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1 3.7.2.6 No Action Alternative

2 With the No Action Alternative, populations currently exposed to noise levels above 65 dB DNL associated with current activities on the NTTR would continue to be 3 exposed to these levels because the Air Force does not plan to give up the restricted 4 airspace. However, the ground areas beneath the airspace would no longer be used for 5 test and training associated with live munitions. Activities associated with the NTTR are 6 an important economic contributor and with the No Action Alternative, there would be a 7 loss of employment, income, and expenditures throughout Clark, Lincoln, Nye Counties. 8 9 Adverse socioeconomic impacts would affect the general public and would not only impact minority, low-income, youth, and elderly populations. Therefore, 10 no disproportionate impacts to environmental justice populations are anticipated with this 11 alternative. 12

13 **3.8 BIOLOGICAL RESOURCES**

14 **3.8.1 Affected Environment**

15 **3.8.1.1 Description of Resource**

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.8.1.1.1 and Tables 1 and 2.

Biological resources include vegetation and wildlife species and their associated habitats, aquatic and wetland habitats, special status species and habitats, and federally listed species. These categories are detailed below.

19 3.8.1.2 Region of Influence

The geographical scope of this analysis includes the land boundary within the existing NTTR as well as the proposed alternative expansion areas. In addition, the overlying airspace (see Figure 1-1) as it applies to biological resources is discussed in Section 3.8.2.

24 The NTTR overlaps two biogeographic regions of the Great Basin and is divided into the South Range, which lies in the eastern Mojave Desert, and the North Range, which lies 25 in the southern Great Basin Desert. This zone of transition between the Mojave and 26 Great Basin Deserts has low- to mid-elevation ranges with valleys oriented north to 27 south. The valley bottoms of the South Range vary in elevation from approximately 28 3,000 to 3,600 feet, whereas the valley bottoms of the North Range are approximately 29 4,500 to 5,500 feet. Mountain range elevations exceed 6,000 feet on the South Range 30 and 8,500 feet on the North Range (U.S. Air Force, 1999). Geology varies from 31 limestone/dolomite in the south to volcanic fields in the north. Natural sources of water 32 are scarce across most of the NTTR. Annual precipitation ranges from 3 to 5 inches in 33 the basins to 16 inches in upper elevations of mountains (U.S. Air Force, 1999). Many 34 plant and wildlife species are distinctly associated with either the Mojave Desert or the 35 Great Basin Desert while others occur in both, depending on local climatic or historical 36 conditions. 37

1 **3.8.1.3 Vegetation**

2 Existing NTTR Boundaries (Alternatives 1 and 2)

Vegetation composition is strongly influenced by the levels of precipitation as well as 3 soils and topography. Since 2005, the Nellis Natural Resources Program has conducted 4 field surveys to provide baseline data on plant communities across the NTTR and the 5 wildlife that utilize those communities. Additional surveys were conducted in 2016, and 6 Maxent modeling was used to assist in identifying plant communities and wildlife habitat 7 for the North and South Ranges, including expansion alternatives (Alternatives 3A, 8 3A-1, 3B, and 3C) (U.S. Air Force, 2017b). A total of 44 plant communities have been 9 identified on the NTTR (Table 3-40, Figure 3-21 and Figure 3-22). 10

Table 3-40. Plant Communities and Associated Acreage on the North and South Ranges

	Area (acres)	
Plant Community	North Range	South Range
G310 Intermountain Semi-Desert Steppe & Shrubland		
A3144 Coleogyne ramosissima Mojave Desert Scrub Alliance	0	165,603
A3196 Ericameria nauseosa Steppe & Shrubland Alliance	13,980	17
A3202 Krascheninnikovia lanata Steppe & Dwarf-shrubland Alliance	73,800	347
A3203 Gutierrezia sarothrae - Gutierrezia microcephala Dwarf-shrubland Alliance	637	23,198
Ericameria spp. Shrubland Alliance (Place Holder)	9,857	0
G541 Warm Semi-Desert Shrub & Herb Dry Wash & Colluvial Slope		
A1044 <i>Chilopsis linearis - Psorothamnus spinosus</i> Desert Wash Scrub Alliance	0	452
A4185 <i>Prunus fasciculata - Salazaria mexicana</i> Northern Mojave Desert Wash Scrub Alliance	0	118
A4186 Psorothamnus fremontii - Psorothamnus polydenius Desert Wash Scrub Alliance	1,930	124
A4188 Hymenoclea salsola - Bebbia juncea Mojave-Sonoran Desert Wash Scrub Alliance	3,107	855
A3259 Fallugia paradoxa Desert Wash Scrub Alliance	0	69
G246 Colorado Plateau-Great Basin Juniper Open Woodland		
A3496 Juniperus osteosperma / Shrub Understory Woodland Alliance	2,629	0
G247 Great Basin Pinyon - Juniper Woodland Group		
A2108 <i>Pinus monophylla - Juniperus osteosperma /</i> Shrub Understory Woodland Alliance	50,884	14,998
CEGL000825 Pinus monophylla Woodland	28,408	0
G295 Mojave-Sonoran Bajada & Valley Desert Scrub		
A3277 Larrea tridentata - Ambrosia dumosa Bajada & Valley Desert Scrub Alliance	14,179	268,258
A3279 Ambrosia dumosa Desert Dwarf Scrub Alliance	0	24,383
G296 Mojave Mid-Elevation Mixed Desert Scrub		,
A0833 Purshia stansburiana Scrub Alliance	569	12,064
A2515 Menodora spinescens Scrub Alliance	76,456	388
A3147 Yucca schidigera Scrub Alliance	0	11,584
A3148 Yucca brevifolia Wooded Scrub Alliance	47,927	124,277
CEGL005294 Yucca brevifolia / Coleogyne ramosissima Wooded	0	99,851
Onrabiana		

	Area (acres)	
Plant Community	North	South
	Range	Range
CEGL005777 Yucca brevifolia / Larrea tridentata - Yucca schidigera / Pleuraphis rigida Wooded Shrubland	0	183,101
A3195 Chrysothamnus viscidiflorus Steppe & Shrubland Alliance	2,280	0
A4167 Eriogonum wrightii - Eriogonum heermannii - Buddleja utahensis	0	136
Scrub Alliance		
A4245 Ephedra nevadensis - Lycium andersonii - Grayia spinosa Scrub Alliance	56,322	13,969
CEGL005751 Ephedra nevadensis - (Salazaria mexicana, Hymenoclea	81	10,242
salsola) Shrubland		,
Lycium (andersonii, shockleyi) Shrubland (Place Holder)	13,772	663
G300 Intermountain Shadscale – Saltbrush Scrub		
A0869 Atriplex canescens Scrub Alliance	65,805	20,423
A0870 Atriplex confertifolia Scrub Alliance	123,205	113,906
CEGL001315 Atriplex confertifolia / Tetradymia glabrata Shrubland	3,637	0
CEGL001452 Picrothamnus desertorum Shrubland	242,108	0
A3171 Grayia spinosa Scrub Alliance	5,084	2,074
G303 Intermountain Tall Sagebrush Steppe & Shrubland		
A3198 Artemisia tridentata - Mixed Shrub Dry Steppe & Shrubland Alliance	234,192	0
G308 Intermountain Low & Black Sagebrush Steppe & Shrubland		
A3219 Artemisia arbuscula ssp. arbuscula Steppe & Shrubland Alliance	192,656	13,455
A3222 Artemisia nova Steppe & Shrubland Alliance	68,753	7,207
G312 Colorado Plateau Blackbrush – Mormon Tea Shrubland Group		
A2572 Ephedra torreyana Shrubland Alliance	0	2,784
G537 North American Desert Alkaline-Saline Wet Scrub		
A1046 Sarcobatus vermiculatus Intermountain Wet Shrubland Alliance	20,665	0
A3880 Mojave Seablite - Red Swampfire Alkaline Wet Scrub Alliance		
CEGL001991 Suaeda moquinii Wet Shrubland	0	2,133
G569 North American Warm Semi-Desert Cliff, Scree & Pavement Sparse Vegetation	0	11,263
G570 Intermountain Basins Cliff, Scree & Badland Sparse Vegetation	227	0
G675 North American Warm Semi-Desert Dune and Sand Flats		
A3170 Pleuraphis rigida Desert Grassland Alliance	0	1,245
G775 Intermountain Sparsely Vegetated Dune Scrub & Grassland Group		,
Achnatherum hymenoides Vegetation Alliance (Proposed)	183	565
NNHP Classification (Peterson, 2008)		
A.858 Ephedra viridis Shrubland Álliance	4,460	0
B.007 Microphytic Playa Alliance	19,684	38,006
No Current Classification		
Developed or Disturbed Land	17,803	21,306
Sarcobatus baileyi Shrubland Alliance	237,178	0
Total	1.632.458	1.189.064

Source: (U.S. Air Force, 2017b)

1 Vegetation communities on the NTTR are named according plant alliances assigned

2 using the 2016 U.S. National Vegetation Classification where possible. In some cases,

3 unique plant community names are assigned because the U.S. National Vegetation

4 Classification did not have a good fit for that plant community. For the North Range,

5 32 plant alliances were mapped, while 38 different plant alliances were mapped for the

South Range (Table 3-40). Most of the plant communities found on the NTTR are of the 1 woodland, shrubland, or scrub alliance. Details of the methodology of and descriptions 2 of each plant community can be found in Plant Community Mapping for the Nevada 3 Test and Training Range and Proposed Evaluation Alternatives Report (U.S. Air Force, 4 2017b) and results of the plant community mapping is provided in Figure 3-21 and 5 Figure 3-22. The discussion below provides a broad description of the vegetation within 6 the South Range and North Range. The South Range is located in the Mojave Desert, 7 and typical physiography of the area consists of mountain ranges that drain into bajadas 8 (collections of alluvial fans) and eventually drain into playas. Playas tend to have little or 9 no vegetation, while bajadas are often dominated by creosote bush (Larrea tridentata) 10 and bursage (Ambrosia dumosa) in the lower bajadas and blackbrush (Coleogyne 11 ramosissima) and Joshua tree (Yucca brevifolia) in the upper bajadas (U.S. Air Force, 12 2017c). Most of the mountains are covered by scattered populations of various desert 13 brush, including bitterbrush (Purshia spp.), matchweed (Gutierrezia spp.), 14 and shadscale (Atriplex confertifolia), cactus species at the lower elevations, and 15 scrub/woodland in elevations above at least 4,900 feet mean sea level and usually 16 above 5,900 feet mean sea level (U.S. Air Force, 2010). At higher elevations (above 17 4,700 feet), plant communities may be dominated by Utah juniper (Juniperus 18 osteosperma) and pinyon pine (Pinus monophylla) (U.S. Air Force, 2017b; 2017c). 19

The North Range encompasses the southern portions of the Great Basin Desert. The 20 physiography of the area is similar to the South Range. However, rainfall is slightly 21 higher in the North Range, resulting in plant communities that have denser vegetation. 22 Similar to the South Range, playas are sparsely vegetated, and from the boundaries of 23 the playas to the base of mountains, vegetation is typically dominated by greasewood 24 (Sarcobatus spp.), shadscale, and sagebrush species (Artemisia spp.). Greasewood 25 and shadscale tend to occur in the basins, on sites where soils may be salt-affected and 26 heat and aridity are locally the greatest. Species of sagebrush (Artemisia spp.) 27 dominate different sites, generally assorting along soil temperature and moisture 28 gradients. The mountain areas are dominated by Utah juniper and pinyon pine, similar 29 30 to the South Range (U.S. Air Force, 2017c).

Habitats that are unique, valuable for wildlife, and in greatest need of conservation in 31 Nevada were identified based on the Nevada Wildlife Action Plan, developed by the 32 NDOW, the USFWS, State of Nevada, and local organization agencies. 33 In 2007. unique habitat investigations were initiated on the NTTR, in support of the Nellis Natural 34 Resources Program, to characterize and understand unique habitats and their 35 associated species. Using these data, specific research studies were prioritized based 36 on species of concern and potential projects (U.S. Air Force, 2014e). In addition, a 37 study has been prepared to document historical reports and survey results for key 38 habitats, including maps and detailed descriptions (e.g., dominant plant species, value 39 to wildlife and plants, potential to support special status plant and wildlife species) (U.S. 40 Air Force, 2017c). 41

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Figure 3-21. Plant Communities on the North Range (U.S. Air Force, 2017b)

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Figure 3-22. Plant Communities on the South Range (U.S. Air Force, 2017b)

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2

LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT | DRAFT NTTR LAND WITHDRAWAL

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Natural sources of water are scarce across most of the study area; therefore, wetland and riparian vegetation is limited to areas of active springs and seeps. Ephemeral streams may support riparian vegetation, which is a unique habitat potentially supporting species of concern (U.S. Air Force, 2010).

Invasive and noxious plant species destroy native ecosystems, negatively impact 5 federally protected and state-protected species, and pose potential problems for military 6 operations. EO 13112, Invasive Species, requires prevention of the introduction and 7 8 spread of invasive plant and animal species on federally managed lands, and control of invasive species is a primary natural resources management issue on military 9 installations. Noxious weeds have federal and state legislation regarding inventory and 10 control of these species. Noxious weeds are defined as any plant designated by a 11 12 federal, state, or county government to be injurious to public health, agriculture, recreation, wildlife, or any public or private property (Sheley et al., 1999). The only 13 14 noxious weed known to occur on the NTTR is salt cedar (Tamarix ramosissima). The Nevada Department of Agriculture maintains a list of noxious weeds and makes 15 regulations for the transport and control of noxious weeds, which is the responsibility of 16 17 every landowner or occupant. Cheat grass (Bromus tectorum), red brome (Bromus madritensis ssp. rubens), halogeton (Halogeton spp.), Russian thistle (Salsola kali), and 18 salt cedar (Tamarix ramosissima) are invasive species that currently inhabit the NTTR. 19 20 Cheatgrass has the widest distribution and is found throughout the North Range. Red brome is mostly restricted to valley bottoms and alluvial fans in the South Range. The 21 occurrence of both these grasses is closely tied to soil disturbances from human 22 activities. Halogeton appears to be restricted to areas that are either regularly or 23 severely disturbed and do not contain a perennial plant component or undisturbed sites 24 with saline soils and low cover from native perennial species. Russian thistle appears to 25 be restricted to areas that are regularly or severely disturbed, such as roadsides, or 26 sites with sandy soils and a low density of perennial plants. Salt cedar is also present 27 but not widespread on the NTTR, due to the fact that this species is adapted to wetter 28 environments, and is basically restricted to a few riparian corridors and wet areas. Salt 29 cedar stands can be quite large, and the plants tend to be very competitive for water 30 use, often outcompeting any other plants in the area (U.S. Air Force, 2014f). 31

32 Alternative 3A – Range 77 – EC South Withdrawal (and Amended Alternative 3A-1)

This area consists of 18,000 acres lying along the southwest boundary of the North 33 Range of the NTTR. The withdrawal of 15,314 acres associated with Alternative 3A-1 is 34 2,592 acres less than Alternative 3A in the EC South Withdrawal. Vegetation is similar 35 to that described above for the North Range. Desert shrubland plant communities, the 36 majority of which is dominated by wolfberry (Lycium andersonii, L. schockleyi), winterfat 37 (Krascheninnikovia lanata), and greasewood, are the dominant vegetation types on 38 Alternatives 3A and 3A-1 areas (occupying 59 percent and 68 percent of the land, 39 respectively). The remaining lands support desert woodland, dominated by Joshua 40 trees (41 percent for Alternative 3A and 32 percent for Alternative 3A-1). Less than 41 0.01 percent of the lands are mapped as developed or disturbed for both Alternatives 42 3A and 3A-1 (U.S. Air Force, 2017b). 43

1 Alternative 3B – 64C/D and 65D Withdrawal and Administrative Incorporation

2 This location consists of approximately 57,000 acres located immediately south of the South Range. The majority of the lands (87 percent) occupied by Alternative 3B is 3 desert shrubland, with 38 percent dominated or co-dominated by creosote bush, 4 18 percent dominated by sagebrush, and 17 percent dominated by shadscale. Desert 5 woodlands dominated by Joshua trees occupy 12 percent of the Alternative 3B lands. 6 7 Less than 1 percent of the lands are mapped as microphytic playa alliance, desert pavement, or barren lands, and less than 0.05 percent is mapped as developed or 8 disturbed (U.S. Air Force, 2017b). 9

10 Alternative 3C – Alamo Withdrawal

The Alamos area consists of 227,000 acres immediately east of the South Range in the 11 DNWR. Vegetation is similar to that described above for the South Range. Desert 12 woodlands dominated by Joshua tree occupy more than half (54 percent) within 13 Alternative 3C lands, and 7 percent is pinyon pine/Utah juniper woodland. About 14 35 percent of the lands support desert shrubland, with areas dominated or co-15 dominated by creosote bush contributing 12 percent, shadscale shrublands 16 representing 10 percent, and 6 percent dominated by sagebrush. The remaining lands 17 include 2 percent mapped as microphytic playa alliance and 1 percent intermittently 18 flooded areas dominated by Mojave seablite (Sueada moguinii) or desert almond 19 (Prunus fasciculata). Less than 1 percent is dominated by herbaceous species and 20 barren lands, and there are no areas mapped as desert pavement or developed or 21 disturbed in Alternative 3C lands (U.S. Air Force, 2017b). 22

23 **3.8.1.4 Wildlife**

24 Existing NTTR Boundaries (Alternatives 1 and 2)

The NTTR lies within two major geographic regions within the Basin and Range 25 physiographic province of the western United States. The region has broad desert 26 valleys bounded by seven intricate mountain ranges, which extend from 3,000 to 27 9,000 feet in elevation, and also includes a transition zone between the Mojave Desert 28 and Great Basin Desert. Together, these factors result in suitable habitat for a variety of 29 wildlife species, including a number of sensitive species, such as the sage grouse 30 (Centrocercus urophasianus), banded Gila monster (Heloderma suspectum cinctum), 31 the Mojave desert tortoise (Gopherus agassizii), and various bat species (U.S. Air 32 Force, 2016d; 2010). Common reptiles include the side-blotched lizard (Uta 33 stansburiana), California whiptail (Cnemidophorous tigris), zebra-tailed lizard 34 (Callisaurus draconoides), yellow-backed spiny lizard (Sceloporus uniformis), desert 35 night lizard (Xantusia vigilis), and the desert horned lizard (Phyrnosoma platyrhinos). 36 Common snakes include the coachwhip (Coluber flagellum), western patch-nosed 37 snake (Salvadora hexalepis), gopher snake (Pituophis catenifer), western shovel-nosed 38 snake (Chionactis occipitalis), and the Mojave rattlesnake (Carotalus scutulatus). On 39 the North Range, additional reptile species have been observed and include the 40 sagebrush lizard (Sceloporus graciosus), long-nosed leopard lizard (Gambelia 41 wislizenii), and the Great Basin rattlesnake (Crotalus oreganus lutosus). Due to the 42

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general lack of suitable aquatic habitat, the NTTR does not have any natural fish populations and amphibians are less common (U.S. Air Force, 2010). Species observed on the North Range include the Great Basin spade-foot toad (*Spea intermontana*) and the western spade-foot toad (*Spea hammondii*), and on the South Range the western toad (*Anaxyrus boreas*) has been seen. Approximately 20 bat species and 143 bird species, including as many as 18 different species of raptors, are found on the NTTR (U.S. Air Force, 2017d; 2017e).

