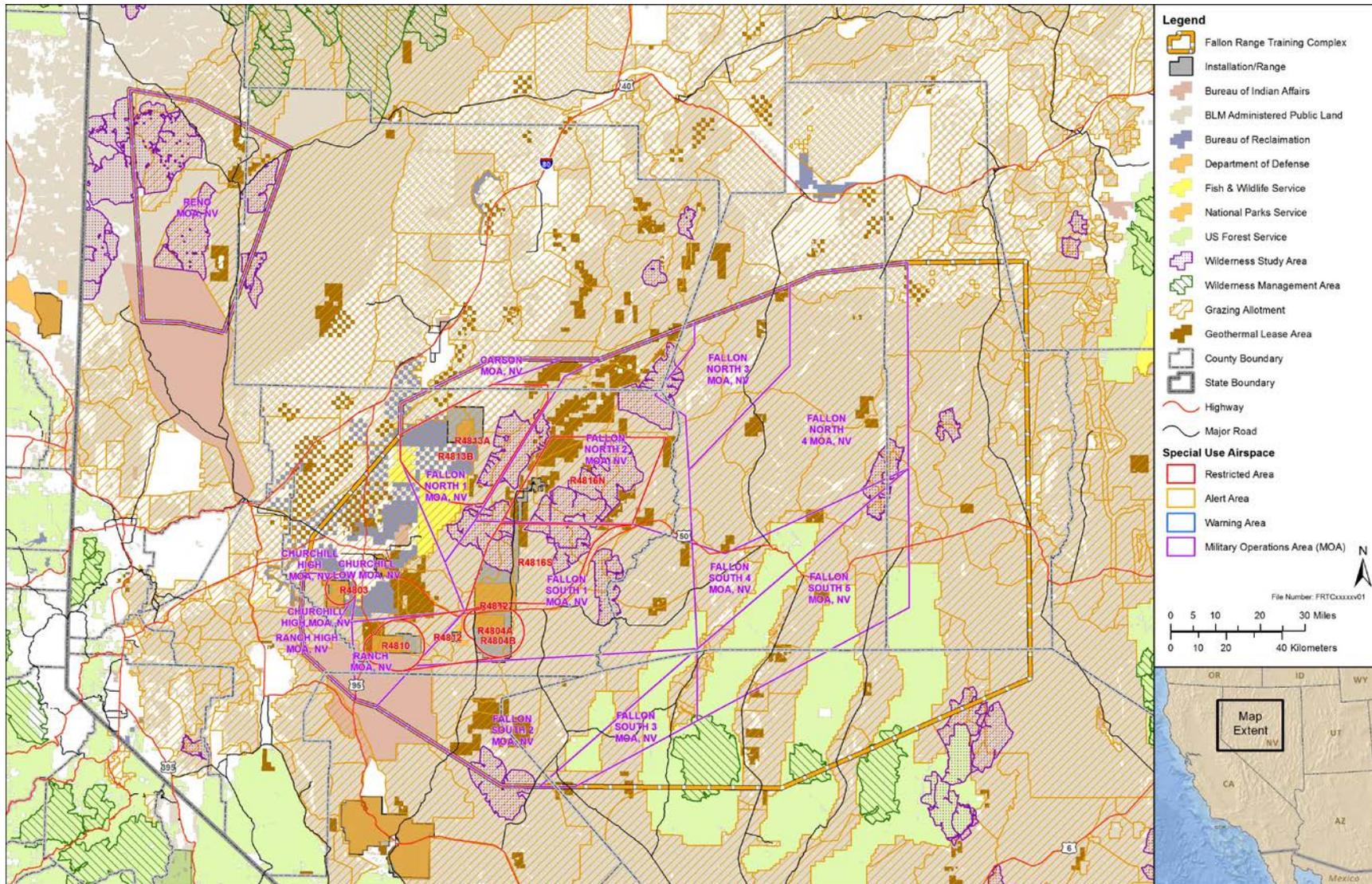


Figure 4-1: Locations of Other Actions and Other Environmental Considerations Identified and Retained for the Cumulative Impacts Analysis