Carnivores such as the coyote (Canis latrans), badger (Taxidea taxus), bobcat (Lynx 8 9 rufus), mountain lion (Felis concolor), and kit fox (Vulpes macrotis) occur on the North and South Ranges. A wide variety of small- to medium-size mammals (e.g., rodents and 10 lagomorphs), including the little pocket mouse (Perognathus longimembris), Merriam's 11 kangaroo rat (Dipodomys merriami), desert wood rat (Neotoma lepida), and black-tailed 12 jackrabbit (Lepus californicus), also are found throughout the NTTR. Desert bighorn 13 sheep (Ovis canadensis) may be found at higher elevations on the NTTR particularly 14 during the summer and at lower elevations in the winter. Other large mammals present 15 on both the North and South Ranges include the desert mule deer (Odocoileus 16 hemionus) and pronghorn antelope (Antilocapra americana), which have increased in 17 population since the early 1990s (U.S. Air Force, 2017f). The majority of pronghorn 18 antelope have been observed on the North Range, especially in basins of Cactus Flats, 19 Kawich Valley, and Kawich Range (U.S. Air Force, 2017f). Wild horses and burros are 20 an important component to the desert ecosystem in Nevada and are protected under 21 P.L. 92-195, the Wild Free-Roaming Horse and Burro Act of 1971. Under this act, the 22 BLM and USFS are charged with managing and protecting these animals. The Air Force 23 and BLM created the Nevada Wild Horse Range on the north-central portion of the 24 NTTR (see Figure 3-6). Wild horse population surveys have been conducted by BLM 25 (U.S. Air Force, 2017f). 26

Prior to the LEIS withdrawal effort, there was limited detailed population information for 27 most wildlife species on the NTTR (U.S. Air Force, 2010). In support of this LEIS, field 28 and desktop surveys (analysis using existing data, reports and GIS information) were 29 conducted for large mammals, small mammals, bats, special status species, key 30 habitat, raptors, migratory birds, sage grouse, and desert bighorn sheep (U.S. Air Force, 31 2017g). In support of natural resources management, habitat range models were 32 developed for select species by a group of scientists and planners from the Air Force, 33 USFWS, BLM, and the NDOW (U.S. Air Force, 2017g). GIS layers of existing 34 distribution data from the select species and associated environmental requirements 35 were used to predict potential habitat ranges (U.S. Air Force, 2017g). The habitat 36 models were developed using the unique habitat guidelines based on the Nevada 37 Wildlife Action Plan, which is a comprehensive wildlife strategy developed cooperatively 38 by the NDOW in response to a mandate by Congress that requires all states and 39 territories of the United States to develop wildlife action plans. This comprehensive 40 database can be used by the military mission for strategic planning of training 41 operations on the NTTR. 42

1 Alternative 3A – Range 77 – EC South Withdrawal (and Amended Alternative 3A-1)

2 Alternatives 3A and 3A-1 consist of 18,000 acres and 15,000, respectively, that lie along the southwest boundary of the North Range. Wildlife species commonly associated 3 including Moiave mid-elevation mixed desert scrub. with NDOW habitats. 4 Mojave/Sonoran warm desert scrub, and intermountain cold desert scrub, could occur in 5 Alternatives 3A and 3A-1 areas (U.S. Air Force, 2017g). Wildlife species that could 6 7 occur in these desert scrub habitats include a variety of small mammals (e.g. pale kangaroo mouse), bats (e.g., Mexican free tailed bat, Townsend's big-eared bat), 8 reptiles (e.g., banded gila monster, long nosed leopard lizard) and bird species (e.g., 9 Brewers sparrow, Bendire's thrasher, loggerhead shrike, and hawks) (U.S. Air Force, 10 2017c; 2017g). 11

12 Alternative 3B – 64C/D and 65D Withdrawal and Administrative Incorporation

Alternative 3B consists of approximately 57,000 acres located immediately south of the 13 South Range. Wildlife species commonly associated with NDOW habitats, including 14 Mojave mid-elevation mixed desert scrub, Mojave/Sonoran warm desert scrub, and 15 intermountain cold desert scrub, desert playas, and cliffs and canyons, could occur in 16 Alternatives 3B 64C/D and 65D areas (U.S. Air Force, 2017g) As mentioned above, 17 wildlife species that occur in desert scrub habitats include a variety of birds, bats, and 18 mammals. Species such as aquatic invertebrates, various waterfowl species, 19 shorebirds, and small water birds are associated with desert playas. Cliffs and canyons 20 provide structure for nesting, roosting or denning, protection from predators and 21 foraging habitat for many wildlife species (U.S. Air Force, 2017c). For example, 22 peregrine falcons, prairie falcons, and golden eagles are obligate nesters in cliff and 23 canyon habitats. Rocks and crevices are used by chuckwallas and gila monsters for 24 protective cover and by ringtails for denning. 25

26 Alternative 3C – Alamo Withdrawal

Alternative 3C consists of approximately 227,000 acres immediately east of the South 27 Range in the DNWR. Wildlife species commonly associated with NDOW habitats, 28 including Mojave mid-elevation mixed desert scrub. Mojave/Sonoran warm desert scrub 29 and intermountain cold desert scrub, desert playas and ephemeral pools, sand dunes 30 and badlands and lower montane woodlands could occur in Alternatives 3C (U.S. Air 31 Force, 2017g). As mentioned above, wildlife species that occur in desert scrub habitats 32 include a variety of birds, bats, and mammals. Most playas do not have permanent 33 sources of water, thus their value to wildlife is largely ephemeral, yet critical in nature. 34 Playas can produce lush growth of emergent and submergent vegetation that are 35 important for aquatic invertebrates, various waterfowl, shorebirds, and small water birds 36 (U.S. Air Force, 2017c). Sand dunes provide habitat for bats, birds, and mammals such 37 as the big dune miloderes weevil, kangaroo mouse, desert pocket mouse, and the pale 38 kangaroo mouse. Other species present in the sand dunes are the western banded 39 geckos, desert night lizards, and desert horned lizards. Sand dunes are also habitat for 40 a high diversity of invertebrates, including beetles, solitary bees, crickets, and ants, 41 some of which are sand dune obligates. A range of wildlife such as birds, bats, and 42 small and large mammals occur in montane woodlands. 43

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3.8.1.5 **Aquatic and Wetland Habitats** 1

Existing NTTR Boundaries (Alternatives 1 and 2) 2

As previously stated, natural sources of water are scarce across most of the study area. 3 Surface waters, including springs, seeps, and pools, provide a critical resource to 4 wildlife species living in or migrating through the arid environment. Migratory and 5 resident birds and large mammals rely heavily on surface water. Native fishes are not 6 known or expected to occur because of the lack of perennial pools of water with 7 sufficient extent to sustain populations during drought (U.S. Air Force, 1999). 8

About 135 water features were identified within the study area, including natural and 9 manipulated or man-made features. Natural springs and seeps originate in areas where 10 the groundwater table intersects the ground surface. Springs in the mountains 11 12 discharge from perched water zones or emerge in areas where groundwater has migrated along rock fractures. Springs typically flow for only short distances before 13 infiltrating into the ground. Pools may occur at some large springs. Seeps also originate 14 from groundwater but have a more diffuse source and very low flow rate. Figure 3-23 15 depicts the locations of springs and seeps, construction pond and surface water 16 accumulation, rivers and streams, floodplains and other water features within the study 17 area on the North and South Ranges and proposed expansion areas. Natural water 18 features include 46 perennial springs, 20 intermittent springs, 7 perennial seeps, and 19 36 intermittent seeps. Other features include 1 surface water accumulation, 20 4 construction ponds, and 21 wildlife water developments. Most of the perennial seeps 21 and springs are found in the mountains and foothills of various mountain ranges in the 22 study area. These springs are usually low flow (less than 2 gallons per minute) and 23 inundate very small areas (10 to 1,000 square feet). A majority of the perennial seeps 24 and springs found on the North Range are allowed to flow naturally over the landscape, 25 which results in development of wetland plant communities where soils remain 26 27 inundated throughout the year. The wetland plant community is often surrounded by a mesic plant community composed of mostly facultative plants capable of growing in wet 28 and dry areas. These areas often support healthy populations of grasses and forbs, 29 which provide forage for grazing animals (U.S. Air Force, 2017h). 30

Most of the active springs are found on the North Range, especially in the Kawich, 31 Belted, and Cactus Mountain Ranges and Stonewall Mountain. Only five springs are 32 found on the South Range. Most of the perennial springs on the South Range, as well 33 as a few of the perennial springs on the North Range, are captured in troughs to allow 34 water to accumulate for use by bighorn sheep, pronghorn antelope, mule deer, and 35 other wildlife. In many cases, these springs do not support wetland vegetation unless 36 the troughs overflow in small areas, which may be dominated by a mix of facultative and 37 upland species. No perennial seeps have been observed on the South Range. Most 38 water sources for wildlife on the South Range are provided by wildlife water 39 developments, which collect water from storm events and store it in water tanks (U.S. 40

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Figure 3-23. Aquatic Resources Within the Study Area

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Intermittent seeps and springs typically flow only in the early spring when water tables 1 are higher. At that time, the seeps and springs support relatively lush vegetation that 2 can be utilized by wildlife in the area. By summer, most of the vegetation becomes 3 desiccated and may be replaced by more xeric species. Intermittent seeps are 4 sometimes very difficult to differentiate from areas where water accumulates after 5 significant precipitation. This is especially true for areas where winter snows melt and 6 7 accumulate in the mountains. These areas of saturated soils could either be the result of accumulated surface water or a temporarily exposed water table. Regardless of the 8 origin of the water, these areas provide excellent forage for wildlife, especially in the 9 spring (U.S. Air Force, 2017h). 10

Federal jurisdictional wetlands have legal protection under Section 404 of the CWA. Activities with the potential to discharge fill into waters of the United States (including wetlands) require a CWA Section 404 permit from the USACE authorizing the activity and may also require permitting or certification under CWA Section 401. The protection of wetlands on federal lands is also required under EO11990, *Protection of Wetlands*, and Air Force Order 780.1.

USACE defines wetlands as "areas that are inundated or saturated by surface or 17 groundwater at a frequency and duration sufficient to support, and that under normal 18 circumstances do support, a prevalence of vegetation typically adapted for life in 19 saturated soil conditions" (USACE, 1987). Wetlands are recognized as a special aquatic 20 site under CWA Section 404(b)(1) guidelines, and a "no net loss" policy continues to 21 guide federal regulatory actions affecting wetlands under CWA Section 404. 22 Jurisdictional wetland areas are identified and delineated according to USACE's 23 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West 24 Region (Version 2.0) (USACE, 2008). 25

Jurisdictional wetlands are a subset of jurisdictional waters of the United States, which 26 include streams, rivers, ponds, and lakes, discussed in Section 3.11 (Water Resources) 27 and also in the Potential Jurisdictional Waters on the Nevada Test and Training Range 28 and Proposed Expansion Alternatives report (U.S. Air Force, 2016e). To be considered 29 jurisdictional, a wetland needs to be dominated by hydrophytic vegetation and have 30 positive indicators for wetland hydrology and hydric soils and a significant nexus 31 (connection) to a jurisdictional water of the United States (USACE, 2008). Figure 3-23 32 depicts wetlands identified by the National Wetlands Inventory (NWI). 33 The NWI. developed by the USFWS, uses high-altitude imagery to identify wetlands based on the 34 visible presence of wetland vegetation or hydrology and depicts these on a series of 35 topical maps available through an on-line guery. The NWI is not intended to define limits 36 of jurisdiction of any federal, state, or local agency, but it is used as a tool that 37 contributes to the existing information available for the survey area. The NWI maps 38 were consulted and included on maps as part of the Potential Jurisdictional Waters on 39 the Nevada Test and Training Range and Proposed Expansion Alternatives report (U.S. 40 Air Force, 2016e). 41

42 It is ultimately the responsibility of USACE to make the final determination on the 43 jurisdictional status of wetlands or other waters of the United States identified within the

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1 survey areas. However, the NTTR is located within the Great Basin region, and most of the surface water on the NTTR occurs as ephemeral streams and washes that drain to 2 many playas found throughout the study area, where water collects and eventually 3 evaporates (U.S. Air Force, 2010). These streams, washes, and playas are not 4 connected to waters of the United States and would likely be considered isolated 5 features (not traditional navigable waters). Areas that have surface water for sufficient 6 time to support wetland vegetation, such as seeps, springs, or other surface water 7 features, would also be considered isolated and nonjurisdictional unless they have a 8 significant nexus to traditional navigable waters. Based on the results of the 9 jurisdictional determination report, the only streams that have the potential to be 10 considered jurisdictional are limited to two watersheds within the study area, including 11 the Amargosa River in the southern portion of the North Range and a small area of the 12 South Range that coincides with the Las Vegas Wash watershed (U.S. Air Force, 13 2016e). (Refer to Section 3.11, Water Resources, for a more detailed description of 14 watersheds). Therefore, wetlands within these watersheds could potentially fall under 15 the jurisdiction of USACE. 16

17 Alternative 3A – Range 77 – EC South Withdrawal (and Amended Alternative 3A-1)

The Alternative 3A and 3A-1 withdrawal area lies along the southwest boundary of the 18 North Range; Figure 3-24 depicts the locations of aquatic features and floodplains 19 within the proposed Range 77 withdrawal area. Nearly all of the Range 77 withdrawal 20 area is within the Amargosa River watershed. Ephemeral streams and natural seeps 21 and springs in this area that meet the definition of USACE wetlands or other waters of 22 the United States with nexus to Amargosa River or tributaries may fall under the 23 jurisdiction of USACE. The only water present on the Alternative 3A and 3A-1 24 withdrawal area are wildlife water developments (U.S. Air Force, 2016e). 25

26 Alternative 3B – 64C/D and 65D Withdrawal and Administrative Incorporation

The Alternative 3B withdrawal area is located immediately south of the South Range; 27 Figure 3-25 depicts the locations of aquatic features and floodplains within the proposed 28 Range 64C/D and 65D withdrawal area. All or a portion of the Range 64C/D and 65D is 29 within the Las Vegas Wash watershed. Ephemeral streams and natural seeps and 30 springs in this area that meet the definition of USACE wetlands or other waters of the 31 United States with nexus to Las Vegas Wash or tributaries may fall under the 32 jurisdiction of USACE. The only springs present on the Alternative 3B withdrawal area 33 are wildlife water developments (U.S. Air Force, 2016e). 34

35 Alternative 3C – Alamo Withdrawal

36 The Alternative 3C withdrawal area is immediately east of the South Range in the

- 37 DNWR; Figure 3-26 depicts the locations of aquatic features and floodplains within the
- 38 proposed Alamos withdrawal area.







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Figure 3-25. Aquatic Resources Within Alternative 3B Proposed Expansion Area

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The southeasternmost portion of the Alamos withdrawal area is within the Las Vegas Wash watershed. Ephemeral streams and natural seeps and springs in this area that meet the definition of USACE wetlands or other waters of the United States with nexus to Las Vegas Wash or tributaries may fall under the jurisdiction of USACE. Two natural springs are present on the west side of the sheep range in the Alternative 3C withdrawal area (U.S. Air Force, 2017h).

7 **3.8.1.6 Special Status Species and Habitats**

8 Special status species include plant and wildlife species listed as threatened or 9 endangered under the federal ESA (including proposed and candidate species), those 10 protected by the State of Nevada or with a state ranking of S1 (critically imperiled), 11 those with a similar status under the NDOW, those identified as sensitive (S) by the 12 BLM or USFS, or those of regional concern due to rarity and potential vulnerability to 13 extinction and that have the potential to occur within the study area (i.e., the NTTR and 14 proposed alternative areas).

15 Sensitive habitats include those that support endangered, threatened, or sensitive species and, therefore, are important to the conservation of these species, as well as 16 wetlands and other waters regulated under Sections 401 and 404 of the CWA. Also 17 included in this category are species protected by the Bald and Golden Eagle Protection 18 Act, the federal Migratory Bird Treaty Act (MBTA), and EO 13186, Responsibilities of 19 Federal Agencies to Protect Migratory Birds. The U.S. Air Force is concurrently 20 preparing a biological assessment for the NTTR land withdrawal and will enter formal 21 Section 7 consultation with USFWS. 22

23 Existing NTTR Boundaries (Alternatives 1 and 2)

24 Plants

Surveys have been conducted on and around the NTTR since the 1990s to locate rare 25 plant populations. Beginning in 2005, extensive surveys were initiated to confirm and 26 reestablish the known locations for previously identified rare plant populations. 27 Fieldwork conducted in 2016 included vegetation surveys to characterize plant 28 communities and identify rare plants on the proposed expansion areas. Prior to the 29 2016 surveys, a target rare plant list was developed and coordinated with the USFWS, 30 NDOW, and BLM. A summary of the historical surveys and results of the 2016 surveys 31 for rare plants and vegetation within the study area (the NTTR and proposed expansion 32 areas) is presented in Rare Plants of the Nevada Test and Training Range and 33 Proposed Expansion Alternatives (Rare Plants Report) (U.S. Air Force, 2016f). 34

A table listing the species identified in the Rare Plants Report (U.S. Air Force, 2016f) as federally listed, state listed as protected, or of special interest to cooperating agencies is included in Appendix H, Biological Resources (Rare Plants Tables), including regulatory status, a general habitat description, and known or potential occurrences within the vicinity of the NTTR. Also in Appendix H, Biological Resources (Rare Plants Tables) is a list of other plant species in the study area (including scientific name, common name, and status) that are of interest to cooperating agencies. Of these, there are no plant

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species federally listed as threatened or endangered or that are candidates for listing by the USFWS in the study area.

The Joshua tree (Yucca brevifolia) is currently under review for listing as an endangered 3 or threatened species under the ESA. A petition for listing this species as threatened, 4 either as a full species or as two intraspecific taxa, was received by the USFWS in 5 September 2015. An emergency listing was determined by the USFWS not to be 6 necessary (USFWS, 2016a). However, the USFWS did find the petition presented 7 substantial scientific or commercial information indicating that listing the Joshua tree 8 9 may be warranted and are initiating a status review for this species and will issue a finding as to whether or not the petitioned action is warranted (USFWS, 2016a). There 10 is no further information available on the status of the USFWS review for federally listing 11 the Joshua tree as endangered or threatened. Joshua tree is present on the NTTR. 12 Joshua tree is currently not specifically identified as a sensitive species in the state of 13 Nevada or on cooperative agency lists, although a collecting permit would be required 14 to harvest this species in Nevada or on BLM-managed lands (WildEarth Guardians, 15 2015). There are 47,927 acres on the North Range and 407,229 acres on South Range 16 currently mapped as Joshua tree habitat (U.S. Air Force, 2017b). 17

No species identified as critically endangered by the State of Nevada occur within the study area. The Las Vegas bearpoppy (*Arctomecon californica*), listed as critically endangered by the State of Nevada, and the Las Vegas buckwheat (*Eriogonum corymbosum* var. *nilesii*), a federal candidate for listing, occur on Nellis AFB, 33 miles south of the NTTR. Although rare plant surveys conducted on the NTTR since 2005 have not found these species within the North or South Range (U.S. Air Force, 2016f), the South Range lies within the range of these plants and gypsiferous soils are present.

Species with a heritage rank of S1 (indicating their distribution in the state of Nevada is critically imperiled and especially vulnerable to extinction or extirpation due to extreme rarity, threats, or other factors) are depicted in Figure 3-27. In addition, three stateprotected cactus species have been identified within the study area; these are depicted in Figure 3-28. The Rare Plants Report includes species descriptions, distributions, and photos (U.S. Air Force, 2016f).

The Rare Plants Report (U.S. Air Force, 2016f) includes other special status plant 31 species of special interest to cooperating agencies (see the list in Appendix H, 32 Biological Resources: Rare Plants Tables). Most of these species have a heritage rank 33 of S2 (indicating their distribution in Nevada is imperiled due to rarity or other 34 demonstrable factors) or S3 (indicating their distribution in Nevada is vulnerable to 35 decline because they are rare and local throughout the range or have a very restricted 36 range), or they are identified as sensitive by BLM or USFS. The Rare Plants Report 37 includes a brief description of the species and a map showing any observations of those 38 species in the study area (U.S. Air Force, 2016f). Of the 65 other special status species 39 of interest to cooperating agencies listed in the Rare Plants Report. 40 were mapped as 40

41 observed in or around the study area.

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Figure 3-27. Special Status Species Reported in the Study Area – Gillman's Milkvetch, Inyo Milkvetch, Remote Rabbitbrush, Kingston Mountains Bedstraw, Cliff Needlegrass

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Figure 3-28. Special Status Species – Armored Hedgehog Cactus, Clokey Pincushion, Hermit Cactus

1 Wildlife

Wildlife surveys have been conducted at the NTTR since the early 1990s to identify and 2 locate any sensitive species. Since early 2000, baseline surveys have focused on select 3 groups of species such as small mammals, large mammals, reptiles, bats, birds, and 4 furbearers (U.S. Air Force, 2016d; 2017e; 2017f). Methods have included live trapping 5 (e.g., small mammals), helicopter surveys, incidental observations, motion-triggered 6 wildlife cameras (e.g., furbearer and carnivores), capture sampling and acoustic 7 8 modeling surveys (e.g., bats), point counts, cliff raptor surveys and winter raptor drives (e.g., birds), night drives, and pitfall trapping (reptiles). 9

A list of special status wildlife species that are known or have the potential to occur on the NTTR is included as Table 3-41. A second group, or "other" special status species, includes all wildlife species that are of special interest to cooperating agencies and ranked by the State of Nevada as imperiled or vulnerable to decline. The list of other special status species is included as Appendix H, Biological Resources (Special Status

15 Wildlife Species).

Scientific Name, Common Name	Status ¹ Federal/Nevada/BLM/USFS	Heritage Rank ² State/Global				
Amphibians						
Anaxyrus nelsoni, Amargosa toad	/PA/S/	S2/G2				
Lithobates pipiens, northern leopard frog	/PA/S/	S2S3/G5				
Reptiles	Reptiles					
Gopherus agassizii, Mojave desert tortoise	FT/TR/S/T	S2S3/G3				
Heloderma suspectum cinctum, banded Gila monster	/PR/S/	S2/G4T4				
Birds						
Accipiter gentilis, northern goshawk	/PR/S/S	S2/G5				
Aquila chrysaetos, golden eagle	BE/PB/S/	S4/G5				
Centrocercus urophasianus, greater sage-grouse	/PR/S/S	S3/G3G4				
Lanius ludovicianus, loggerhead shrike	/SB/S/	G4/S4				
Spizella breweri, Brewer's sparrow	/SB/S/	G5/S4B				
Toxostoma bendirei, Bendire's thrasher	//S/	S1/G4G5				
Mammals						
Antrozous pallidus, pallid bat	/PM/S/S	S3/G5				
Chaetodipus penicillatus, desert pocket mouse	//	S1S2/G5				
Corynorhinus townsendii, Townsend's big-eared bat	/SM/S/S	S2/G3G4				
<i>Microdipodops megacephalus albiventer</i> , desert valley kangaroo kangaroo mouse	/PM/S/	S2/G4T2				
Microdipodops pallidus, pale kangaroo mouse	/PM/S/	S2/G3				
<i>Microtus montanus fucosus</i> , Pahranagat Valley montane vole	//	S1S2/G5T2				
Myotis thysanodes, fringed myotis	/PM/S/S	S2/G4				

Table 3-41. Special Status Wildlife Species that Are Known or Have the Potential to Occur on the NTTR

Table 3-41. Special Status Wildlife Species that Are Known or Have the Potential toOccur on the NTTR

Scientific Name, Common Name	Status ¹ Federal/Nevada/BLM/USFS	Heritage Rank ² State/Global
Ovis canadensis nelsoni, desert bighorn sheep	/GM/S/R4S	S4/G4T4
Tadarida brasiliensis, Mexican free-tailed bat	/PM/S/	S3S4B/G5
Gastropods		
Pyrgulopsis fausta, Corn Creek pyrg	//	S1/G1
Insects		
Neivamyrmex nyensis, endemic ant	//	S1/G1
Pseudocotaipa giulianii, Giuliani's dune scarab	//S/	S1/G1
Aegialia magnifica, large Aegialian scarab	//S/	S1/G1
Miloderes sp., big dune miloderes weevil	//S/	S1/G1

Sources: (USFWS, 2017a; Nevada Natural Heritage Program, 2017; U.S. Air Force, 2017g)

Notes:

^{1.} Status -- = no status:

Federal: = Species listed by the U.S. Fish and Wildlife Service under the Endangered Species Act

FT – Federally Listed Threatened – likely to be classified as Endangered in the foreseeable future if threats continue.

BE - Protected under the Bald and Golden Eagle Protection Act

State = Species listed by the State of Nevada

PA - Protected Amphibian; PR - Protected Reptile; TR - Threatened Reptile; PM - Protected Mammal; SM - Sensitive Mammal;

PB - Protected Birds; SB - Sensitive Birds; GM-Game Mammal

BLM = S - Sensitive, which include USFWS species, and those protected by Nevada state law on BLM managed lands.

USFS = S - Sensitive Species; T -Threatened; R4S - Region 4 Sensitive

². Heritage Rank: S = State rank indicator, based on distribution within Nevada at the lowest taxonomic level; G = Global rank indicator, based on worldwide distribution at the species level; T = Global trinomial rank indicator based on worldwide distribution at the infraspecific level; B - Breeding - Conservation status refers to the breeding population of the element in the nation or state/province.

1-Critically imperiled and especially vulnerable to extinction or extirpation due to extreme rarity, threats, or other factors.

2-Imperiled due to rarity or other demonstrable factors.

3-Vulnerable to decline because rare and local throughout range or with very restricted range.

4-Long-term concern, though now apparently secure; usually rare in parts of its range, especially at its periphery.

5-Secure, at very low or no risk of extirpation in the jurisdiction due to a very extensive range or abundant populations or occurrences, with little to no concern from declines or threats.

1 Desert Bighorn Sheep

2 Large mammal species are of special interest on the NTTR, especially the desert

bighorn sheep. The desert bighorn sheep is a medium-sized, herbivorous bovid that

- 4 occurs in mountains, canyons, and upper alluvial fans. They use their climbing abilities
- 5 in rough, rocky, and steep terrain to escape from predators. Free-standing water is
- 6 particularly important during the summer months. Breeding season (rutting season for
- 7 rams or estrous season for ewes) in the eastern Mojave Desert typically begins in July
- 8 and continues through September. On the NTTR, desert bighorn sheep occupy a
- 9 variety of habitats, particularly in the rough terrain of the mountain ranges throughout
- the South Range and much of the western half of the North Range (Figure 3-29).

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Figure 3-29. Special Status Wildlife Species, Desert Bighorn Sheep and Golden Eagle

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Since 2003, the number of desert bighorn sheep observed during helicopter surveys has varied due to factors including survey efforts and the area covered during the surveys, for details see *Final Large Mammal Report* (U.S. Air Force, 2017f).

Desert bighorn sheep have been documented on the North Range, on Stonewall
Mountain, Pahute Mesa, Thirsty Canyon, Cactus Range, and Mount Helen. On
Stonewall Mountain, bighorn sheep counts have ranged from a low of 192 in 2009 to a
high of 384 in 2011. In 2013 and 2015, numbers were 272 and 238 respectively.
Pahute Mesa and Thirsty Canyon surveys conducted in 2012, 2014, and 2015 reported
relatively stable numbers from 96, 132, and 109, respectively, and surveys for the
Cactus Range from the same years reported 51, 62, and 31 sheep.

On the South Range, desert bighorn sheep surveys have been conducted almost annually from 2003 through 2015 and focused on the Spotted Range, Pintwater Range, Sheep Range and Desert Range. In 2014 and 2015, the total number of sheep observed on the South Range was 422 and 488, respectively. In general, the desert bighorn sheep counts for the South Range indicate a stable population, with a trend towards an increase in numbers (U.S. Air Force, 2017f).

In 2015, 25 GPS collars were deployed on desert bighorn sheep on the NTTR and 21 collars were deployed in 2016 (U.S. Air Force, 2017f). All collars were real-time satellite collars, with a battery life of about two years and GPS data recorded every hour. Data is downloaded weekly and combined into monthly datasets. Data collected from the monitoring of collars will be used to determine the locations and movements of bighorn sheep herds and to provide baseline information for development of a habitat range model by the U.S. Geological Survey (USGS).

24 Golden Eagle

The golden eagle (*Aquila chrysaetos*) is culturally important to Native Americans and is also protected under the *Bald and Golden Eagle Protection Act*. The golden eagle is one of the largest birds of prey. It is associated with mountain cliffs, canyons, and rim rock terrain adjacent to shrub steppe, native grassland, and open desert. Eagles soar for long distances and hunt over open areas in search of prey, including game birds, young ungulates, mammals (especially black-tailed jack rabbits), and reptiles.

Nesting occurs from December through May and is often associated with cliffs, trees, or 31 earthen mounds. Nests are frequently located within 2 miles of a water source. Golden 32 eagles are particularly susceptible to human disturbance. Golden eagle surveys were 33 conducted from 2001 to 2016 on the NTTR (U.S. Air Force, 2017e). Nest sites have 34 been found on cliff ledges, cliffs and rocky outcrops at elevations as high as 8,600 and 35 as of 2016 golden eagles have only been found nesting in mountain habitat on NTTR 36 (U.S. Air Force, 2017e). Active golden eagle nests are known to occur on the North 37 and South Ranges. From 2011 through 2016, 47 active golden eagle nests have been 38 recorded on the North and South Ranges; 37 in the North Range and 10 on the South 39 Range. In 2016, there were 14 nests observed, 10 in the North Range, and 4 in the 40 South Range with a total of 23 chicks initially observed (Figure 3-29). Of those, 41 15 successfully fledged, 4 are unknown, and 4 were failed (U.S. Air Force, 2017e). 42

1 Migratory Bird Treaty Act Species

2 The MBTA is an international agreement between the United States, Canada, and Mexico that protects designated species of birds. The MBTA controls the taking of these 3 birds and their nests, eggs, parts, or products. The USFWS has regulatory authority 4 over the MBTA (16 USC 703-712). More specifically, the MBTA and EO 13186, 5 Responsibilities of Federal Agencies to Protect Migratory Birds, direct the Air Force to 6 avoid or minimize negative impacts on migratory birds and take steps to protect birds 7 and restore or enhance their habitat whenever possible. These actions include 8 9 preventing or evading pollution or detrimental alteration of the environment as practicable within the constraints of the military mission. 10

A complete list of all species of migratory birds protected by the MBTA is in the Federal 11 Register (50 CFR 10.13). Nearly all native bird species found within the boundaries of 12 the NTTR are protected under the MBTA (U.S. Air Force, 2017d). Bird species typically 13 found in sagebrush communities, which are more prevalent on the North Range than 14 the South Range, include the sage thrasher (Oreoscoptes montanus), sage sparrow 15 (Amphispiza belli), Brewer's sparrow (Spizella breweri), and horned lark (Eremophila 16 alpestris). Less frequently observed species include the greater roadrunner, common 17 nighthawk (Chordeiles minor), and western meadowlark (Sturnella neglecta) (U.S. Air 18 19 Force, 2010). Chukars (Alectoris chukar) typically inhabit rocky habitat and desert scrub near springs and other freshwater sources. Many species of ducks, geese, and water 20 21 birds are seasonal migrants that may inhabit playas during wet years; many of these birds are also protected under the MBTA. Canyons in the NTTR provide a unique 22 23 structure for habitat that attracts raptors and other cliff-dwelling avian species such as the prairie falcon (Falco mexicanus), golden eagle, white-throated swift (Aeronautes 24 saxatalis), and rock wren (Salpinctes obsoletus). 25

Pinyon-juniper woodlands occur on both the North and South Range and support a high 26 diversity of MBTA species. Common species include the blue-gray gnat catcher 27 (Polioptila caerulea), gray vireo (Vireo vicinior), black-throated gray warbler (Dendroica 28 nigrescens), juniper titmouse (Baeolophus ridgwayi), gray flycatcher (Empidonax 29 wrightii), pinyon jays (Gymnorhinus cyanocephalus), Townsend's solitaire (Myadestes 30 townsendi), and the house finch (Carpodacus mexicanus). Birds present in the Mojave 31 Desert creosote scrub plant communities found on much of the South Range include 32 33 the common raven (Corvus corax), horned lark, loggerhead shrike, mourning dove (Zenaida macroura), sage sparrow (Amphispiza belli), black-throated sparrow 34 (Amphispiza bilineata), burrowing owl (Athene cunicularia), greater roadrunner 35 (Geococcyx californianus), lesser nighthawk (Chordeiles acutipennis), and Gambel's 36 quail (Callipepla gambelii). The diversity of MBTA-protected species generally increases 37 where Joshua trees, riparian vegetation, or large cacti are present. The cactus wren 38 (Campylorhyncus brunneicapillus) is associated with stands of cholla cactus, and 39 40 Scott's oriole (Icterus spurius) and ash-throated flycatchers (Myiarchus cinerascens) are observed nesting in Joshua trees, whereas phainopepla (Phainopepla nitens), ash-41 throated flycatcher, and blacktailed gnatcatchers (Polioptila melanura) are associated 42 with riparian scrub habitat dominated by mesquite (U.S. Air Force, 2010). 43

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1 The NTTR has been conducting migratory bird surveys since 1996. In 2007, the Nellis Natural Resources Program initiated formal migratory bird surveys on the NTTR. The 2 migratory bird project monitors bird populations on the NTTR and these surveys 3 supported the military mission by providing knowledge about the locations of bird 4 populations, the locations of nesting birds and sensitive bird species, and the potential 5 risk of bird populations to military operations. MBTA-protected species are known to 6 occur throughout the North and South Ranges and in the proposed expansion areas; 7 8 see Migratory Bird Report (U.S. Air Force, 2017d) for further details. Note that surveys conducted to date have been intended to determine presence/absence and do not 9 provide data that can accurately estimate population size or density. A total of 120 bird 10 species was recorded on the NTTR from 2007 to 2009, and from 2010 to 2015, a total 11 of 148 was reported. (U.S. Air Force, 2017d). Approximately 7,676 individual birds were 12 observed during the surveys. Seventeen different special status migratory bird species 13 have been observed on the NTTR, and 12 have been observed on the expansion 14 alternatives, including Brewer's sparrow (Spizelia breweri), loggerhead shrike (Lanius 15 *ludovicianus*), golden eagle, phainopepla, crissal thrasher (*Toxostoma crissale*), pinyon 16 jay, and prairie falcon (U.S. Air Force, 2017d). The common nighthawk was the only 17 special status species that was observed on proposed expansion areas and not within 18 the NTTR. Other rare birds observed outside their normal range include black and 19 white warbler (*Mniotilta varia*), indigo bunting (*Passerina cyanea*), and golden crowed 20 kinglet (*Regulus satrapa*). Six habitat types (desert playas and ephemeral pools, lower 21 montane woodlands, Mojave mid-elevation mixed desert scrub, Mojave/Sonoran warm 22 desert scrub, mesquite bosques and desert washes, Mojave/Sonoran warm desert 23 scrub with a mix of cliffs and canyons, and sand dunes and badlands) were surveyed in 24 the NTTR proposed expansion areas (U.S. Air Force, 2017d). MBTA species were 25 recorded in all habitats. Overall, recent and historical migratory bird surveys indicate 26 that the bird populations found on the NTTR and the potential expansion alternatives 27 appear to be healthy and diverse (U.S. Air Force, 2017d). 28

29 Federally Listed Species

30 Mojave Desert Tortoise (Gopherus 31 agassizii)

To date, only one federally listed 32 species, the Mojave desert tortoise 33 (Gopherus agassizii), is known to occur 34 on the NTTR. The Mojave Desert 35 population of the tortoise was federally 36 listed as threatened on April 2, 1990 37 (55 Federal Register 12178). Critical 38 habitat occurs in portions of Nevada 39 40 (59 Federal Register 5820–5846); however, no designated critical habitat 41 occurs on the NTTR (USFWS, 1994). 42 The NTTR is situated within the 43



occurs on the NTTR (USFWS, 1994). **Mojave Desert Tortoise (***Gopherus agassizii***)** The NTTR is situated within the Source: (U.S. Air Force, 2017i) Northeastern Recovery Unit and includes the Ivanpah Valley, Coyote Spring, Mormon

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Mesa, Gold Butte-Pakoon, and Beaver Dam Slope Desert Wildlife Management Areas (USFWS, 2011). In Nevada, the desert tortoise is protected under NAC 503.080, wherein the species is listed as a state-protected reptile further classified as threatened (USFWS, 2011). Further details on the desert tortoise listing, range, life history, and critical habitat, refer to the Biological Assessment (Appendix B, Agency Consultation and Coordination).

7 The desert tortoise is a herbivorous reptile that occupies a variety of habitats from flats to rocky slopes and is associated with the creosote bush scrub plant community at 8 lower elevations and juniper woodland ecotones at higher elevations (USFWS, 2011). 9 Seasonal, annual, and geographic variations in rainfall affect the physiology, behavior, 10 and ecology of desert tortoises (Henen, 1998). The desert tortoise spends much of the 11 vear underground in burrows to avoid extreme temperatures during summer and 12 winter. In general, it is most active and above ground during the spring, summer, and 13 fall when daytime temperatures are below 90 °F (32 °C). Their diet primarily includes 14 annual forbs, but tortoises will also forage on perennials (grasses and cacti) and eat 15 non-native species such as red-stem filaree (Erodium cicutarium). Desert tortoises derive 16 much of their water requirements from the vegetation they eat and can go for extended 17 periods without drinking. They can live for more than 50 years and do not reach 18 reproductive maturity until 14 to 20 years of age. 19

The decline of the desert tortoise is thought to be a result of a complex interaction of 20 threats. Disease along with urbanization, human access, military operations, and illegal 21 use of off-road vehicles have been suggested as the most serious threats to the desert 22 tortoise (Darst et al., 2013). Vehicle travel and human activity on unpaved roads 23 increase the risk of crushing a tortoise or burrow, can damage native vegetation, 24 facilitate the establishment and spread of nonnative vegetation, result in the loss and 25 compaction of soil, generate increased particulate matter emissions, and likely result in 26 direct mortality (USFWS, 2011). Predation by the common raven, feral/domestic dog, 27 28 and coyote is also a threat, especially to juvenile tortoises.

The Mojave desert tortoises have been known to occur on the NTTR since the early 1990s, and there has been ongoing management of this species as required by the INRMP (U.S. Air Force, 2010) (Figure 3-30). Numerous biological opinions have been issued regarding management practices for the desert tortoise (1992, 1994, 1997, 2003, 2004, 2007, and 2012), including a programmatic biological opinion for the NTTR (99 CES/CEIEA, 2015; U.S. Air Force, 2017j).

In general, desert tortoise surveys on the NTTR have focused on population monitoring 35 (e.g., documenting burrows, carcasses, and live tortoises). Surveys have focused on 36 the South Range, because suitable habitat is lacking on the North Range (U.S. Air 37 Force, 2017j). In 2015, desert tortoise habitat was evaluated in several locations on the 38 39 South Range. As of 2015, approximately 69 percent of the South Range had been surveyed, with 247,459 acres of suitable desert tortoise habitat. A total of 17 live 40 tortoises, 79 active burrows, 202 burrows in good condition, 226 inactive or abandoned 41 burrows and 33 carcasses have been documented (U.S. Air Force, 2017j). 42

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The estimated density of desert tortoise on the South Range is approximately 5.2 desert 1 tortoises per square mile or 5.8 desert tortoises per square mile, correcting for 2 90 percent detection (U.S. Air Force, 2017j). The density is comparable to the estimates 3 for 2015 and 2016 for the Eastern Mojave Recovery Unit, which were 4.9 and 7.0 desert 4 tortoises per square mile, respectively (USFWS, 2016b). Data to determine population 5 trends are lacking for the NTTR, but over the years there has been an increase in 6 7 detection of desert tortoise. Surveys in 1992 found evidence of desert tortoise in 110 of 431 (26 percent) transects, whereas the surveys from 2010 through 2015 found 178 of 8 405 transects (44 percent) that showed positive sign (presence of a live tortoise, 9 burrow, scat or carcass) of desert tortoise. The desert tortoise population on the South 10 Range is currently comparable in density to populations in the Eastern Mojave 11 Recovery Unit. 12

13 No formal desert tortoise surveys have been conducted on the expansion alternatives.

Instead, a desert tortoise habitat range model for all expansion alternatives based on vegetation, soils, and other factors has been developed and further details can be found in the *Desert Tortoise Habitat Model* (U.S. Air Force, 2017k).

The Air Force has initiated formal consultation with the USFWS (Ecological Services Branch) as required by Section 7 of the ESA; P.L. 93-205; 18 USC Section 1536, as amended; and 50 CFR 402.14(c). A Biological Opinion would not be issued until after

20 the Congressional decision.

21 Alternative 3A – Range 77 – EC South Withdrawal (and Amended Alternative 3A-1)

22 Special Status Plants

The Alternatives 3A and 3A-1 areas are along the southwest boundary of the North Range. None of the species with a heritage rank of S1 have been observed within the Alternative 3A/3A-1 withdrawal areas, although other sensitive plant species of special interest to cooperating agencies may be present, such as the hermit cactus, which is protected by the State of Nevada, has been reported in this area (U.S. Air Force, 2016f). Additionally, Joshua tree wooded shrubland is abundant and covers 41 percent of the area.

30 Special Status Wildlife

There is potential suitable habitat for special status wildlife, including birds (e.g., 31 Brewer's sparrow, Bendire's thrasher [Toxostoma bendirei], and loggerhead shrike), 32 33 reptiles (e.g., banded Gila monster [Heloderma suspectum cinctum]), and bats (e.g., fringed myotis [Myotis thysanodes], Mexican free-tailed bat [Tadarida brasiliensis], pallid 34 bat [Antrozous pallidus], Townsend's big-eared bat [Corynorhinus townsendii]) within 35 the Alternative 3A/3A-1 areas (U.S. Air Force, 2017g). Desert bighorn sheep, golden 36 37 eagles, and MBTA-protected species also have the potential to occur within the Alternative 3A/3A-1 areas. 38

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1 Desert Tortoise

- 2 Desert tortoises are not known to occur within the Alternative 3A/3A-1 areas; however,
- based on recent modeling efforts there is potential suitable habitat present (see
 Appendix H).

5 Alternative 3B – 64C/D and 65D Withdrawal and Administrative Incorporation

6 **Special Status Plants**

The Alternative 3B area is located immediately south of the South Range. None of the 7 species with a heritage range of S1 have been observed within the Range 64C/D and 8 65D withdrawal areas, although other sensitive plant species of special interest to 9 cooperating agencies may be present, such as the armored hedgehog cactus and 10 Clokey pincushion, which are protected by the State of Nevada, which have been 11 reported in this area (U.S. Air Force, 2016f). Joshua tree wooded shrubland is 12 abundant and covers 10 percent of Alternative 3B and 53 percent of Alternative 3C 13 14 area.

15 Special Status Wildlife

There is potential suitable habitat for special status wildlife, including, birds (e.g., 16 Brewer's sparrow, Bendire's thrasher, and loggerhead shrike), bats (e.g., Mexican free-17 tailed bat, pallid bat, Townsend's big-eared bat, spotted bat [Euderma maculatum]), 18 reptiles (e.g., banded Gila monster), amphibians (e.g., northern leopard frog (Lithobates 19 pipiens]), and small mammals (e.g., desert valley kangaroo mouse [Microdipodops 20 megacephalus albiventer], desert pocket mouse [Chaetodipus penicillatus], and pale 21 kangaroo mouse [Microdipodops pallidus]) within Range 64C/D and 65D (U.S. Air 22 Force, 2017g). Desert bighorn sheep, golden eagles, and MBTA-protected species are 23 also known to occur in Range 64C/D and 65D. 24

25 **Desert Tortoise**

In 2015, desert tortoise habitat was evaluated and signs of desert tortoise and suitable

habitat occurs within Ranges 64C/D and 65D (U.S. Air Force, 2017i). See Appendix H

for desert tortoise suitable habitat within the Alternative 3B 64C/D and 65D areas.

29 Alternative 3C – Alamo Withdrawal

30 Special Status Plants

The Alternative 3C area is immediately east of the South Range in the DNWR. None of 31 the species with a heritage rank of S1 have been observed within the Alamos 32 withdrawal area, although other sensitive plant species of special interest to cooperating 33 agencies may be present. Armored hedgehog cactus, Clokey pincushion, and hermit 34 cactus, all of which are protected by the State of Nevada, have been reported in this 35 area. Numerous occurrences of armored hedgehog cactus are present throughout the 36 Alamos withdrawal area, and several observations of Clokey pincushion have been 37 made in the southern portion of this area. Hermit cactus is also present, but very few 38 observations have been made for this species (U.S. Air Force, 2016f). 39

1 Special Status Wildlife

There is potential suitable habitat for special status wildlife, including, birds (e.g., 2 Brewer's sparrow, Bendire's thrasher, northern goshawk [Accipiter gentilis], and 3 loggerhead shrike), bats (e.g., Mexican free-tailed bat, pallid bat, Townsend's big-eared 4 bat, and spotted bat), reptiles (e.g., banded Gila monster), amphibians (e.g., northern 5 leopard frog), and small mammals (e.g., dark kangaroo mouse, desert pocket mouse, 6 and pale kangaroo mouse) within the Alamos withdrawal area (U.S. Air Force, 2017g). 7 Golden eagle nests, desert bighorn sheep, and MBTA-protected species are also 8 9 known to occur in the Alamos withdrawal area. The Sheep Range, located on the east side of the proposed Alamo withdrawal areas, was designated as an Important Bird 10 Area (IBA) by the National Audubon Society in 2004. The Sheep Range IBA provides 11 important breeding habitat for flammulated owl, gray flycatcher, black-throated gray 12 warbler, and Grace's warbler. It also represents the northern limit of the Mexican whip-13 poor-will (Nevada Audubon Society, 2008). 14

15 **Desert Tortoise**

16 Signs of desert tortoise have been reported within the Alamo withdrawal areas. See 17 Appendix H for potential desert tortoise suitable habitat within Alternative 3C.