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 disturbance associated with the improvements would be approximately 2,500 square feet (ft.²) (232 square meters [m²]).
- 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 [km²]) 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 km²). The geothermal leases held by TGP for the Dixie Meadows exploration project contain 3,960 ac. (16.03 km²). The proposed action for Dixie Meadows also includes an area known as the Lamb Mineral Interests (760 ac. [3.08 km²]). 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 km²]) 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 (CO₂) 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 km²] 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 km²] in Solar Energy Zones) (Bureau of Land Management and Department of Energy 2012). In Nevada, 9,076,145 ac. (36,730 km²) were identified as being in variance areas and 60,395 ac. (244 km²) 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 km²]). 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 km²) 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 km²) 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 km²) 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 km²) 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 km²) of project-related disturbance, which includes 330.27 ac. (1.34 km²) of surface facility disturbance, 30.11 ac. (0.12 km²) of existing disturbance (currently the responsibility of Newmont to reclaim), 4.94 ac. (0.02 km²) of existing notice-level surface exploration disturbance (#NVN-087927), and an additional 100.00 ac. (0.40 km²) 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 km²) 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

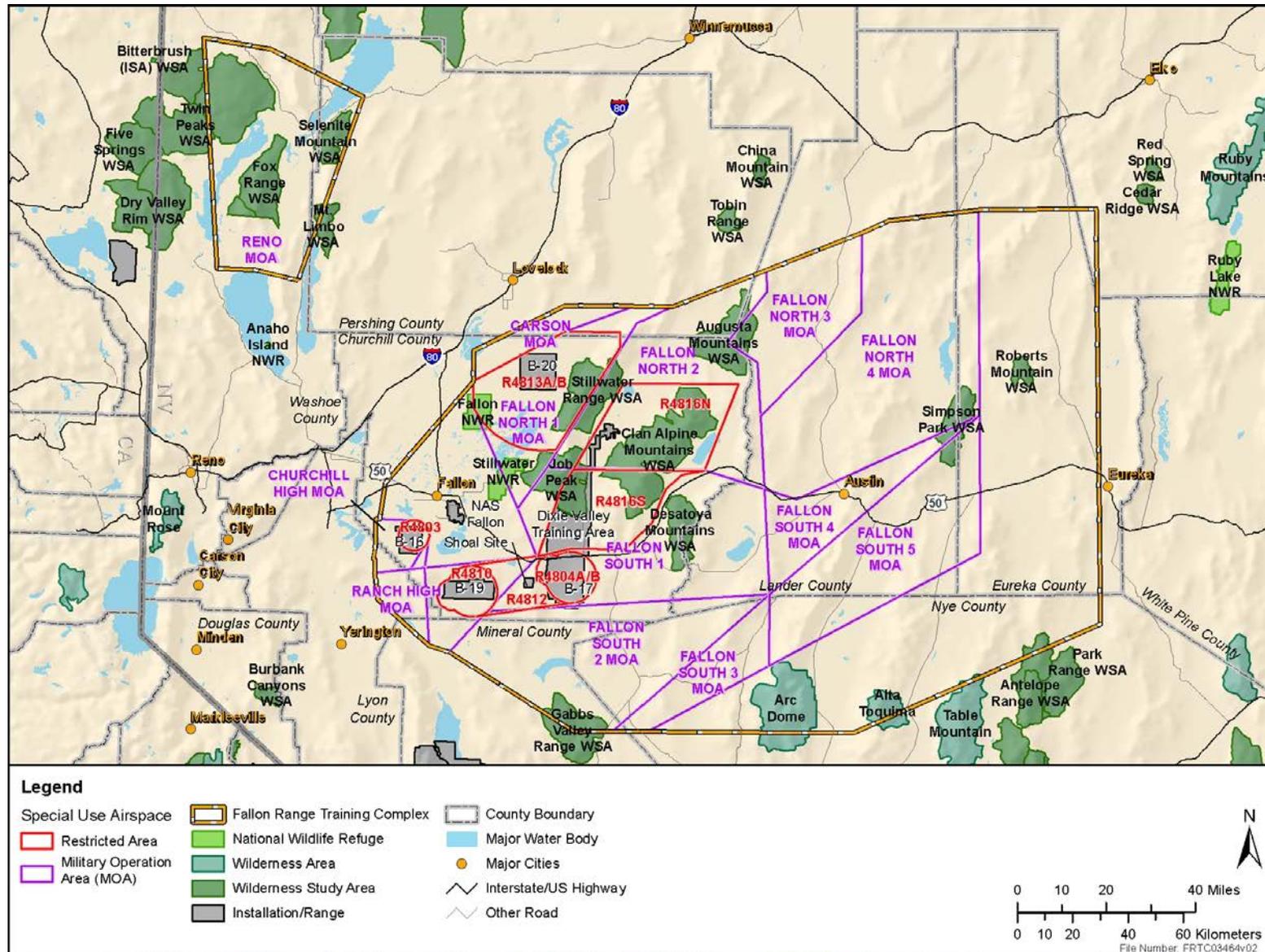
Nevada's geographic boundary includes 45 wilderness areas and 64 wilderness study areas (Bureau of Land Management 2007). These wilderness areas and wilderness study areas are listed under the field office with primary administrative jurisdiction.