3.8.1.7 Current Natural Resources Management Practices

Many of the activities involved in meeting the goals and objectives of the military 19 mission have impacts on natural resources. However, maintaining ecosystem integrity 20 through good stewardship and protecting existing biodiversity ensures lasting use of the 21 installation and minimizes management costs and efforts (U.S. Air Force, 2010). The 22 authority to establish natural resources management programs at DoD installations is 23 provided by 16 USC 670 or Sikes Act (Conservation Programs on Military Installations). 24 25 Additional governing laws include the ESA, CWA, the MBTA, and the MLWA (1999) (P.L. 106-65). AFI 32-7064 (Integrated Natural Resources Management), 26 as implemented by Air Force Policy Directive 32-70 (Environmental Quality) and DoD 27 Instruction 4715.03 (Natural Resources Conservation Program), authorizes planning 28 and implementation of current and future management actions necessary to meet 29 resource management goals to maintain ecosystem integrity and dynamics on the 30 NTTR without compromising the military mission. 31

- The U.S. Air Force typically implements the following biological resource management guidelines prior to a Proposed Action (U.S. Air Force, 2010):
- Identifies specific project or training areas and access corridors prior to ground
 operations to allow for any natural resource surveys and protection measures
 that may be necessary (i.e., desert tortoise surveys).
- Through various existing program offices and current practices, NTTR planners, with user group support:
- Develops guidance on environmental restrictions and compliance
 requirements, to include mitigations and environmental constraints, and
 associated consultations, as well as the INRMP.

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- Provides both a visual and written presentation of restrictions to unit
 commanders and training personnel (through NTTR Range Safety and
 Operations Procedures annual briefings, additional site-specific
 environmental briefings, and/or the Center Scheduling Enterprise).
- 5 6
- Documents and resolves any issues related to environmental compliance with the cooperating agencies upon notice of any compliance issues.
- The Air Force typically works with the USFWS, BLM, and NDOW to develop a mitigation plan as required by NEPA identifying proposed resource-specific mitigations to be implemented, responsible parties for mitigation implementation and compliance evaluation, and monitoring mechanisms for evaluation of mitigation effectiveness.

The natural resources management practices described above are ongoing as part of the NTTR natural resources management program and will continue to be periodically reviewed and revised, as well as implemented, to ensure management of the NTTR meets the goals and objectives of the military mission, which includes maintaining ecosystem integrity through good stewardship and protecting existing biodiversity during any military planning or activities.

18 **3.8.2 Environmental Consequences**

19**3.8.2.1Analysis Methodology**

The analysis of potential impacts to biological resources for the Proposed Action and 20 alternatives evaluated several factors, including direct or indirect impact, permanence of 21 impact (permanent loss versus temporary short term/temporary long term), sensitivity of 22 the resource, legal protection of the resource, and local/regional management. The 23 sensitive biological resources within the action area (the sphere of influence subject to 24 25 effects caused by the Proposed Action and alternatives) were evaluated, on a programmatic level, to determine their potential to be affected by the project 26 components for each of the proposed alternatives. Potential temporary and permanent 27 impacts on species federally listed as threatened or endangered require consultation 28 with the USFWS Ecological Services under Section 7 of the ESA prior to project 29 Ongoing management of biological resources on the NTTR and implementation. 30 conservation and minimization measures should reduce impacts to federally listed 31 species and special status species or habitat known or that have the potential to occur. 32

- 33 The types of impacts to biological resources are summarized below:
- Beneficial The Proposed Action would result in some benefit or overall improvement to or increased protection of native vegetation, wildlife, aquatic or wetland habitats, and special status species.
- Adverse Adverse impacts may include the removal or degradation of the native vegetation, wildlife, aquatic or wetland habitats, and special status species. The degree or level of impact is directly related to the context, intensity, and duration of the impact and can either be significant or insignificant.

- Significant Unavoidable A significant impact typically endures over the 1 0 medium term to long term, with a regional context and a high intensity, but 2 can also potentially occur over the short term under any context given a 3 high intensity. Significant adverse impacts are typically not recoverable 4 over the short term and require long-term recovery processes with 5 extensive mitigation or revision of a proposed action to avoid or minimize 6 impacts. An example of a significant adverse impact would be destruction 7 of large percentages of desert tortoise habitat. Potential significant effects 8 that cannot be reduced to acceptable levels through mitigation or 9 management measures would be considered an unavoidable adverse 10 effect. 11
- Significant Avoidable/Mitigatable Impacts are similar as described above; however, these impacts can either be avoided or minimized through implementation of mitigations and/or management actions.
- Insignificant An insignificant impact is typically short to medium term under any context or intensity. Beneficial impacts that are not significant in nature may include restoration of small areas of desert tortoise habitat. Adverse but not significant impacts are typically recoverable over the short-to-medium term with mitigations required to minimize level or potential for impact.
- Neutral or no effect These are impacts that are typically of a low intensity such that they are imperceptible, regardless of context or duration. Such impacts, whether beneficial or otherwise, are recoverable over the short term without mitigation and result in no overall perceptible change to the resource.

3.8.2.2 Alternative 1 – Extend Existing Land Withdrawal and Management of NTTR (North and South Range) – Status Quo

27 **3.8.2.2.1 Vegetation**

Activities causing potential impacts to vegetation include ground disturbance associated 28 29 with air-to-ground attack training, construction and maintenance of facilities and targets, placement of threat emitters, ground training (including access by vehicles and 30 personnel), use and maintenance of roads and utility lines, and soil contamination and 31 cleanup. Brush fires can result from certain military activities, including exploding 32 ordnance, aircraft crashes, and flares, impacting natural resources. Ground disturbance, 33 including fires, may reduce or eliminate vegetation. The mission currently impacts about 34 5 percent of the total land area of the NTTR, and activities associated with the current 35 land withdrawal are concentrated on playas, where vegetation cover and biological 36 resource impacts should be low (U.S. Air Force, 2010). 37

Under Alternative 1, the current types of activities and locations would continue. Ground-disturbing activities with potential for direct impacts to vegetation, such as construction and maintenance of facilities and targets, placement of threat emitters, ground training (including access by vehicles and personnel), use and maintenance of

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roads and utility lines, would likely be restricted to disturbed areas and existing roads, 1 as much as feasible. For any ground-disturbance activities, including construction or 2 operation of facilities, targets, roads, etc., environmental impacts are assessed prior to 3 initiation of any work according to NEPA regulations, Air Force guidance, and other 4 relevant authority. In addition, cooperative environmental NTTR development planning 5 is conducted to minimize impacts on natural resources. With regard to fire, the U.S. Air 6 Force has a responsibility under P.L. 106-65 to take the necessary precautions to 7 suppress wildland fires caused by military operations. The vegetation types most 8 susceptible to fires are pinyon-juniper woodlands and grasslands. Procedures have 9 been in place and additional procedures are being developed to minimize the potential 10 for causing fires at the NTTR, including preparation of a comprehensive Wildland Fire 11 Management Plan in cooperation with BLM (U.S. Air Force, 2010; McEldery, 2016). 12

The direct impacts of extending the withdrawal of the NTTR are adverse and 13 insignificant, because existing disturbed areas, which are widely dispersed across the 14 NTTR, will be utilized to the maximum extent practicable. The land that is affected by 15 Alternative 1 represents a small fraction (5 percent) of the existing NTTR, and any new 16 disturbances would be subject to review and mitigation under NEPA when warranted 17 (U.S. Air Force, 2010). Any future impacts associated with military activities on 18 vegetation, wildlife, aquatic and wetland habitats, and special status species within the 19 existing NTTR withdrawn areas are expected to be similar to the impacts resulting from 20 past activities on this land. Native desert scrub and woodland vegetation would remain 21 dominant outside of training areas. There is minimum risk of large-scale changes in 22 vegetation beyond the areas of immediate, ongoing impact (U.S. Air Force, 1999). 23 Therefore, Alternative 1, extending the withdrawal of the NTTR, would have an adverse 24 insignificant impact to vegetation on the NTTR. 25

Ground disturbance, off-road vehicle use, and fires may indirectly contribute to the 26 spread of weeds such as red brome or cheat grass. The increased cover of these 27 28 grasses and other weeds in desert scrub and woodland areas can lead to increased fire frequency, which can, over time, result in a "type conversion" from scrub and woodland 29 to grassland vegetation. Invasive species, such as salt cedar, can also have a 30 significant effect on aquatic and wetland habitats, especially since such habitats are 31 small, widely spaced, and provide important habitat functions to both plants and wildlife, 32 including special status species. The rapid growth and expansion of invasive plant 33 species in Nevada can cause problems for military air operations and ground training, 34 with particular concern for increased fire hazard from invasive plants that can ignite 35 easily and burn rapidly (U.S. Air Force, 2014f). 36

To control or minimize populations of invasive species on the NTTR, the Air Force monitors, maps, and implements a pest management plan for the control of invasive species, as part of the NTTR natural resources management program. While the entire NTTR has not been surveyed, ongoing surveys and mapping of invasive plant species is identified as a management goal of the NTTR (U.S. Air Force, 2010): Invasive species management is implemented by the following:

- Incorporate mapping of populations of invasive plant species during ongoing
 vegetation surveys using GPS and enter data into the natural resource database
 for use in planning
- Manage encroachment of invasive plant species on the NTTR
- Implement invasive plant species control methods, monitor effectiveness, and
 re-treat as appropriate
- Survey invasive species distribution and identify treatment methods and priority
 areas

9 Air Force activities within the overlying airspace outside of the NTTR boundaries would 10 have no effect on vegetation in this region, since they are confined to altitudes and 11 locations where they are unlikely to cause disturbance.

An indirect environmental consequence of the existing NTTR withdrawal is the exclusion of mining, agriculture and grazing, and recreational use from the withdrawn lands. These activities can be a threat to desert vegetation, and the continued exclusion of these activities may provide a beneficial impact to biological resources.

16 **3.8.2.2.2 Wildlife**

Extending the existing NTTR withdrawal could result in direct, permanent (i.e., removal 17 of habitat, direct mortality), and temporary (i.e., generation of dust, increased noise and 18 altered behavior) impacts to wildlife within the withdrawal footprint. Direct effects of 19 ground-disturbance activities (i.e., continuing use of range targets, ground facilities, 20 training areas, and roads) within suitable wildlife habitat could alter existing wildlife 21 22 habitat (e.g., cause disturbance to vegetation, destruction of burrows). Permanent and temporary impacts to wildlife could occur in activity-specific vicinities due to the 23 presence of humans, increased noise levels, episodic noise, visual disturbances, and 24 chaff and flare releases on ranges in accordance with their approved uses. Although 25 direct mortality to individual animals of common, less mobile wildlife species, including 26 reptiles and small mammals, may be adversely affected in the immediate vicinity of 27 these activities, more than likely these activities would induce a startle response by 28 wildlife species such as horses, burros, and pronghorn antelope. Little is known of the 29 long-term effects of noise on the physiology of wild ungulates; however, behavioral 30 changes resulting to sudden or loud noise, such as sustained running or avoidance 31 behavior, could increase their expenditure of energy during critical periods and 32 decrease the amount of time spent on life functions, such as seeking food or mates 33 (Manci et al., 1988). Further discussion on wildlife and noise is provided below. Ground-34 disturbance activities could also temporarily mask auditory signals from other animals 35 and put nests in the immediate vicinity at risk for abandonment and depredation (Manci 36 et al., 1988). Wildlife species (e.g., mammals, birds, reptiles) on the NTTR would likely 37 take cover or temporarily suspend activity when ground-disturbance activities are 38 ongoing. Other wildlife species might avoid the area of activity entirely but may possibly 39 return during more inactive conditions. 40
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1 Other sources of noise at the NTTR could include subsonic noise, sonic booms, and noise from high explosives and ground activity, which could cause wildlife to become 2 stressed, cause short-term physiological changes (e.g., increased heart rate), cause or 3 lead to deafness or abnormal behavior such as avoidance behaviors that could diminish 4 feeding opportunities and potentially lead to mortality (Manci et al., 1988). The use of 5 explosive ordnance can cause localized dust and an increase in contaminant 6 concentrations in the soil. If dust occurs due to explosives, contaminants will also be 7 wind driven and could affect wildlife and vegetation. Areas where these contaminants 8 could occur are assessed prior to any initiation of work and any actions follow the 9 regulatory requirements (e.g., NEPA, CWA, ESA, etc.) and current natural resources 10 management guidelines, requiring the same planning prior to mission and project 11 activities to avoid and minimize impacts to biological resources (U.S. Air Force, 2010); 12 hence, potential toxicity to wildlife due to contamination is not considered a significant 13 risk on the NTTR at present. 14

Indirect impacts to existing wildlife habitats may also occur through the introduction of 15 invasive nonnative plant species where ground surfaces are disturbed, providing 16 opportunities for invasive nonnative plant species to establish and move into adjacent, 17 undisturbed native habitats. As described above under Section 3.8.2.2.1 (Vegetation), 18 the Air Force controls or minimizes invasive nonnative plant species on the NTTR, as 19 part of the NTTR natural resources management program. Although these measures 20 may not eliminate the potential for adverse, indirect impacts associated with the spread 21 of invasive nonnative plant species, continued monitoring and control in areas where 22 active ground disturbance is occurring (e.g., along roads and after fires) would ensure 23 impacts are insignificant. 24

25 Construction activities associated with extending the NTTR withdrawal could result in direct impacts, permanent impacts (i.e., removal of habitat caused by construction), and 26 temporary impacts (i.e., generation of dust and noise during construction) to wildlife 27 within the project footprint. Proposed construction could cause direct mortality to 28 29 individual species, behavior changes, or disturbance to existing wildlife habitat as described above. Direct impacts from construction activities would be greatest during 30 active periods for specific wildlife species. Effects related to dust and noise would be 31 temporary and diminish with distance from the construction area. The most likely wildlife 32 response to construction activities would be avoidance (flushing) of the area during the 33 activity. Implementing the construction management guidelines currently practiced at 34 NTTR, such as planning to avoid or minimize removal of native vegetation, avoid 35 nesting or mating season, preserve migratory routes, etc. would ensure impacts to 36 wildlife are insignificant (U.S. Air Force, 2010). 37

Aircraft operations could cause temporary impacts to wildlife (i.e., generation of dust and noise during aviation operations). Noise from aircraft activities could cause stress, potentially induce a startle response, and cause possible injury. Wildlife in the vicinity of a noise source would likely exhibit increased awareness or response, which would vary depending on animal group and other factors. Songbirds and raptors vary in their responses to military jet overflight, but documented responses have been limited to short-term behavioral responses, and no effects that would be measurable at a

- 1 population level have been documented (Manci et al., 1988; Jones, 2004; Bowles et al.,
- 2 1999; Bowles, 1995). Helicopters generally create a greater response at a given altitude
- 3 than do fixed-wing aircraft, including military jets.

Large mammals (e.g., wild horses, wild burros, pronghorn antelope, desert bighorn 4 sheep, coyote, deer) that use the NTTR may avoid accessing resources during aircraft 5 activity but may possibly return during more inactive conditions. There have been no 6 7 direct studies for the NTTR that have examined the effects of military noise and responses to ongoing activities by wildlife. Other studies have examined wildlife 8 responses to aircraft activity. For example, horses have been observed to react to 9 overflights of jet aircraft. In 1995, Bowles cites Kruger and Erath as observing horses 10 exhibiting intensive flight reactions, random movements, and biting/kicking behavior. 11 However, no injuries or decrease in reproductive success occurred, and there was 12 evidence that the mares adapted somewhat to the flyovers over the course of a month. 13 Although horses were observed noticing the overflights, it did not appear to affect either 14 survivability or reproductive success. There was also some indication that habituation to 15 these types of disturbances was occurring. The reactions (physiological and behavioral) 16 of pronghorn antelope to helicopter activity were assessed at different altitudes and 17 approaches (Manci et al., 1988). At an altitude of 400 feet and a slant range of 18 3,000 feet, no reactions to the aircraft were observed (Manci et al., 1988). As the aircraft 19 moved toward the herd at a descent rate of 200 feet per minute and a forward air speed 20 of 40 to 50 knots, mild reactions (muscle tensing and interruption of grazing) were 21 observed, whereas strong reactions (running) began when the craft was at 150-foot 22 altitude and a slant range of 500 feet (Manci et al., 1988). 23

Other studies have documented the reaction of ungulates such as bighorn sheep, 24 pronghorns, barren-ground caribou (Rangifer arcticus), and buffalo (Bison bison), 25 exposed to military aircraft overflights. Responses ranged from no reaction and 26 habituation to panic reaction from overflights below 500 feet AGL (Weisenberger, 1996; 27 28 Manci et al., 1988). For example, bighorn sheep (Ovis canadensis nelson) were exposed to jet (F-16 aircraft) overflights at the DNWR in Nevada, to determine if jet 29 noise was having an impact. Results showed that the noise levels created by the F-16 30 did not alter behavior or use of habitat, or increase heart rates to the detriment of the 31 sheep (Krausman, 1998). 32

Overall, behavioral responses for wildlife species, including various ungulate species, are generally minor and include individuals assuming an alert posture, rising, walking, or running short distances. Both the visual aspect and peak noise level of overflights diminish rapidly with increasing altitude of overflight. Similarly, wildlife responses diminish with increasing altitude of overflight (or increasing slant distance, which is a combination of aircraft height above ground level and the horizontal distance from the animal for an aircraft not directly overhead).

The aircraft noise could temporarily mask auditory signals from other animals and/or otherwise reduce the protection and stability of young animals (Manci et al., 1988). Small mammals, reptiles, bats, and birds would likely be present in the immediate vicinity of the activity and, thus, could be affected by noise associated with continued

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aircraft operations. Noise levels up to 80 dBA generate startle responses in birds and 1 animals, and noise levels in excess of 90 dBA may cause negative impacts. Dooling 2 and Popper (2007) note that physical damage to birds' ears occur with single blasts of 3 140 dBA and multiple blasts of 125 dBA (both assumed to be the maximum level with A-4 weighted frequency response and fast time constant, LAFmax; sound level descriptor is 5 not provided in the study). The study also notes that birds' ears can suffer physical 6 damage at continuous exposure (greater than 72 hours) to noise above 110 dBA. Under 7 laboratory conditions, reptiles experienced at least temporary threshold shifts or hearing 8 loss following exposure to 95 dB for several minutes (Manci et al., 1988). The number of 9 individual animals that could be lost due to ongoing activities would be based on the 10 number of general wildlife species present during the activity. 11

Direct impacts from aircraft operations would be greatest when the aircraft is in close 12 proximity to occupied wildlife habitats. During landing and takeoff activities, the area 13 directly under the aircraft would experience substantially greater impacts due to focused 14 downwash, engine exhaust heat, and landing gear. Effects related to dust generation 15 and wind velocities from aircraft operations (i.e., rotor wash) would diminish 16 substantially beyond 100 feet (30 meters) from the aircraft (Boeing, Bell, 2008). The 17 most likely wildlife response to aircraft operations activities would be avoidance 18 (flushing) of the area during the activity. 19

Birds and bats can present hazards to low-flying jet aircraft, especially around man-20 made structures, seeps, springs, caves, and crevices, in the early evening around 21 sunset, when bats are typically active. The potential for bird/wildlife-aircraft strikes would 22 increase with the proposed lower altitudes to be flown, since most birds tend to fly at 23 altitudes lower than 500 feet. However, long-distance migrants start out at about 24 5,000 feet and progressively climb to around 20,000 feet. The greatest number of Nellis 25 AFB-reported bird strikes has occurred between April and May. Proactive management 26 of BASH issues would continue on the NTTR, and the BASH Plan would be followed 27 28 (U.S. Air Force, 2010). For example to avoid BASH issues, the location or scheduling of activities would be modified to avoid migratory route paths, seasonal populations, and 29 nesting sites of birds and bats. When birds and bats are present, the takeoff or landing 30 should be delayed or moved to another runway that is free of bird or bat activity. Flight 31 operations may need to be modified in the presence of known or anticipated bird or bat 32 activity. 33

Implementation of ongoing management activities on NTTR (e.g., management 34 guidelines for bats, birds, reptiles and amphibians, small mammals, wild horses, and 35 large mammals) would reduce effects on wildlife habitat. Various species of wildlife 36 benefit from 99 CES/CEVN's basic strategy to limit non-mission essential activities and 37 avoid unnecessary development (U.S. Air Force, 2010). The overall quality of wildlife 38 habitat on the NTTR is high (i.e., the ability of the environment to provide conditions 39 appropriate for individual and population persistence) (Hall et al., 1997), and during 40 activities would provide habitat for mobile species to relocate to another area as 41 needed. Therefore, no significant impacts on wildlife would occur. 42

Air Force activities within the overlying airspace outside of the NTTR boundaries could be hazardous for birds and bats. Location or scheduling of activities would be modified to avoid BASH issues. (See Section 3.13.1.4, Flight Risks, for more discussion about

4 BASH issues.)

5 **3.8.2.2.3** Aquatic and Wetland Habitats

Mission activities typically do not impact surface waters associated with seeps and 6 springs. However, many activities associated with the mission may impact ephemeral 7 streams, which flow throughout the NTTR. Most of the streams on the NTTR flow into 8 closed basins and are not connected to navigable waters of the United States, making 9 them nonjurisdictional waters of the United States. Some of the streams on the west 10 and south side of the NTTR flow into navigable waters (Amargosa River and Las Vegas 11 Wash) and may be jurisdictional. Actions that result in fill of streams or wetlands, 12 alteration of surface water flows, or degradation of wetland or riparian habitats would be 13 considered a significant impact to these resources. Activities potentially impacting 14 15 wetlands and ephemeral streams, including some areas that may fall under the jurisdiction of USACE, include road construction, target construction, construction of 16 buildings or other facilities, vehicle or pedestrian access, and erosion or weed invasion. 17 As part of the NTTR natural resources management program, procedures have been 18 developed to monitor and maintain all wetlands, seeps, springs, and water sources 19 important for wildlife on the NTTR. These procedures include annual assessment of 20 ecosystem health, delineation and mapping of ephemeral streams, ongoing assessment 21 of USACE jurisdiction for wetlands, and annual monitoring and assessment of surface 22 water quality. Mission activities are reviewed to ensure avoidance of direct and indirect 23 impacts to all aquatic and wetland habitats on the NTTR whether they are jurisdictional 24 features or not. For any activity that may directly or indirectly affect a potential 25 jurisdictional wetland or waters of the United States, consultation with USACE is 26 required as part of the planning process. 27

Air Force activities within the overlying airspace outside of the NTTR boundaries would have no effect on aquatic and wetland resources in this region. However, other biological resources such as birds or wildlife that may use surface waters or riparian areas could be affected by activities within the overlying airspace and are discussed under the wildlife section.

33 3.8.2.2.4 Special Status Species

34 Plants

No federal or state-listed plant species have been reported in the NTTR. However, nearly 50 plant species that are considered sensitive by the state of Nevada or other agencies are found within the existing land withdrawal areas of the NTTR. Actions that result in the removal or damage to individuals or a population of a rare plant species, or degradation of their habitat, may be considered significant depending on the number of individuals or percentage of the population or habitat affected and the ability of the species to recover following the disturbance. As stated above, the military mission

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impacts about 5 percent of the total land area of the NTTR, which means that most of 1 the vegetation on the NTTR remains non-impacted and many rare plant populations are 2 being conserved. Mission activities in mountainous areas on the NTTR may result in 3 potential impacts to rare plant communities in those areas. However, continued 4 monitoring of rare plant species and populations (U.S. Air Force, 2016f) and careful 5 planning prior to mission activities, as part of current NTTR natural resource 6 management program practices, would avoid and minimize impacts to vegetation and 7 rare plant populations (U.S. Air Force, 2010). Impacts to special status plant species 8 associated with Alternative 1, extending the withdrawal of the NTTR, may be adverse (if 9 individuals of a rare plant species are present within the disturbance area), but would 10 likely be isolated, represent a small portion of the locations/populations on the NTTR, 11 mitigable through proper planning, monitoring and maintenance. 12

Air Force activities within the overlying airspace outside of the NTTR boundaries would have no effect on special status plant species in this region since they are confined to

altitudes and locations where they are unlikely to cause disturbance.

The exclusion of mining, agriculture, and recreational use from the existing NTTR withdrawn lands may provide a beneficial impact to rare and endangered plants as these activities are threats to rare plant populations in Nevada.

19 Wildlife

Suitable habitat for special status wildlife, including MBTA-protected species, is present within the NTTR. Direct, permanent (i.e., removal of habitat, direct mortality) and temporary (i.e., generation of dust, increased noise and altered behavior) impacts from ground disturbance, construction and aviation activities would be similar as described above under general wildlife species.

Nests of MBTA-protected species, including golden eagles in the immediate vicinity of 25 the NTTR would be susceptible to abandonment and depredation. Golden eagles have 26 shown little effects due to aircraft flights. In their guidelines for aerial surveys, the 27 USFWS (Pagel, Whittington, & Allen, 2010) summarized past studies by stating that 28 most golden eagles respond to survey aircraft (fixed wing and helicopters) by remaining 29 on their nests and continuing to incubate or roost. Surveys took place as close as 33 to 30 66 feet (10 to 20 meters) from cliffs (including hovering less than 30 seconds if 31 necessary to count eggs) and no farther than 656 feet (200 meters) from cliffs 32 depending on safety (Pagel, Whittington, & Allen, 2010). 33

Several studies on nesting raptors have indicated that birds become habituated to 34 aircraft overflights and that long-term reproductive success is not affected by exposure 35 to overflight (Grubb & King, 1991; Ellis, Ellis, & Mindell, 1991). For example, bald eagles 36 (Haliaeetus leucocephalus) were more disturbed by human pedestrian activity than 37 overflights by aircraft (Grubb & King, 1991). Nesting peregrine falcons (Falco 38 peregrinus) in Alaska showed small differences in nest attendance and time-activity 39 budgets between undisturbed nests and those that were overflown by military aircraft 40 within 500 feet (152 meters); however, the differences were not correlated with specific 41 overflights nor did they affect reproductive success (Palmer, Normeyer, & Roby, 2003). 42

Furthermore, Palmer et al. (2003) did not observe a difference in nest-provisioning rates
 between disturbed and undisturbed nests.

Raptors and other birds protected under the MBTA and Bald and Golden Eagle 3 Protection Act, could be affected by aircraft on approach, takeoff or during flight. As 4 noted above, several studies on nesting raptors have indicated that birds become 5 habituated to aircraft overflights and that long-term reproductive success is not affected 6 7 by exposure to overflight; nonetheless, overflight activity has the potential to at least temporarily result in a behavioral change in nesting birds, and as a result, the NTTR 8 may require breeding season limitations or seasonal restrictions at some landing areas 9 near known raptor nests or routes of migratory bird species to minimize the potential for 10 adverse impacts. Effects from noise associated with ongoing activities are expected to 11 be minimal. 12

13 Migratory bird conservation should be incorporated into agency planning processes whenever possible. A take permit under the USFWS Migratory Bird Program is required 14 for taking of golden eagles and their parts, nests, or eggs (USFWS, 2017b). Any take of 15 MBTA-protected species or golden eagles is expected to be incidental and would not 16 result in significant impacts at the population level. The USFWS should be notified if 17 unintentional take of migratory birds as a result of Air Force actions is having, or is likely 18 to have, measurable negative impacts on migratory bird populations. Implementation of 19 ongoing management activities on the NTTR (e.g., management guidelines for 20 threatened and endangered species) would result in significant avoidable/mitigatable 21 effects on sensitive wildlife and their habitat, including birds protected under the MBTA 22 and golden eagles protected under the Bald and Golden Eagle Protection Act. 23

24 Desert Tortoise

Ground-disturbance activities that occur within suitable desert tortoise habitat could 25 result in direct and indirect impacts to the Mojave desert tortoise. Potential impacts 26 could include habitat degradation caused by vegetation removal, mortality or impacts 27 from conflicts with vehicles, and the associated damage or destruction of burrows that 28 could result in harm, injury, or mortality of eggs, juveniles, or adult tortoises. The 29 likelihood of direct impacts to desert tortoise from ground disturbance (i.e., continuing 30 use of range targets, ground facilities, training areas, troop movement and roads) would 31 decrease with distance from the areas of activity. The Air Force complies with all state 32 and federal regulations to accommodate or remove hazardous materials and depleted 33 uranium from target sites, construction sites, etc. Therefore, the potential for tortoises to 34 be affected by contamination is low. Foot patrols and vehicular traffic on and off 35 existing trails/access roads would have the potential to harass, injure or crush a tortoise, 36 and/or crush a burrow in the direct path. Indirect impacts associated with the 37 establishment and spread of invasive, non-native plant species, could result in the loss 38 39 or compaction of soil, generate increased particulate matter emissions, and affect desert tortoise habitat (Berry, 1990; McEldery, 2016). Furthermore, the removal of 40 native plants makes finding shelter and food more difficult and reduces cover for 41 individual tortoises, which could become more vulnerable to predation (particularly by 42 predators attracted to human activity such as common ravens or coyotes). An increase 43

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in invasive, non-native plant species could modify existing plant communities and provide additional fuel that could pose a risk for wildfires. As described above under vegetation, there are ongoing management guidelines to control or minimize invasive non-native plant species on the NTTR and implementation of mitigation measures for desert tortoise, derived from the *Desert Tortoise Management Plan* would minimize or avoid significant impacts to desert tortoise (99 CES/CEIEA, 2015); see Appendix H, Biological Resources.

Direct impacts to desert tortoise may occur during construction activities within tortoise 8 habitat. Construction impacts may include soil disturbance and/or habitat degradation 9 caused by vegetation removal, mortality or impacts from conflicts with vehicles as 10 described above. Use of heavy equipment during construction and maintenance of 11 infrastructure generally produces noise and vibration that may have temporary, minor 12 impacts on desert tortoise in the immediate area. Application of water to minimize dust 13 production during construction can result in attraction of desert tortoise to an area. 14 Accumulation of trash in and around construction sites can result in attraction of certain 15 predators, including ravens and coyotes. Pre-construction surveys would minimize 16 adverse effects to desert tortoise during construction activities. Tortoises that are 17 removed to avoid harm in a construction area and/or from existing trails and access 18 roads may be affected directly by physical stress of the handling and relocation (such as 19 loss of bodily fluid), and, if moved beyond its home range, by associated stresses, 20 resulting from unfamiliarity with the area and not knowing the locations of cover sites. 21 burrows, and foraging areas. Aircraft operations that occur in suitable desert tortoise 22 habitat could affect tortoises. When desert tortoises are in burrows, caliche caves, or 23 rock shelters, downwash impacts are expected to be minimal (except when directly 24 under the aircraft). The area directly under the aircraft would experience substantially 25 greater impacts due to focused downwash, engine exhaust heat, and landing gear. 26 Burrows in nearby habitat could be collapsed or damaged by aviation activities. 27

Desert tortoises may be also impacted by dust and noise generated from aircraft 28 operations. Increased noise, dust, and aircraft activity would be localized and 29 temporary, but could occur. Dust generation due to aircraft operations at the designated 30 landing areas would have a minor adverse impact on plant productivity, but over time 31 could result in degradation of desert tortoise habitat, with potential damage to food 32 plants, disturbance to soils, compaction of soils, which could impede burrowing, and 33 potential replacement of native vegetation by invasive, non-native plants. Noise could 34 elicit temporary behavioral responses by tortoises or could possibly affect hearing 35 thresholds (Bowles et al., 1999). A desert tortoise would be expected to resume normal 36 activities following departure of the aircraft from the immediate area of the tortoise. 37 Implementation of mitigation measures for desert tortoise would minimize or avoid 38 significant impacts to desert tortoise (99 CES/CEIEA, 2015). 39

403.8.2.3Alternative 2 – Extend Existing Land Withdrawal and Provide Ready41Access in the North and South Ranges

The NTTR boundary under Alternative 2 would similar to Alternative 1, but the Air Force would have "ready access" in both the North and South Ranges as a result of a

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1 Congressionally directed change in land management (see Section 2.3.2 for a more detailed description of Alternative 2). Currently, a large portion of the South Range is 2 not available for military activities due to existing land being managed as a National 3 Wildlife Refuge and de facto wilderness. Air Force activities within the DNWR, which 4 overlaps the South Range, are currently limited to areas below 4,000 feet and within the 5 designated target impact areas. Existing roads (mountain roads/passages) and targets 6 used prior to the Wilderness Act that are located in areas that were proposed as 7 8 wilderness are also off limits. In addition, activities in range areas below 4,000 feet require coordination between the Secretary of the Air Force and USFWS through an 9 MOU. Under Alternative 2, a Congressionally directed change in land management 10 would effectively eliminate the need to manage the withdrawn lands as if they were 11 wilderness. Primary jurisdiction of portions or all of the area of the DNWR that overlaps 12 with the NTTR may be reallocated from the USFWS to the U.S. Air Force. The 13 withdrawn lands would be managed using the same natural resources management 14 requirements, guidelines, and biological constraints currently being implemented on the 15 NTTR. Military activities, including any new construction projects, would require proper 16 surveys and planning, including coordination with appropriate agencies, to avoid and 17 minimize impacts to vegetation, wildlife, aquatic and wetland habitats, and special 18 status species. Furthermore, applicable laws and regulations would apply the same as 19 the current Air Force managed lands within the NTTR. 20

The conduct of military operations in the area of the South Range currently managed as 21 de facto wilderness is not allowed; therefore, there are no defined projects associated 22 with Alternative 2. However, should the requirement to manage portions of the South 23 Range as de facto wilderness be removed, military activities would be allowed in these 24 areas, and potential impacts to biological resources would be similar to but slightly 25 greater than those described under Alternative 1 because the scope/scale and intensity 26 of activities would increase. It is anticipated that aircraft operations, munitions 27 expenditures, and motorized vehicular activity may be up to 30 percent greater as a 28 result of ready access in the South Range than those stated for Alternative 1. Current 29 military activities occupy an estimated 5 percent of the NTTR: conceptually, Alternative 30 2 would result in an increased use from 5 to less than 7 percent of the NTTR. Biological 31 resources have the potential to be impacted by military activities, including ground 32 disturbance associated with existing target impact area use, construction and 33 maintenance of existing and new facilities and targets, placement of threat emitters, 34 ground training (including access by vehicles and personnel), use and maintenance of 35 roads and utility lines, soil contamination and cleanup of target impact areas, as well as 36 impacts associated with non-native species invasion, accidental spills or fire. However, 37 ready access would not exempt military actions or projects from existing laws, and any 38 action would follow the regulatory requirements (e.g., NEPA, CWA, ESA, etc.) and 39 current natural resources management guidelines, requiring the same planning prior to 40 mission and project activities to avoid and minimize impacts to biological resources 41 (U.S. Air Force, 2010). Impacts associated with Alternative 2 would likely be site-42 specific, represent a small portion of the area within the NTTR, and avoidable or 43 mitigable through proper planning, monitoring, and maintenance. Adverse impacts 44

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associated with Alternative 2 may occur depending on the location of the military action
 and the sensitivity of the resources present or potentially affected by the action.

Air Force activities within the associated airspace outside of the NTTR boundaries from 3 Alternative 2 would have no effect on vegetation, aquatic and wetland habitats, and rare 4 plants in this region since they are confined to altitudes and locations where they are 5 unlikely to cause disturbance. Potential effects on large mammals (e.g. wild horses, 6 burros, pronghorn antelope, desert bighorn sheep, coyote, deer) include possible startle 7 or behavioral responses to overflights. Animals may react to the sound of jet aircraft or 8 the visual stimulus of the aircraft overhead by avoiding the area or altering their natural 9 behavior patterns. Associated airspace outside of the NTTR boundaries could be 10 hazardous for birds and bats. Activities would be modified in location or scheduling to 11 avoid BASH issues. 12

3.8.2.4 Alternative 3 – Expand Withdrawal of Public Lands for the NTTR

- 14 Alternative 3 includes subalternatives, as described in Section 2.3.3:
- Alternative 3A Range 77 EC South Withdrawal
- Alternative 3A-1 Amended Range 77 EC South Withdrawal
- Alternative 3B Range 64C/D and 65D Withdrawal and Administrative
 Incorporation
- 19 Alternative 3C Alamo Withdrawal

Potential direct or indirect impacts to biological resources are similar in context to those 20 described under Alternative 2, which includes extending the existing NTTR Withdrawal. 21 For the purpose of analyzing the potential impacts associated with the increase in 22 overall range utilization under Alternative 3, a 30 percent increase in test and training 23 activities is projected to provide a reference point for analytical comparisons (similar to 24 25 Alternative 2). Military activities (such as construction, munitions use, and vehicle or personnel access) would also occur within the proposed expansion lands, as discussed 26 in each of the Alternative 3 descriptions below. 27

In addition, fencing would be installed along the proposed boundaries that do not abut 28 the current NTTR boundary for each Alternative 3 scenario. To conduct programmatic 29 analysis for the affected resources discussed in this chapter, the following fencing 30 specifications were used. The fencing would consist of four strands of wire. The 31 bottom strand would be smooth while the three upper wires would be barbed. The 32 maximum fence height would 40 inches. Wire spacing from the ground up would be 33 16 inches, and then spacing between wires would be 6 inches, 6 inches, and 12 inches 34 (i.e., 16 inches, 22 inches, 28 inches, and 40 inches above ground level), which is the 35 standard for BLM antelope fencing. Fencing would not be implemented at high 36 elevations to allow large mammals to traverse through the landscape. The 37 environmental consequences analysis for each applicable affected resource has been 38 conducted using the total area to be fenced that abuts the current NTTR boundary to 39 provide a conservative analysis; however, there may be instances where natural 40 barriers will not allow for fence construction. 41

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1 Alternative 3A – Range 77 – EC South Withdrawal (and Amended Alternative 3A-1)

Alternatives 3A and 3A-1 are approximately 18,000 acres and 15,000 acres, 2 respectively, lying along the southwest boundary of the North Range of the NTTR. 3 There would be no construction disturbance or munitions use in this area, as it would 4 serve as a safety buffer for live weapons deployment on the interior of Range 77. The 5 additional land would be managed the same as the existing NTTR withdrawn lands, and 6 in accordance with the current natural resources management guidance and biological 7 constraints. Impacts associated with the withdrawal of 18,000 (or 15,000) acres in the 8 9 EC South Withdrawal area could be adverse (should construction or clearing of lands be proposed at a future date), but are likely to be low intensity and therefore less than 10 significant. 11

Approximately 25 miles of fencing would be installed along the Alternative 3A or 3A-1 12 boundary, which will result in impacts to biological resources. In addition to fence 13 installation, the boundary fence will require periodic monitoring and maintenance, which 14 means a permanent loss of vegetation and potential direct impacts to other biological 15 resources within the construction corridor. Indirect impacts on biological resources 16 outside the fence and access corridors may occur if invasive plant species establish in 17 areas disturbed by fence installation or access routes and subsequently spread into 18 adjacent native habitats. Fences that cross ephemeral streams or canyons can also act 19 as dams altering the flow of surface water which could affect the biological resources in 20 the vicinity of the dam as well as downstream aquatic resources or wetlands that 21 depend on the surface water input. Although it is likely that the direct impacts (e.g., 22 mortality of species, fragmentation of habitat) to biological resources associated with the 23 fence installation and maintenance will represent a fraction of the NTTR withdrawal 24 area, disturbance to a natural corridor has greater potential for far-reaching direct and 25 indirect impacts as it can span many habitat types, leading to fragmentation, with 26 indirect impacts that may be difficult to assess or control. Therefore, the installation, 27 monitoring and maintenance of up to 25 miles of fencing along the Alternative 3A or 3A-28 1 boundary has the potential to cause adverse impacts depending on the biological 29 resources affected and implementation of suggested mitigation measures described 30 below. 31

In accordance with Air Force guidance and NEPA regulations, an assessment of 32 environmental impacts associated with the fence installation is required prior to initiation 33 of any work. Current operations include annual boundary/fence surveys conducted with 34 the use of a helicopter and fence repairs, weed control, or other fencing or 35 environmental maintenance requirements, implemented in accordance with current 36 NTTR management guidelines. In addition, the following recommended actions and 37 mitigation measures, adapted from the BLM Handbook H-1741-1: Fencing (BLM, 1989) 38 may reduce impacts to biological resources from fence installation: 39

Minimize direct removal of vegetation and ground disturbance. Avoid bulldozer
 clearing or other major soil disturbing methods. In brushy areas, keep the cleared
 area to the minimum needed to allow construction. In areas with heavy
 vegetation, consider irregularly shaped fence line clearings rather than those with
 uniform width. Mechanical clearing can be successful if accompanied by

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1 rehabilitation actions that minimize soil loss and avoid long-term contrasts in 2 vegetative cover.

2. Consultation with the USFWS is required if a proposed fencing project may affect a federally listed species. In addition, consultation with other cooperating agencies may be required if federally listed species, species proposed for listing, candidate species, state-listed species or other special sensitive species have the potential to occur within or otherwise be affected by a proposed fencing project.

- 9 3. In places where watershed conditions create the potential for a large amount of runoff, special drainage crossing structures (sometimes called "water gaps") shall be used. Designs of this type of fencing vary, and need to consider the field situation and purpose of the fencing. The need for periodic reconstruction or major maintenance can be substantially reduced if this type of fence structure is used.
- 4. The fence should be periodically monitored and repairs implemented, as needed, to maintain the fence in a usable condition, consistent with the original as-built standards. In addition, monitoring of the fence line and access roads for invasive plant species could be conducted and corrective actions implemented as soon as possible if issues are identified.

5. Major reconstruction or replacement should occur only when construction or
 design inadequacies, or the normal effects of use and environmental influences,
 leads to sufficient wear and deterioration that replacement is required.

The proposed expansion of the existing withdrawal boundaries associated with 23 Alternative 3A or 3A-1 would not substantially change military activities within the 24 overlying airspace, compared with the existing NTTR withdrawn lands. Activities in this 25 region are confined to altitudes and locations where they are unlikely to cause 26 disturbance greater than existing conditions and would, therefore, have no significant 27 effect on vegetation, wildlife, aquatic and wetland habitats, rare plants, sensitive wildlife, 28 and MBTA-protected species and birds protected under the Bald and Golden Eagle 29 Protection Act. Although desert tortoises have not been documented, potential suitable 30 31 habitat desert is present within the boundaries associated with Alternatives 3A and 3A-1. No direct impacts to desert tortoise are expected, because this alternative does 32 not involve any construction or activities that could cause mortality, destroy burrows. 33 Any potential impacts due to installation of fencing or any construction or clearing of 34 lands proposed at a future date, will be minimized through implementation of mitigation 35 measures for desert tortoise (Appendix H, Biological Resources). 36

37 Alternative 3B – Range 64C/D and 65D Withdrawal and Administrative Incorporation

Alternative 3B is approximately 57,000 acres located immediately south of the South Range of the NTTR. No changes to airspace would occur, but implementation of this alternative could result in increased use and scheduling of the airspace around the South Range. The Alternative 3B area would be managed in accordance with the same natural resources management requirements, guidelines, and biological constraints

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currently implemented for the NTTR and would ensure impacts from any future military 1 actions are minimized and mitigated. The exclusion of development, recreation, and 2 mining activities in the area could be beneficial to biological resources, because the 3 land would continue to be managed for the protection of biological resources and 4 excluded from uses that could reduce habitat for plant and wildlife species. 5 Approximately 30 miles of fencing would be installed along the Alternate 3B boundary, 6 which will result in direct and indirect impacts (e.g., mortality of species, increased 7 depredation due to supplemental perches, fragmentation of habitat) similar in nature to 8 biological resources as described under Alternative 3A, though Alternative 3B would 9 cover a larger area. The installation, monitoring and maintenance of 30 miles of fencing 10 along the Alternative 3B boundary has the potential to result in a significant adverse 11 impact to biological resources. An assessment of environmental impacts associated 12 with the fence installation is required prior to initiation of any work, to avoid and 13 minimize any impacts. In addition, implementation of the mitigation measures described 14 under Alternative 3A may reduce impacts to biological resources from fence installation. 15

Suitable habitat for special status wildlife, including MBTA-protected species, is present 16 within the Alternative 3B area. Direct, permanent (i.e., direct mortality), and temporary 17 (i.e., generation of dust, increased noise, and altered behavior) impacts from additional 18 aviation activities could occur. Wildlife, such as large mammals (e.g., desert bighorn 19 sheep), golden eagles, and MBTA-protected species, in the vicinity of a noise source 20 would likely exhibit increased awareness or response, which would vary depending on 21 animal group and other factors (as described above). Raptors and other MBTA-22 protected species, including golden eagles, protected under the Bald and Golden Eagle 23 Protection Act, could be affected by aircraft activity that has the potential to at least 24 temporarily result in a behavioral change in nesting birds. As a result, breeding season 25 limitations, seasonal restrictions in areas near known to be occupied by raptor nests, or 26 routes of migratory bird species could be avoided to minimize the potential for adverse 27 impacts. Nests of MBTA-protected species, including golden eagles in the immediate 28 vicinity of the Proposed Action, would be susceptible to abandonment and depredation. 29 Any take of special status wildlife, including MBTA-protected species or golden eagles, 30 should be incidental and would not result in significant impacts at the population level. 31 Implementation of ongoing management activities implemented on the NTTR (e.g., 32 management guidelines for threatened and endangered species) would reduce effects 33 on sensitive wildlife species and their habitats. 34

Alternative 3B includes desert tortoise habitat, and recent signs of desert tortoise have been documented (U.S. Air Force, 2017j). No direct impacts to desert tortoise are expected, because this alternative does not involve any construction or activities that could cause mortality, destroy burrows, or degrade habitat. Increased aircraft activity could result in indirect effects due to an increase in noise, though effects are likely to be insignificant. Any potential impacts will be minimized through implementation of mitigation measures for desert tortoise (Appendix H, Biological Resources).