- 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.



1
2

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 km²) are recommended suitable and 469,752 ac. (1,901 km²) 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 m²) 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 PM₁₀, 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 mi² (5,237 km²). 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 km²) 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 km²) 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 CO₂, methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Although CO₂, CH₄, and N₂O 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 CO₂, which has a value of 1. For example, CH₄ has a global warming potential of 21, which means that it has a global warming effect 21 times greater than CO₂ 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 CO₂ (CO₂ Eq.). The CO₂ 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 CH₄ and N₂O have much higher global warming potentials than CO₂, CO₂ is emitted in much higher quantities, so it is the overwhelming contributor to CO₂ Eq. from both natural processes and human activities. Global warming potential-weighted emissions are presented in terms of equivalent emissions of CO₂, using units of teragrams (Tg) (1 million metric tons, or 1 billion kilograms) of carbon dioxide equivalents (Tg CO₂ Eq.).

In 2011, the United States generated an estimated 6,702.3 Tg CO₂ Eq. (U.S. Environmental Protection Agency 2013). The 2011 inventory data (U.S. Environmental Protection Agency 2013) show that CO₂, CH₄, and N₂O contributed from fossil fuel combustion processes from mobile and stationary sources (all sectors) include approximately:

- 5,612.9 Tg CO₂,
- 587.23 Tg CH₄, and
- 356.9 Tg N₂O.

The 6,702.3 Tg CO₂ Eq. generated in 2011 is a decrease from the 6,810.3 Tg CO₂ 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 CO₂ emissions, medium- and heavy-duty trucks 22 percent, commercial aircraft 7 percent, and other sources 11 percent. Across all categories of aviation, CO₂ 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 CO₂ emissions, in 2011, commercial aircraft generated 114.6 Tg CO₂ Eq., military aircraft generated 12.2 Tg CO₂ Eq., and general aviation aircraft generated 19.4 Tg CO₂ 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 CO₂ Eq. over the No Action Alternative. Greenhouse gas emissions under Alternative 2 would increase by 108,111 metric tons CO₂ 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: CO₂ 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 CO₂ 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 CO₂ 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 CO₂ 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 CO₂ 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 CO₂ 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 CO₂ emissions from BLM treatments

in Nevada, and from other sources of CO₂ emissions in the region, CO₂ 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 CO₂ emissions from wildfire smoke.

The effects of changing climate on future fire regimes and CO₂ 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.