Alternative 3B could add land to create a safety buffer and should not substantially
 change military activities within the overlying airspace, compared with the existing
 NTTR withdrawn lands, and effects should be insignificant for vegetation, wildlife,

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aquatic and wetland habitats, and rare plants in this region since these activities are

2 confined to altitudes and locations where they are unlikely to cause disturbance greater

- 3 than existing conditions.
- 4 Alternative 3B would also be beneficial to special status plants and wildlife, in that it
- 5 would serve as a habitat corridor, which can provide a linkage to the NTTR. Therefore,
- 6 impacts associated with the withdrawal of approximately 57,000 acres in Range 64C/D
- 7 and 65D withdrawal areas could be adverse but are likely to be of low intensity.

8 Alternative 3C – Alamo Withdrawal

9 Alternative 3C would request the withdrawal of approximately 227,000 acres immediately east of the South Range of the NTTR in the DNWR to correspond with 10 potential weapons safety footprints associated with target impact areas, which must be 11 controlled for safety purposes; however, live munitions are only used specifically in the 12 target impact areas. Alternative 3C implements IW capabilities that would involve 13 developing potential insertion points that would include one runway that would be a 14 mockup location to provide special operations personnel a location to practice tactics, 15 while a second runway would be an active runway, providing more realistic insertion 16 training. Each runway would be 6,000 feet long and 90 feet wide, and it is anticipated 17 that ground disturbance activities associated with construction of the runways would be 18 less than 13 acres. The mockup runway would not be used for aircraft operations. 19 However, it is anticipated that the active runway would be a dirt runway, and operational 20 levels would occur at a tempo of 520 takeoffs and landings annually. In addition, 21 FAARP training, which consists of training activities associated with refueling and 22 munitions loading of aircraft, would occur in an austere area, such as a dry lake bed. 23 Analysis of this alternative focuses mainly on the proposed use of the area from a 24 conceptual perspective, and site-specific NEPA analyses will be necessary in the future 25 for specific locations and routes once a Congressional decision on the withdrawal has 26 been made. 27

As with the other two alternative proposed expansion areas, the additional land would 28 be managed in accordance with the same natural resources management 29 requirements, guidelines, and biological constraints as the existing NTTR. Construction 30 projects, including the proposed 13 acres for insertion runways, represent an extremely 31 small portion (less than 0.01 percent) of the withdrawal area and would require proper 32 surveys and planning to avoid and minimize impacts to vegetation, wildlife, aguatic and 33 wetland habitats, and special status species. Fuel spills could occur during FAARP 34 activities and have the potential to poison or contaminate biological resources, either 35 directly, if spills are left unattended in areas where wildlife is active, or indirectly, if 36 37 contaminants are carried to surface waters during rainfall. FAARP activities would occur in a dry lake bed where vegetation is sparse and during a time when wildlife activity is 38 generally low; runoff to surface waters would be unlikely, and spill response actions 39 would be incorporated into training preparation. As mentioned above, natural resources 40 management requirements, guidelines, and constraints would also apply to the 41 Alternative 3C area as a whole, which would ensure impacts from the proposed 42 insertion of training runways, or any future military actions are minimized and mitigated. 43

1 Approximately 60 miles of fencing would be installed along the Alternative 3C boundary, which will result in the same direct and indirect impacts to biological resources as 2 described under Alternative 3A, though Alternative 3C would cover a larger area. The 3 installation, monitoring, and maintenance of 65 miles of fencing along the Alternative 3C 4 boundary has the potential to result in a significant adverse impact to biological 5 resources. An assessment of environmental impacts associated with the fence 6 installation is required prior to initiation of any work to avoid and minimize any impacts. 7 In addition, implementation of the mitigation measures for installation and maintenance 8 of fencing described under Alternative 3A may reduce impacts to biological resources. 9

The expansion of the existing withdrawal boundaries associated with Alternative 3C 10 would increase military activities, compared with the existing NTTR withdrawn lands. An 11 increase in activities would result in impacts to vegetation, wildlife, aquatic and wetland 12 habitats, and special status species in this region; however, activities are confined to 13 altitudes and locations where they are unlikely to cause disturbance that would 14 significantly impact biological resources. Furthermore, implementation of mitigations 15 and current management practices carried over to new lands would serve to minimize 16 potential impacts. Suitable habitat for special status wildlife, including MBTA-protected 17 species, is present within the Alternative 3C area. Direct, permanent (i.e., removal of 18 habitat, direct mortality), and temporary (i.e., generation of dust, increased noise) 19 impacts from any ground disturbance, construction, and annual aviation activities could 20 occur. Noise from aircraft activities could cause stress, potentially induce a startle 21 response, and cause possible injury. Wildlife, such as large mammals (e.g., desert 22 bighorn sheep), in the vicinity of a noise source would likely exhibit increased 23 awareness or response, which would vary depending on animal group and other factors 24 (as described above). Raptors and other MBTA, including golden eagles, could be 25 affected by increased aircraft activity. As noted above, many birds become habituated 26 to aircraft overflights and long-term reproductive success should not be affected by 27 exposure to overflight; nonetheless, overflight activity has the potential to at least 28 temporarily result in a behavioral change in nesting birds, and as a result, the NTTR 29 may require breeding season limitations or seasonal restrictions in areas near known 30 raptor nests, golden eagles, or routes of migratory bird species to minimize the potential 31 for adverse impacts. Nests of MBTA-protected species, including golden eagles in the 32 immediate vicinity of the Proposed Action would be susceptible to abandonment and 33 depredation. Migratory bird conservation should be incorporated into agency planning 34 processes. Any take of MBTA-protected species or golden eagles would be incidental 35 and would not result in significant impacts at the population level. Implementation of 36 37 ongoing management activities implemented on the NTTR (e.g., management guidelines for threatened and endangered species) would reduce effects on sensitive 38 wildlife species and their habitats. 39

Alternative 3C contains suitable high-quality desert tortoise habitat. Signs of desert tortoise have been identified in the area (U.S. Air Force, 2017j). Aircraft operations that occur in suitable desert tortoise habitat could affect tortoises. However, if desert tortoises are in burrows, caliche caves, or rock shelters, downwash impacts are

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expected to be minimal (except when directly under the aircraft). Burrows in nearby
 habitat could be collapsed or damaged by aviation activities.

Desert tortoises may be also impacted by dust and noise generated from aircraft 3 operations. Increased noise, dust, and aircraft activity would be localized and temporary 4 but could occur. Dust generation due to aircraft operations at the designated landing 5 areas would have a minor adverse impact on plant productivity and soil compaction, but 6 7 effects would be minimal due to the small portion (less than 0.01 percent) of the total 220,000 acres in the proposed expansion. Noise from aircraft activity could elicit 8 temporary behavioral responses by tortoises, and tortoises may assume a protective 9 posture by temporarily withdrawing their head and limbs into their shell and remain still, 10 much as they do when a human or predator approaches. This posture provides 11 protection from physical injury and minimizes exposure to blowing dust. Temporary 12 behavioral responses include voiding their bladders, which can be life-threatening to 13 tortoises. A desert tortoise would be expected to resume normal activities following 14 departure of the aircraft from the immediate area of the tortoise. Use of electromagnetic 15 radiation, lasers, and microwave transmission would not likely affect the tortoise 16 because the tortoise would not be in direct contact with the emitter beam for an 17 extended period of time. Any effects on desert tortoises from aircraft overflight or use 18 of threat emitters would be low and not likely to result in a permanent change to the 19 habitat for the species. Implementation of mitigation measures for desert tortoise would 20 minimize or avoid significant impacts to desert tortoise (99 CES/CEIEA, 2015); see 21 Appendix H, Biological Resources. 22

Because nearly all of the area within Alternative 3C is within areas of the DNWR 23 managed to preserve wilderness characteristics, activities such as mining, agriculture 24 and grazing are already limited or excluded from these areas, and the withdrawal is not 25 likely to provide a significant beneficial impact to biological resources. Furthermore, 26 under Alternative 3C, access to some of the areas would be reduced but the public 27 28 would continue to have access to key recreational areas. The potential loss of any recreational areas associated with the Alternative 3C proposed expansion area could 29 result in a shift of recreational activities to other locations in the region; however, given 30 the recreational opportunities that will remain within the Alternative 3C boundaries, and 31 opportunities outside the project boundaries, it is likely people would disperse to all 32 available recreation areas and not concentrate in one area (see Land Use, Recreation 33 and Visual Resources, Section 3.4). Potential direct and indirect impacts to biological 34 resources resulting from recreational activities would not be expected to increase in 35 magnitude or duration, and overall impacts to biological resources would be 36 insignificant. 37

38 **3.8.2.5** Alternative 4 – Establish the Period of Withdrawal

The proposed withdrawal periods associated with Alternative 4–Alternative 4A (20-year withdrawal period), Alternative 4B (50-year withdrawal period), and Alternative 4C (indefinite)–must be implemented in conjunction with one or more of the other alternatives or subalternatives. Because Alternative 4 reflects periods of time, which do not in and of themselves affect biological resources, there are no specific impacts associated with Alternative 4, except to provide a point in time at which impacts from other chosen alternatives may end.

3 3.8.2.6 No Action Alternative

Under the No Action Alternative, BLM-administered public lands would be subject to the
multiple resource management objectives of the FLPMA. Most of the North Range
would be returned to BLM. Much of the South Range that overlaps the DNWR would be
under the jurisdiction of USFWS.

Prohibitions previously placed in effect by the MLWA on appropriations under the public 8 land laws would expire. However, segregation of these lands from appropriative land 9 uses (such as mining, geothermal leasing, or livestock grazing) would continue until the 10 Secretary of the Interior publishes an order opening the lands for such uses. An opening 11 order could not be issued by the Secretary until the costs, benefits, and environmental 12 consequences of competing land use could be fully evaluated through planning directed 13 by FLPMA and analyzed in NEPA documentation. The results of new land management 14 planning may or may not find that portions or all of the former NTTR lands managed by 15 the BLM should be opened to some or all forms of appropriative land use. Management 16 of the former NTTR lands would continue as currently directed until new management 17 planning under FLPMA and NEPA regulations could be completed. 18

The DOI, through the USFWS, would continue to manage the DNWR to protect and 19 preserve desert bighorn sheep and other species of wildlife. It is anticipated that the 20 DOI, through the BLM, would employ multiple-use concepts on lands that do not pose a 21 health threat to potential users. A detailed estimation of the former NTTR areas 22 requiring remedial actions prior to final release or a determination of actions required 23 would be necessary if Congress selected the No Action Alternative. Access to the 24 DNWR would be under the jurisdiction of the USFWS. Access to all other lands would 25 be under the jurisdiction of the BLM. 26

27 **3.9 CULTURAL RESOURCES**

28 **3.9.1** Affected Environment

29 **3.9.1.1 Description of Resource**

Cultural resources consist of prehistoric and historic sites, structures, artifacts, and any other physical or traditional evidence of human activity considered relevant to a particular culture or community for scientific, traditional, religious, or other reasons.

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.9.1.1.1.

As defined under 32 CFR 800 (I)(1), "Historic Property means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP) maintained by the Secretary of the Interior.

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This term includes artifacts, records, and remains that are related and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria."

This section describes known historic properties within the affected areas that are 5 potentially eligible for the NRHP and evaluates whether elements of the LEIS would 6 7 potentially affect these resources. Also presented are potential resources as described under a predictive model implemented over some of the proposed expansion areas. 8 These resources may include any archeological resources considered eligible, 9 potentially eligible, or currently listed on the NRHP. This may include historic structures, 10 historic districts, any known historic cemeteries, traditional cultural properties, or sacred 11 sites. In addition, areas where adequate effort to identify cultural resources have not 12 occurred are discussed. 13

14 3.9.1.2 Region of Influence

15 Cultural resources were analyzed by assessing each 16 resource's status of investigation and condition, then 17 evaluating the resource as it overlaps with the area of 18 potential effects (APE). The ROI for this LEIS is equivalent 19 to the APE designation as described in the NHPA. For the Native American perspective on information in this section, please see Appendix K, paragraph 3.9.1.2.1.

As defined under 36 CFR 800.16, "Undertaking means a project, activity, or program 20 funded in whole or in part under the direct or indirect jurisdiction of a Federal agency. 21 including those carried out by or on behalf of a Federal agency; those carried out with 22 Federal financial assistance; and those requiring a Federal permit, license or approval. 23 Also, as defined under 36 CFR 800.16, "the Area of Potential Effects is the geographic 24 area or areas within which an undertaking may directly or indirectly cause changes in 25 the character or use of historic properties, if such properties exist. The area of potential 26 effects is influenced by the scale and nature of the undertaking and may be different for 27 different kinds of effects caused by the undertaking." 28

The APE is influenced by the scale and nature of the alternatives proposed and may differ according to the types of effects caused by the action. The APE for this proposed action is assumed to not extend beyond the footprint of the activity boundaries as defined for Alternatives 1, 2, 3A, 3A-1, 3B, and 3C and associated airspace. Alternative 4 deals with the time period of the withdrawal and, as such, does not influence the APE.

A literature and records search was conducted for the proposed expansion lands and surrounding areas within 1 mile. Data from multiple sources were examined, including information from the Nevada Cultural Resource Information System, Southern Nevada and Battle Mountain districts of the Nevada BLM, Desert Research Institute, among others. General Land Office maps were reviewed for information regarding historic roads. Files at the Nevada Bureau of Mines and Geology were examined for historic mining resources (Duke, 2016a). 1 The literature and records search found 201 cultural resources sites (157 prehistoric,

2 36 historic, 1 multi-component prehistoric and historic, 1 ethnohistoric, and 1 unknown

3 affiliation), and 95 cultural resources projects within all of the proposed expansion areas

4 (Duke, 2016a).

5 3.9.1.3 Cultural Resources

6 Cultural resources described in this subsection include
7 historic structures, districts, traditional cultural properties,
8 sacred sites, and other areas ethnographically important to
9 prehistoric and modern populations within the region.

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.9.1.3.1.

Traditional cultural properties can include properties, sites, or other resources associated with the cultural practices or beliefs of a living community that link the community to its past and help maintain its cultural identity and that are eligible for or listed on the NRHP. Traditional cultural resources are areas associated with the cultural practices or beliefs of a living community that link the community to its past and help maintain its cultural identity but that have not been evaluated for NRHP eligibility.

Sacred sites are well-known areas associated with cultural practices or beliefs of a living community. Most traditional cultural properties, resources, or sacred sites on and around the NTTR are associated with Native American tribal groups. Cultural landscapes are geographic areas where cultural and natural resources and wildlife have been associated with historic events, activities, or people or which serve as an example of cultural or aesthetic value.

22 Archival and field studies designed to characterize and, in part, identify resources and existing conditions within the proposed expansion areas are currently underway. To 23 this end, the following studies have been completed or are currently underway: a 24 literature and records search, research of previous ethnographic studies and Native 25 American involvement, background search of previous oral histories, and testing of an 26 archeological model through associated surveys (Duke, 2016b). This subsection 27 addresses historic resources, traditional resources, ethnographic studies, and oral 28 29 traditions, while Section 3.9.1.4, Archeological Resources, discusses previous and current archeological studies and the archeological record. 30

A review of the primary ethnographic literature pertinent to the proposed expansion lands, including ethnographic studies, was conducted for the NTTR. Sources reviewed include studies conducted in collaboration with Native American tribes as part of Nellis AFB's Native American Program. Other sources of primary literature include Julian Steward's ethnographic documentation of the region and Isabel Kelly's field notes on the Southern Paiute (both circa 1930s) (Duke, 2016b).

Current Native American tribe members were solicited for information on important places within the proposed expansion lands (Duke, 2016b). Tribe members were invited to participate in the survey project as monitors, allowing for information gathering on landscape features that may be culturally important. Local special interest groups, such as Friends of Nevada Wilderness, were consulted regarding key landscapes that have been important historically.

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1 Cultural properties and ethnographically important locations are currently being researched for each of the alternative areas. This information will be added to the LEIS 2 and/or included in the consultation process as the survey data becomes available. A 3 report on these surveys is expected to be produced in autumn 2017. Oral traditions of 4 regional Native American tribes were collected from Native Americans who were 5 participants in field survey efforts. In addition, as part of the ethnographic study, 6 academic specialists will compile interviews regarding oral traditions and local histories. 7 These represent the primary sources of information identifying oral traditions (Duke, 8 2016b). 9

10 Existing NTTR Boundary (Alternatives 1 and 2)

Historic features are not extensive on NTTR equating to 13 percent of the 2,889 total 11 cultural resources that have been recorded to date. A total of 364 locations are historic 12 or historic with prehistoric components (Duke, 2016b). Historic-period use of NTTR 13 lands was limited by lack of extensive ore deposits for mining, substantial water sources 14 for ranching and agriculture, and primary travel routes. These features include 15 remnants of abandoned towns associated with the mining and ranching history of 16 Nevada. Mines and 15 mining districts, many of which have campsites related to the 17 operation nearby, are located on what is now the NTTR. These were created and 18 operated during the late 19th and early 20th centuries. Seven structures underlying the 19 NTTR airspace in Lincoln and Clark Counties are listed on the NRHP. More than 20 21 100 historic ghost towns, most containing architectural features, are located underneath the MOAs and restricted air space. No World War II and Cold War-era structures on the 22 NRHP have been identified within the NTTR or underneath associated airspace (U.S. 23 Air Force, 2011). 24

Traditional cultural properties located on the NTTR may include traditionally used 25 wildlife and plants (such as piñon nuts) and certain geographic areas. Types of 26 resources that have been specifically identified in recent studies include rock art sites, 27 landscape features (such as mountains or caves), burial sites, gathering places, 28 traditional landscapes, and lithic raw material. Since 1997, Nellis AFB's Native 29 American Program and ethnographic studies have identified ceremonial and sacred 30 sites on the NTTR and have worked to protect them (U.S. Air Force, 2011). Any TCP 31 designation is initiated by Nellis AFB in coordination with various Native American 32 groups. 33

Consultations between the NTTR and the Native American Program occurred early in the planning process. This early engagement helps to ensure that traditional cultural properties are not affected by the proposed project. Throughout the LEIS process, the Native American Program has participated in informational as well as scoping meetings regarding this proposed action. Issues of concern include the potential for impacts due to potential restriction of access to areas of interest and noise and vibration effects on sacred or traditional resources.

The ethnohistoric record for the NTTR is extensive. Of the 364 historic-era sites on the NTTR, 51 are defined as ethnohistoric (Duke, 2014). This record aligns with the historic

43 record of the region in general. Many sites are related to ethnohistoric-era pine nut

harvesting that took place well into the 20th century. This shows a continuous utilization
 of this important resource in the Belted and Kawich mountain ranges.

The Oasis Valley area and a large portion of the western half of the NTTR was 3 documented as the traditional home of various Shoshone tribal groups. The Shoshone 4 in this area also had close associations with the Shoshone families living in the Belted 5 Range and northern Death Valley areas. Although subsistence methods varied from 6 7 band to band, there were general subsistence patterns common to all Shoshone bands. Seasonal movement of small family groups in search of gathering and hunting areas 8 occurred spring through fall. During the winter, groups would gather into dispersed 9 camps. Oasis Valley was one of these winter camp areas. The valley continues to be 10 culturally significant to Shoshones (Bengston, 2005). 11

A 2008 ethnography consisted of interviews with Southern Paiutes, Owens Valley Paiutes, and Western Shoshone tribes. The focus of the study was the Thirsty Canyon and the Black Mountain Caldera, the traditional uses of this area, and examination of oral tradition and previous scientific study by Julian Steward. The study recorded the sacred trails and ceremonial sites and how these were tied together by the landscapes throughout the study area (Stoffle et al., 2008).

The NTTR region includes part of a huge trail system that ran from Hot Creek Valley in 18 central Nevada to the Amargosa Valley in southern Nevada, with important connections 19 to the Spring Mountains, Las Vegas, Moapa, and the Colorado River on the south and 20 east and connections to Oasis Valley, Beatty, Black Mountain, and Death Valley on the 21 west. These are considered sacred trails as they connect at least six ceremonial ritual 22 deposit areas, including the First Menses site, Juniper site, Aqueduct Mesa, McKinnis 23 site, Piapi Canyon, and Apache Tears sites (Zedeno et al., 2005). This trail system is 24 marked by rockshelters with pictographs and petroglyphs and open campsites with 25 petroglyphs. There are also two major trail junctions on the south end of the Belted 26 Range: Ammonia Tanks and upper Fortymile Canyon. The trail and these sites are 27 located near the territorial boundaries of Shoshone and Paiute groups (Zedeno et al., 28 2005) 29

AFI 32-7065 and EO 13007 require that installations should provide federally recognized Native American tribes access to and use of traditional cultural properties and sacred sites on Air Force-controlled lands. Under this instruction, the Air Force can set terms that protect human life and do not allow for interference with the current mission. In addition, it is the Air Force's responsibility to protect the integrity and confidential location of such sites. If future Air Force activity may impact such access or protections, then reasonable notice must be provided to federally recognized tribes.

37 Alternative 3A – Range 77 – EC South Withdrawal (and Amended Alternative 3A-1)

Previous ethnographies have documented culturally significant trails that traverse the Tolicha Peak area (CGTO, 1997). The region is discussed in traditional Shoshone stories, although specific information cannot be presented in this document due to its

41 sensitive nature.

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1 Alternative 3B – 64C/D and 65D Withdrawal and Administrative Incorporation

The Southern Paiutes are recorded as having an extensive connection to the Spotted Range and north end of the Spring Mountains (CGTO, 1997). Subsistence activities, such as collecting pine nuts and hunting deer and bighorn sheep, were common to this area. The Spotted Range was also known as a good place for catching chuckwallas, which were used for medicine by the Southern Paiutes.

7 Alternative 3C – Alamo Withdrawal

Several culturally important locations are present in the Alamos area (Stoffle et al., 8 2004). A particularly significant feature called the Honeymoon Trail runs from the 9 Sheep Range to various points westward. The trail is called the Honeymoon Trail 10 because of its use by men from the Pahrump villages traveling to Moapa in search of 11 wives and the Moapa men when they were seeking wives. This trail is also significant 12 as it connects important natural and cultural places, including pine nut harvesting sites, 13 caves, the Virgin River, the Colorado River, a Ghost Dance site, Pintwater Range, 14 Pahranagat Valley, and sheep hunting areas, in all the local mountains. 15

16 3.9.1.4 Archeological Resources

In addition to previously identified resources, an
 archeological survey for the Alternative 3A/3A-1 and 3B
 areas was conducted in the summer of 2017 to further

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.9.1.4.1.

characterize the archeological record and identify resources. As a cooperating agency, for the purposes of complying with NHPA Section 106, 36 CFR 800.4, the USFWS felt that the existing archaeological record was sufficient to characterize the potential archaeological historic properties within the APE and, therefore, no archaeological surveys were conducted for the Alternative 3C area. Ethnographic studies will be conducted within the Alternative 3C area and, should the Alternative 3C be implemented, future studies may be required.

Sampling for cultural resources surveys of large land areas can be accomplished using a statistically based sampling methodology. Typically, 5 to 10 percent of the lands under consideration would be subjected to such a methodology. Surveys would be required under Section 106 for specific developments (e.g., emitter pads, landing fields, other construction, etc.) on unsurveyed lands in the future (Duke, 2016b).

A predictive archeological survey model was developed in GIS. The model strata were 32 defined using a combination of topographic, land cover, and hydrography GIS datasets. 33 The topographic, land cover, and hydrography data were then combined to create the 34 final model strata. The final six strata include lowlands, playa bottom, uplands, pinyon 35 uplands, and steep slopes (Duke, 2016b). The effectiveness of this model was tested in 36 summer 2017 by comparing the results from the proposed expansion area survey 37 against existing survey data from the NTTR (Duke, 2016b). The projected site densities 38 of the implemented model range from a low of 2.6 sites per 1,000 acres in the steep 39 slopes stratum to a high of 18.3 sites per 1,000 acres in the pinyon uplands stratum 40 (Duke, 2016b). 41

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Sample random survey units were based on a 500- by 500-meter (61.8-acre) grid within 1 the proposed expansion areas (Duke, 2016b). Each block was assigned to a single 2 physiographic characterizing stratum, according to whichever model stratum occurred 3 most frequently within the block. A 6 percent stratified random sample consisting of 4 227 blocks (14,024 acres) made up the random sample field effort. The non-random 5 survey allowed investigation of areas of interest observed outside of survey blocks 6 during the random-sample survey. Also, additional areas for formal survey may be 7 defined by Native American tribes, Air Force, BLM, and/or the USFWS. The survey 8

9 areas were selected using blocks from the sample grid (Duke, 2016b).

10 Existing NTTR Boundary (Alternatives 1 and 2)

At present, approximately 5.7 percent, or 167,882, of the 2,939,540 acres that compose the NTTR have been surveyed for archeological resources (Duke, 2014). Some of these surveys were conducted under Section 106 of the NHPA, while additional surveys were conducted as part of the regular Section 110 responsibilities of the Nellis AFB cultural resources program.

Of the 2,889 resources known to occur on the NTTR, 364 are considered historic resources. Of these historic resources, 183 are historic only and 181 are multicomponent with prehistoric resources. Along with the military historical resources found on the NTTR, many important historic places are located in the areas surrounding the NTTR and the proposed expansion lands (Duke, 2016b).

Of the prehistoric archeological sites identified in the area, 2,369 are either prehistoric or multi-component prehistoric/historic-era sites and are true sites (i.e., not isolated

finds previously recorded as sites) (Duke, 2016b).

24 Alternative 3

The probability model utilized for the fieldwork supporting the LEIS predicted a total of 2,663 sites within the expansion areas proposed by Alternative 3 as a whole. This represents an average density of 9.15 sites per 1,000 acres. The largest projected site count was projected within the Lowlands stratum (N=1,239), with the highest density of sites per acre expected within the pinyon uplands stratum (18.28 sites per 1,000 acres) (Duke, 2016b).

31 Alternative 3A – Range 77 – EC South Withdrawal (and Amended Alternative 3A-1)

Eleven previous cultural resource studies have been conducted in the Range 77 withdrawal area. No NRHP-eligible cultural resources were identified during these surveys. Tables listing cultural resource studies conducted and the archaeological sites identified can be found in Appendix I, Cultural Resources.

Of the 17,937 acres in the Range 77 withdrawal area, the probability model projected 151 archeological sites. Of these, 127 sites are projected to occur within lowlands stratum and 24 sites are projected within uplands stratum (Duke, 2016b). The site densities per 1,000 acres are estimated at 8.17 and 9.81, respectively.

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1 Alternative 3B – 64C/D and 65D Withdrawal and Administrative Incorporation

Twenty-three previous cultural resources studies have been conducted for the Range 64C/D and 65D withdrawal area. Two NRHP-eligible cultural resources, two sites of undetermined eligibility, and one site unevaluated as to eligibility were identified during these surveys. Tables listing cultural resource studies conducted and the archaeological

6 sites identified can be found in Appendix I, Cultural Resources.

Of the 61,006 acres under the Range 64C/D and 65D withdrawal area, the probability model had a projected site count of 525 archeological sites. Of these, 6 sites were projected to occur within the playa bottom stratum, 259 sites were projected to occur within lowlands stratum, 251 sites were projected within uplands stratum, and 8 sites are expected within the steep slopes stratum (Duke, 2016b). The site densities per 1,000 acres are estimated at 14.17, 8.17, 9.81, and 2.61, respectively.

13 Alternative 3C – Alamo Withdrawal

Fourteen previous cultural resource studies have been conducted for the Alamos withdrawal area. These surveys identified 25 NRHP-eligible cultural resources and 56 sites that are unevaluated as to eligibility. Tables listing cultural resource studies conducted and the archaeological sites identified can be found in Appendix I, Cultural Resources.

Of the 231,994 acres under consideration within the Alamos, the probability model projected 1,987 archeological sites. Of these, 134 sites were projected to occur within the playa bottom stratum, 853 sites are projected to occur within the lowlands stratum, 841 sites were projected within the uplands stratum, 87 sites were expected within pinyon uplands stratum, and 72 sites were expected within the steep slopes stratum (Duke, 2016b). The site densities per 1,000 acres are estimated at 14.17, 8.17, 9.81, 18.28, and 2.61, respectively.

26 **3.9.2 Environmental Consequences**

27 3.9.2.1 Analysis Methodology

28 The impact assessment evaluated the potential impacts of

29 the proposed land withdrawal extension and expansion to

30 cultural resources. As specific actions for specific locations

on the land proposed to be withdrawn have not yet been

- 32 determined, impacts to these resources are discussed in a
- 33 general sense; site-specific evaluations of cultural resources would be conducted on a
- 34 per-project basis in the future, and potential impacts and associated consultation efforts
- 35 would be conducted at that time.
- ³⁶ Potential impacts to cultural resources are evaluated with respect to the extent, context,
- and intensity of the impact in relation to existing regulatory guidance and historic
- properties present within the APE. Determining significance of impacts (40 CFR

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.9.2.1.1.

1 1508.27) requires the action to be analyzed with respect to the setting of that action and 2 consideration relative to the severity of the impact.

NEPA regulations (40 CFR 1508.27[b]) also provide for the consideration of the severity 3 of an impact (i.e., intensity). There are numerous factors to consider when determining 4 the intensity of potential impacts. For cultural resources, the degree to which the 5 proposed action may adversely affect historic properties or objects listed in or eligible 6 for listing in the NRHP or could lead to a loss or destruction of significant scientific, 7 cultural, or historical resources are a primary point of consideration. Other 8 considerations include but are not limited to: unique geographic areas, the potential for 9 significance determinations to establish future precedents, the potential for cumulative 10 impacts, and whether an action may violate a federal, state, or local law concerning the 11 protection of cultural resources and the environment. Together, these factors define the 12 13 intensity of potential impacts.

NHPA obligations (as described herein) for a federal agency are independent from the 14 NEPA process and must be complied with even when environmental documentation is 15 not required. When both are required, the Air Force may coordinate NEPA compliance 16 with their NHPA responsibilities to ensure that historic properties, as defined under 17 36 CFR 800.16(I)(1), are given adequate consideration. As per AFI 32-7065 Section 18 3.3.1, and 36 CFR 800.8(a), the Air Force has chosen to incorporate NHPA Section 106 19 review into the NEPA process, rather than substituting the NEPA process for a separate 20 NHPA Section 106 review of alternatives (AFI 32-7065 Section 3.3.2, and 36 CFR 21 800[c]). 22

The regulatory NHPA Section 106 compliance process consists of four primary stages. 23 These include: initiation of the Section 106 process (36 CFR 800.3); identification of 24 historic properties (36 CFR 800.4), which includes identifying historic properties 25 potentially affected by undertakings; assessment of adverse effects (36 CFR 800.5), 26 which determines whether the undertaking will affect historic properties and if effects to 27 those properties might be adverse; and resolution of adverse effects (36 CFR 800.6) 28 between affected and consulting parties such as the SHPO, the Advisory Council on 29 Historic Preservation, Indian tribes and interested individuals. Additional stipulations are 30 provided for in the NHPA should a failure to resolve adverse effects occur during this 31 32 process (36 CFR 800.7).

As this LEIS effort encompasses large amounts of land where multiple, future development and training activities will take place, identification of historic properties will be a time-consuming and labor-intensive effort. As per 36 CFR 800.4(b)(2), Phased Identification and Evaluation:

Where alternatives under consideration consist of corridors or large land areas, or where access to properties is restricted, the agency official may use a phased process to conduct identification and evaluation efforts. The agency official may also defer final identification and evaluation of historic properties if it is specifically provided for in a memorandum of agreement executed pursuant to § 800.6, a programmatic agreement executed

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pursuant to § 800.14 (b), or the documents used by an agency official to
 comply with NEPA pursuant to Section 800.8.

Formal initiation of the NHPA Section 106 process began on July 18, 2016, with 3 notification to the Nevada SHPO, consulting parties and Advisory Council on Historic 4 Preservation of the Proposed Action and anticipated impacts. Also, 17 tribal groups 5 were notified of the Proposed Action on August 23, 2016. Ethnographic and 6 7 archaeological survey and recordation efforts to inform this consultation were also initiated in summer 2017. These efforts will occur in a phased approach in an effort to 8 better involve and coordinate cooperative efforts between the U.S. Air Force, consulting 9 parties and tribal groups. The Air Force is conducting a study of the APE (under 10 36 CFR 800.4) to identify historic properties of cultural and religious significance to 11 Native American tribes. The study will use data collection methods that include field 12 investigations of the APE and interviews with tribal members. These investigations may 13 identify archaeological sites along with other cultural resources and cultural landscapes. 14 Such sites and resources may be significant not just for their scientific value, but also 15 because of religious and cultural significance to regional tribal groups. Consultations 16 with agencies and tribal organizations are discussed in Section 1.5, Environmental 17 Impact Analysis Process. More information regarding these consultations and 18 notifications is provided in Appendix B, Agency Consultation and Coordination. 19

An archaeological inventory was initiated by the U.S. Air Force in June 2017 with the 20 intent of characterizing potential archaeological and cultural resources within the 21 proposed expansion areas associated with the NTTR land withdrawal. A portion of this 22 effort is to test the efficacy of an archaeological model previously developed for the 23 existing NTTR boundaries. Additionally, this field effort includes an ethnographic study 24 to identify areas of interest to regional tribal groups, further determine areas of high 25 priority for cultural resources and serve as an identification effort under the NHPA. The 26 goal of this effort is to better inform and guide future cultural resources studies within 27 28 the NTTR.

Guided by studies such as these, properties identified in the APE by the Air Force are evaluated according to the NRHP criteria, in consultation with the SHPO and other parties. Typically, if the SHPO and other parties and the Air Force agree in writing that a historic property is eligible or not eligible for listing on the NRHP, that judgment is sufficient for purposes of fulfilling requirements of Section 106 (36 CFR 800.4[c][2]). Relevant procedures and criteria can be found in 36 CFR 63, Determinations of Eligibility for Inclusion in the National Register of Historic Places.

Effects (i.e., impacts) to cultural resources are defined as "alteration to the 36 characteristics of a historic property qualifying it for inclusion in or eligibility for the 37 National Register" (36 CFR 800.16(i)). For the purposes of this analysis, there are three 38 types of effects when considering historic properties. These include "no historic 39 properties affected," which applies when there are no historic properties present or 40 there are historic properties present but the undertaking will have no effect upon them; 41 "no adverse effect," which means that there is a direct or indirect effect to a historic 42 property, but the effect does not diminish the qualities that make the property significant; 43

and "adverse effect," which "is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, and association" (36 CFR 800 5(a)(1)).

6 3.9.2.2 Alternative 1 – Extend Existing Land Withdrawal and Management of 7 NTTR (North and South Range) – Status Quo

Aircraft operations would have minimal to no direct impact
 on archeological resources within the current boundaries of
 NTTR withdrawal areas under Alternative 1. As operations

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.9.2.2.1.

would remain at status quo, the intensity of operations would not increase, and the severity of the impact would be low given the resource is not likely to be affected by the current operations. Safety footprints required in conjunction with current and future aircraft operations would necessarily restrict public access to the range providing a level of protection for extent resources. Although direct physical impacts are not anticipated,

16 the potential for indirect auditory and visual impacts exist with aircraft operations.

Visual intrusions can include aircraft overflights that enter the viewshed of a historic 17 property. Effects from such overflights tend to be temporary and sporadic, and no 18 physical changes occur to the historic properties as a result of the overflights. The 19 potential for impacts depends on several factors, including the speed of the aircraft, the 20 size of the operational airspace, and the specific location of the cultural properties in 21 relation to the flight activities. At lower altitudes, the aircraft's visual presence is 22 23 amplified and could adversely affect the character and feeling associated with a historic property (U.S. Air Force, 2014g). 24

During tribal events or ceremonies, overflights of any type can serve as a visual intrusion regardless of speed and altitude. Potential reductions or avoidance for such impacts could include the establishment of reasonable avoidance areas around the resources or landscape for reasonable time periods to reduce or eliminate any intrusion and protect the sanctity of the cultural or spiritual event (U.S. Air Force, 2014g).

Individuals attending ceremonies or visiting sacred spaces or traditional cultural 30 properties can experience auditory effects as well. Annoyance is the most common 31 effect of aircraft noise on humans, as it noticeably interferes with activities such as 32 conversation, using a telephone, and sleeping, among other social and relaxation 33 activities. Interference from sources such as jet aircraft can contribute to individuals 34 becoming annoyed. Annoyance of 12 percent of the population occurs at approximately 35 64 dB and below, while the percentage of people annoyed increases to 12 to 21 percent 36 at 65 to 70 dB (see Appendix C, Noise, which provides additional detail regarding noise 37 metrics, analysis methodology, and impacts). 38

Previous studies have shown that little probability exists that runway operations noise causes structural damage to buildings. In fact, several studies of the effects of noise on historic buildings located in high aircraft-noise zones have found that vibrations resulting

42 from the activities of tour groups, and even vacuuming, generated more structural

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vibration than aircraft noise (NRC/NAS, 1977; NASA, 1976; NASA, 1978). Subsonic
sounds of less than 130 dB is highly unlikely to damage structural elements
(Sutherland, 1990). Despite this, vibrations from flight operations may lead to increased
rattling of structural elements, adding to annoyance factors for occupants. Sutherland
(1990) documented that the probability of damage to a wood frame building is less than
0.3 percent, even when the building is directly under a large, high-speed aircraft flying
only a few hundred feet above ground level.

Although sonic booms do occur over the NTTR and within the proposed expansion areas, such events would be expected to occur a maximum of one to three times a day in any given area of the range. The most prominent cultural resource at risk from sonic booms are buildings and other structures. Most damage recorded during sonic boom events is to fragile structural features, such as glass and plaster, and much of the variability in degree of the damage depends on the pre-existing condition of a structure (Sutherland, 1990; U.S. Air Force, 2014g).

Battis (1983) indicates that sonic booms are unlikely to cause damage to archeological features. The expected motions produced by sonic booms are comparable to those produced by local earthquakes. At these levels of motion, structurally sound features will be unaffected by seismic waves and are unlikely to initiate either fracture or spalling in rocks. However, where natural erosive mechanisms have had an effect on features, it is possible that sonic booms could accelerate the processes to some small or insignificant degree.

A second study conducted by Battis (1988) considered vibrational effects on structural elements of archeological sites from jet aircraft overflights at altitudes ranging from 60 to over 300 meters AGL. It was concluded that these tested aircraft overflights had no significant vibration effect on structural elements. Given this, the potential for impacts to more fragile manmade features, rock art, or other archeological features would be considered highly unlikely.

Use of ordnance on the NTTR would typically result in some degree of ground 28 disturbance and, in turn, may potentially damage archeological resources. Current 29 target impact areas would remain the same, and the Air Force does not plan to create 30 any new target impact areas as part of this withdrawal effort. Because this alternative 31 would retain the current boundaries of the NTTR and not increase the intensity of 32 33 munitions use, no additional impacts beyond the scope of existing conditions are anticipated with respect to cultural resources within the NTTR. The continued use of 34 existing ranges would ensure that any potential disturbance or contaminants introduced 35 from munitions use would be confined to currently approved areas of use. 36

Construction, the use of vehicles, and overland troop movement on the NTTR would typically result in some degree of ground disturbance and, in turn, may potentially damage cultural resources. Current target areas would remain the same. Because this alternative would retain the current boundaries of the NTTR and not greatly increase the intensity of activities, no additional impacts beyond currently approved activities and those currently covered by standard operating procedures in the Nellis AFB ICRMP are anticipated with respect to cultural resources within the NTTR. The Nellis AFB ICRMP Section 5.2.3, Archaeological Resource Protection, provides for the monitoring and protection of cultural resources (U.S. Air Force, 2012a). Archaeological resources requiring protection on the NTTR are subject to regular monitoring in an effort to note negative impacts, identify the source, and work to reduce or eliminate the causes of the deterioration.

It is anticipated that any construction projects in the future would be selected to avoid 6 7 impacts to significant cultural resources. Section 5.2.4 of the Nellis AFB ICRMP requires a treatment plan when a historic property is identified as threatened. This requires an 8 investigation and evaluation to be conducted according to procedures in 36 CFR 60. A 9 draft treatment plan shall be composed by the Cultural Resources Manager followed by 10 consultation. If possible, avoidance shall be selected as the preferred treatment 11 measure. Because avoidance of resources is the preferred method of treatment, it is 12 anticipated that sites would be selected that provide resources with a sufficient buffer 13 that prevent direct impacts to cultural resources. In addition, depending on the scope of 14 the activities, proposed actions may be subjected to additional consideration under 15 NEPA and the NHPA. 16

17 Under AFI 32-7065, inadvertent discoveries of Native American cultural items require installations to comply with the Native American Graves Protection and Repatriation Act 18 and 43 CFR 10, Native American Graves Protection and Repatriation Act Regulations. 19 (U.S. Air Force, 2012a). If an inadvertent discovery is made during development or 20 training activities, personnel should implement the following as per Section 5.2.1 of the 21 Nellis AFB ICRMP (U.S. Air Force, 2012a): (1) activities shall immediately cease and 22 efforts will be taken to ensure protection until arrival of the Cultural Resources Manager, 23 (2) the resource shall be marked to provide an efficient relocation, (3) artifacts shall be 24 left in place, (4) the Cultural Resources Manager shall be notified within 24 hours of the 25 discovery, and (5) personnel should take efforts to be available to assist in relocating 26 the resource. 27

As per Section 5.2 of the Nellis AFB ICRMP, if human remains are discovered or if there 28 is sufficient reason to suspect that human remains are present, the Cultural Resources 29 Manager or Asset Management Flight Chief shall be immediately notified. If a federal 30 action is underway near the burial materials, all activity within or near the location shall 31 cease. If the discovery is determined to be human remains of possible Native American 32 origin, the Cultural Resources Manager shall invite consultation with Native American 33 tribes. If there is an inadvertent discovery of human remains that are thought to be non-34 Native American, Section 106 consultation with the SHPO and possibly notification of 35 installation or local law-enforcement authorities is required (U.S. Air Force, 2012a). 36

As potential emitters would be placed along existing roads or two tracks, and the emitter operations pose no threat to cultural resources, no impacts to cultural resources would be anticipated from operations at emitter sites. Placement of the emitter depending on the future locations selected may adversely affect cultural resources resulting from site preparation activities. Section 5.2.4 of the Nellis AFB ICRMP requires a treatment plan when a historic property is identified as threatened. This requires an investigation and evaluation to be conducted according to procedures in 36 CFR 60. A draft treatment

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1 plan shall be composed by the Cultural Resources Manager followed by consultation.

2 Because avoidance of resources is the preferred method of treatment, it is anticipated

3 that sites would be selected that provide resources with a sufficient buffer that prevent

4 direct impacts to cultural resources.

5 If an inadvertent discovery of cultural resources or human remains occurs during any

6 ground-disturbing activity, procedures set forth in the Nellis AFB ICRMP and AFI 32-

7 7065 and discussed above for ordnance use would be implemented.

8 3.9.2.3 Alternative 2 – Extend Existing Land Withdrawal and Provide Ready 9 Access in the North and South Ranges

As Alternative 2 would have the same footprint and a similar range of activities as discussed for Alternative 1 with a 30 percent increase in operations, impacts to cultural resources from air operations with Alternative 2 would be similar to those discussed under Alternative 1. For the Native American perspective on information in this section, please see Appendix K, paragraph 3.9.2.3.1.

An increase in flight operations of 30 percent would occur; however, as discussed for Alternative 1, minimal impacts to archeological resources would be anticipated from this activity as the severity of the impact would remain low given the nature of the resource.

18 Auditory and visual effects from aircraft operations are similar to those described for Alternative 1. Although the potential exists for increased annoyance from a 30 percent 19 increase in flight operations, the Air Force could potentially ameliorate negative effects 20 through scheduling of air operations away from sensitive cultural locations or utilization 21 of specific times for operations near these locations. For Alternative 2, it is anticipated 22 that sound levels would be approximately 66 to 70 dB in the northern part of the NTTR 23 and that sound levels would be lower, approximately 45 to 67 dB, in the southern part of 24 the NTTR (see Section 3.2, Noise, Figure 3-2, Subsonic Noise Exposure Within the 25 NTTR). With the implementation of avoidance areas around specific traditional cultural 26 properties and sacred sites and scheduling of mission activities around tribal events, no 27 adverse effects to cultural resources would be anticipated from aircraft operations. 28

As Alternative 2 would have the same range of activities as discussed for Alternative 1 29 with a 30 percent increase training activities as outlined in Section 2.3.2. Alternative 2 30 would provide ready access, which includes a Congressionally directed change in land 31 management that effectively eliminates the need to manage the withdrawn lands as if 32 they were wilderness. As such, impacts to cultural resources from munitions, ground 33 disturbance, and emitter operations would have the potential to increase above those 34 discussed under Alternative 1 because ready access would provide a greater area for 35 military activities to occur as compared to Alternative 1. Access to the wilderness area 36 would occur under this alternative; however, any future undertaking in this area could 37 require additional consultation under NEPA and Section 106 of the NHPA. 38

It is anticipated that any construction projects and emitter placement in the future would
 be selected to avoid impacts to cultural resources. If an historic property is threatened,
 base personnel would follow procedures found in Section 5.2.4 of the Nellis AFB

42 ICRMP that requires the completion of a treatment plan.

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If an inadvertent discovery of cultural resources or human remains occurs during any ground-disturbing activity, procedures described for Alternative 1 and set forth in the Nellis AFB ICRMP and AFI 32-7065 would be implemented.

4 3.9.2.4 Alternative 3 – Expand Withdrawal of Public 5 Lands for the NTTR

6 Alternative 3 includes subalternatives, as described in7 Section 2.3.3:

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.9.2.4.1.

- Alternative 3A Range 77 EC South Withdrawal
- Alternative 3A-1 Amended Range 77 EC South Withdrawal
- Alternative 3B Range 64C/D and 65D Withdrawal and Administrative
 Incorporation
- Alternative 3C Alamo Withdrawal

8

9

Aircraft operations with a 30 percent increase in intensity would have no direct impact 13 on physical cultural resources (structural, archeological) within the proposed expansion 14 areas for Alternatives 3A, 3A-1, 3B, and 3C. Given the type of operations under 15 Alternative 3 and the context of the resource, the likelihood of a severe impact would be 16 low. Auditory and visual effects from aircraft operations for Alternatives 3A, 3A-1, 3B, 17 and 3C would be similar to those described for Alternative 2 as this alternative would 18 expect the same level of increase in operations. For Alternatives 3A and 3A-1, it is 19 anticipated that sound levels would be approximately 45 to 67 dB in the proposed 20 For Alternative 3B, it is anticipated that sound levels would be expansion area. 21 approximately 60 to 61 dB in the proposed expansion area. For Alternative 3C, it is 22 anticipated that sound levels would be approximately 60 to 61 dB in the proposed 23 expansion area. Additional details regarding noise impacts can be found in the noise 24 section of this document (see Section 3.2, Noise, Figure 3-2, Subsonic Noise Exposure 25 With the implementation of avoidance areas around specific Within the NTTR). 26 traditional cultural properties and sacred sites and scheduling of mission activities 27 around tribal events, no adverse effects to cultural resources would be anticipated from 28 aircraft operations for Alternatives 3A, 3A-1, and 3B. 29

No munitions use would occur in the proposed expansion areas for Alternatives 3A, 3A-30 1, 3B and, as such, munitions use would have no effect on cultural resources with these 31 subalternatives. Ordnance and munitions use would continue within current ranges. 32 Munitions to be utilized within the proposed expansion area for Alternative 3C would 33 include blanks, smoke grenades and hand flares, among others. Use of ordnance on 34 the currently used NTTR areas would typically result in some degree of ground 35 disturbance and may, in turn, cause potential to damage cultural resources. However, 36 current target areas would remain the same and are unlikely to contain undisturbed or 37 accessible cultural resources. With respect to the Alternative 3C proposed expansion 38 areas, the closest target area where live munitions use would occur is the target area 39 located on 62A. It is not anticipated that these activities would have an impact on 40 cultural resources within the proposed expansion areas for Alternative 3C. Therefore, 41

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1 munitions use would have no impact on cultural resources within the proposed 2 expansion areas for Alternatives 3A, 3A-1, 3B, and 3C.

For Alternatives 3A, 3A-1, and 3B, approximately 25 and 30 miles, respectively, of new 3 fencing would be installed. Additional compliance with NEPA and the NHPA would be 4 required prior to fence construction. If areas of potential disturbance are anticipated 5 within any unsurveyed area, additional Section 106 compliance would be required. 6 7 Under Alternatives 3A, 3A-1, 3B and 3C, public access to the Alamo areas would be restricted other than the limited access allowed under current Air Force procedures. It is 8 anticipated that the limitation of access would reflect a beneficial impact to cultural 9 resources by restricting traffic through the area and preventing intentional or accidental 10 damage to resources. Similarly, fences on the property, once in place, would provide 11 the ability to deny access to the public and would serve as a beneficial impact to 12 sensitive cultural resources such as archeological sites and traditional cultural 13 properties. 14

Construction, a 30 percent increase over the baseline in the use of vehicles, and 15 overland troop movement on the NTTR would typically result in some degree of ground 16 17 disturbance and, in turn, may potentially damage archeological resources. With Alternative 3C, an increase in foot traffic in mountainous areas would occur from IW 18 activities. In terms of IW activities, a small number of troops would participate and 19 operations are designed to leave no evidence of troop presence. Munitions are limited 20 to items such as blank small-arms ammunition. flares, and other training munitions such 21 as paint balls. Access to the South Range would likely be more restricted, and access 22 protocols would need to be developed. 23

In addition, 65 miles of fencing would be constructed, with subsequent maintenance and 24 monitoring, and approximately 13 acres of construction-related ground disturbance may 25 occur from runway construction. The associated FAARP would be used during training 26 activities. These training activities consist of refueling and munitions loading of aircraft 27 and would occur in austere areas such as a dry lake bed. Completion of the Section 106 28 process of the NHPA would be required prior to the implementation of these or any 29 other future undertakings. If Section 106 is completed prior to these or other similar 30 future activities, no significant impacts from ground disturbance are anticipated with 31 respect to cultural resources for Alternative 3C. 32

If future ground-disturbing activities occur subsequent to the withdrawal process, it is anticipated that sites would be selected to avoid impacts to cultural resources or changes in design or location by the Air Force may be enacted to avoid impacts to resources. As stated under Alternative 2, Section 5.2.4 of the Nellis AFB ICRMP would require a treatment plan if an historic property may be threatened.

Conceptual emitter operations would not occur within proposed expansion areas for Alternatives 3A, 3A-1, and 3B, and, as such, there would be no impact on cultural resources due to emitter operations for these alternatives. For Alternative 3C, emitters would be placed along existing roads or two tracks, and the emitter operations pose no threat to cultural resources; therefore, no impacts to cultural resources would be anticipated from operations at emitter sites. Placement of an emitter, depending on the

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future locations selected, may result in disturbance to cultural resources from site preparation. However, in compliance with procedures set forth in the Nellis AFB ICRMP, sites would be selected to avoid impacts to cultural resources. Depending on the scope of the activities, may be subject to additional consideration under NEPA, the NHPA, and

5 other appropriate regulations.

When a unit proposes a mission, it is required to submit its plans to 99 CES/CEA for review. The Cultural Resources Manager then reviews the documentation and makes recommendations for protection/avoidance of resources (U.S. Air Force, 2012a). For Alternatives 3A, 3A-1, 3B, and 3C, if an inadvertent discovery of cultural resources or human remains occurs during any activity, procedures described for Alternative 1 and set forth in the Nellis AFB ICRMP and AFI 32-7065 would be implemented.

The Archaeological Resources Protection Act of 1979 provides criminal and civil penalties for any individual who removes, damages, alters, defaces, excavates without authorization, or attempts to injure archaeological resources located on public or Native American lands. The installation commanders will take action to initiate prosecution under the Act for offenders who collect artifacts or disturb features (U.S. Air Force, 2012a).

18 **3.9.2.5** Alternative 4 – Establish the Period of Withdrawal

For Alternative 4, the period of withdrawal would be established and combined with other alternatives, conjunctively determining the temporal and spatial limits of the withdrawal. The longer the term of the withdrawal and the greater the geographic extent of the withdrawal, the For the Native American perspective on information in this section, please see Appendix K, paragraph 3.9.2.5.1.

greater the opportunity for beneficial impacts to cultural resources due to a lack of 24 access to the general public. This lack of access would decrease the likelihood of direct 25 impacts to cultural resources within the NTTR and/or the proposed expansion areas 26 from foot or vehicular traffic and vandalism or looting. Military personnel accessing or 27 utilizing the withdrawn areas would be required to follow any standard operating 28 29 procedures determined by project-specific Section 106 consultation with the SHPO and tribal entities or similar procedures as mandated by the Nellis AFB ICRMP and AFI 32-30 7065. 31

Alternative 4A (20 years) would have the potential to beneficially affect cultural 32 resources. Alternative 4B (50 years) would also have the potential to beneficially affect 33 cultural resources. Protections to cultural resources within the NTTR and proposed 34 expansion areas offered by Air Force land access control would be beneficial in nature 35 for a longer period than that for Alternative 4A. The indefinite withdrawal period 36 proposed under Alternative 4C would represent a longer term withdrawal period than 37 proposed under Alternative 4A or 4B. Protections to cultural resources within the NTTR 38 and proposed expansion areas offered by Air Force land access control would be 39 beneficial for an indefinite period, thereby protecting resources for a longer period than 40 that for Alternative 4A or Alternative 4B. 41

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3.9.2.6 **No Action Alternative** 1

2 In the event that the land withdrawal for the NTTR is not renewed, much of the approximately 2.9 million acres 3 currently closed to the public would potentially be open to 4 use under BLM and USFWS administration. The potential 5 for the public to interact with known cultural resources, 6 7

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.9.2.6.1.

traditional properties, or cultural landscapes would increase. Currently protected tribal

8 resources could potentially be unprotected and open to potential damage from looting or vandalism. Appropriate environmental documentation and safeguards would be the 9

responsibility of the permitting federal agency, which in this case would be the BLM and 10

USFWS.

11

3.10 EARTH RESOURCES 12

3.10.1 Affected Environment 13

The NTTR is located within the southern part of the Great Basin and is generally 14 characterized by north-south trending mountain ranges that are separated by internally 15 draining alluvial basins or playas. The valley bottoms of the South Range vary in 16 elevation from approximately 1,900 to 3,600 feet mean sea level, and the valley bottoms 17 of the North Range are approximately 4,500 to 5,500 feet mean sea level. Mountain 18 range elevations exceed 6,000 feet on the South Range and are over 8,500 feet on the 19 North Range (U.S. Air Force, 2010). 20

3.10.1.1 Description of Resource 21

Earth resources include geologic resources, soil, minerals, 22 tectonic features, landforms, and paleontological resources 23 located within the study area, any of which can have 24 scientific, economic, and recreational value. For purposes 25 of this LEIS, the term "soil" refers to unconsolidated 26

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.10.1.1.1.

material and "rock" refers to consolidated material. This LEIS analyzes data on the 27 area's geologic setting, as well as the various earth resources of the NTTR (U.S. Air 28 Force, 2017I). 29

3.10.1.2 Region of Influence 30

31 Physiography and Topography

The NTTR is located in the southern part of Nevada within the Basin and Range 32 Physiographic Province. This province is characterized by north-trending mountain 33 ranges that are separated by alluvial basins (U.S. Air Force, 2010). Within the Great 34 Basin subprovince, water is captured in basins and only discharges to groundwater or to 35 the atmosphere via evaporation (U.S. Air Force, 2017I). The Great Basin subprovince 36 occupies a 375- by 375-mile tract, which predominantly lies within the state of Nevada. 37

1 Nineteen named mountain ranges, mountains, hills, and one mesa are partially or fully 2 within the existing NTTR boundaries (U.S. Air Force, 2017l).

Most of the Great Basin is an area of internal drainage. The majority of surface water runoff within the study area collects in eight seasonal playa lakes within the NTTR boundary. These include Mud Lake, Antelope Lake, and Lambs Pond in the North Range and Groom Lake, Papoose Lake, Three Lakes Valley playa, Dog Bone Lake, and the Indian Springs playa in the South Range (U.S. Air Force, 2017). The land area

8 under the Alamo airspace contains the Desert Lake playa.

9 **3.10.1.3 Geology**

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10 Existing NTTR Boundary (Alternatives 1 and 2)

11 The geologic terrain of the NTTR can be divided into a

12 southeastern area of largely Paleozoic sedimentary rocks

13 and a northwestern area of mainly volcanic rocks of late

14 Cenozoic age (U.S. Air Force, 2010). Surface exposed

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.10.1.3.1, Geology (page K-16) and paragraph 3.10.1.3.1, Volcanism and Seismic Activity (page K-37).

rock formations across the NTTR vary in age from Precambrian (older than 570 million years before present) to Quaternary (less than 1.6 million years before present).

Volcanic rocks are a predominant feature of the North Range. Other volcanic features include the Black Mountain, Cactus Range, and Silent Canyon calderas and the Mount Helen dome. The mountain ranges in the South Range are dominated by carbonate rocks with lesser amounts of quartzite, sandstone, and shale. Valleys contain thick deposits of alluvium from erosion of adjacent mountain ranges. Lacustrine and fluvial sedimentary rocks deposited in shallow basins occur in several areas within the NTTR (U.S. Air Force, 2010).

24 Volcanism and Seismic Activity

The NTTR is located within an area of moderate seismic hazard and is within a 16 to 25 48 percent g zone (USGS, 2008). This percentage is referred to as peak ground 26 acceleration and is representative of seismic horizontal shaking that has a 2-in-100 27 chance of being exceeded within a 50-year period. The peak horizontal acceleration is 28 the measurement of horizontal movement at a given geographic point. This horizontal 29 shaking is expressed as a percentage of **g** where **g** represents the acceleration of a 30 falling object due to gravity (USGS, 2008). The zone within which the NTTR falls 31 represents the potential for light to moderate damage to structures resulting from 32 earthquakes. 33

Several faults are present within the NTTR. The Yucca fault, located in the central portion of the NTTR, is considered active. The Carpetbag fault, located to the west of the Yucca fault, and the Pahranagat fault system, located in the South Range, have also displayed displacement within the past several million years. Most of the faults on the NTTR are considered inactive (U.S. Air Force, 2010) (Figure 3-31).

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Several late Cenozoic era calderas are located on the NTTR. The area containing these calderas is referred to as the southwestern Nevada volcanic field. The Stonewall caldera, located in northwestern area of the NTTR, dates to 7.5 million years B.P. During the past 10 million years, mild eruptions occurred in the region, resulting in basaltic cinder cones and lava flows. The nearest examples of volcanic cones and lava flows are at Crater Flat, located in the southwestern area of the NTTR (U.S. Air Force, 1999; 2010).

8 Alternative 3A – Range 77 – EC South Withdrawal (and Amended Alternative 3A-1)

9 The Range 77 withdrawal area is within part of the Oasis Valley and the Transvaal Hills, 10 on the western edge of the Southwestern Nevada Volcanic Field. To the east is the 11 Timber Mountain Caldera Complex. Much of the Range 77 withdrawal area is in the 12 center of Oasis Valley and is covered by Quaternary and Tertiary alluvium. Volcanic 13 rocks outcrop in the east on the Rainer Mesa/Ammonia Tanks caldera margins and to 14 the north along the Thirsty Mountain Shield Volcano (U.S. Air Force, 2017l).

Examples of volcanism in the area are characterized by a rhyolite-basalt association, 15 with few examples of intermediate composition rocks present. The primary bedrock 16 exposed in the Range 77 withdrawal area is extensive ash-flow tuff sheets erupted from 17 the overlapping Rainier Mesa and Ammonia Tanks calderas during the Timber 18 Mountain stage of the Southwestern Nevada Volcanic Field. 19 These tuffs are interspersed with rhyolite and basalt lava and tephra from cinder cones. Alluvial and 20 lake sediments and breccia deposits are also present. Within the Range 77 withdrawal 21 area, the Cenozoic sequence is underlain by Proterozoic to late Paleozoic sedimentary 22 rocks consisting of limestone, dolomite, argillite, and quartzite (U.S. Air Force, 2017I). 23

24 Alternative 3B – 64C/D and 65D Withdrawal and Administrative Incorporation

The 64C/D and 65D area is bordered to the north by the Cross Grain Valley, to the east 25 and south by the Indian Springs Valley, and to the west by the Mercury Valley. The 26 Spotted Range is composed of Paleozoic sedimentary rocks with sediments from Late 27 Proterozoic to Middle Devonian. Late Devonian and Late Mississippian sediments were 28 deposited in a shallow marine setting and consist of carbonates and shales. Tertiary 29 age lacustrine sediments and reworked ash-fall tuffs are found in the interior valleys of 30 the Spotted Range, representing volcanism in the nearby Southwestern Nevada 31 Volcanic Field (U.S. Air Force, 2017I). 32 The oldest structure in the Spotted Range, the Mercury Klippe consists of upper plate 33

Cambrian carbonates thrust over Devonian and Mississippian carbonates. The lower plate sequence is composed of over 1,870 meters of dolomite, limestone with minor quartzite, and shale. The upper plate is approximately 1,645 meters thick and almost all limestone and dolomite (U.S. Air Force, 2017)

³⁷ limestone and dolomite (U.S. Air Force, 2017l).

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Figure 3-31. Faults Within the NTTR and Potential Expansion Areas

1 2
1 Alternative 3C – Alamo Withdrawal

The Alamo areas primarily occupy the internally drained Desert Valley, with western portions of the eastern DNWR, the Sheep Range on the east, and the Pahranagat Range on the north. Elevations vary from approximately 977 meters at Desert Lake to 2,448 meters in the Sheep Range. Exposed bedrock consists of Paleozoic rocks, with mixed Tertiary volcanic and Paleozoic rocks at the north portions of the Alamo withdrawal area (U.S. Air Force, 2017I).

8 Surficial geology of the Alamo areas is predominantly Cambrian to Devonian 9 sedimentary sequences that formed along the western margin of North America. During 10 this period, rocks were deposited in an offshore carbonate shelf and intertidal 11 depositional settings. In addition to the sedimentary sequence, the northern portion of 12 the Alamo areas has Tertiary volcanic rocks (U.S. Air Force, 2017I).

Paleozoic carbonate sequences are the oldest rocks exposed in the Alamo areas, with 13 formations consisting of limestones, shales, and sandstone. The stratigraphic thickness 14 15 of the Paleozoic section in the Alamo area is over 3,000 meters. Of those 3,000 meters, nearly 2,000 meters are dolomitic and 120 meters are guartzite; the remaining section is 16 a mixture of limestones, dolomites, sandstone, and shales (U.S. Air Force, 2017I). The 17 northern portion of the Alamo areas, between the Pahranagat and the Sheep Ranges, 18 has four mapped units of Oligocene and Miocene ash-flow tuffs that erupted from 19 calderas outside the study area (U.S. Air Force, 2017I). 20

21 **3.10.1.4 Soils**

22 Existing NTTR Boundary (Alternatives 1 and 2)

Descriptions of soil series were available from the USDA and the State Soil Geographic Dataset (2017) (Figure 3-32). The NTTR consists of 33 general soil associations. One of the most prevalent, the St. Thomas series, consisting primarily of shallow, welldrained soils that formed in colluvium and residuum from limestone and dolomite, are the primary soil types found in the mountains. These soils generally occur on hills and mountains with 8 to 75 percent slopes (Natural Resource Conservation Service, 2017; U.S. Air Force, 2010).

The Crosgrain and Arizo soil series are located on the fan piedmonts. The Crosgrain series are shallow, well-drained soils that formed in mixed alluvium on older fan piedmonts, with slopes of 4 to 30 percent. The Arizo series are very deep, excessively drained soils that formed in mixed alluvium on recent alluvial fans with slopes of 0 to 15 percent (Natural Resource Conservation Service, 2017; U.S. Air Force, 2010).



Figure 3-32. Soil Types Within the NTTR and Potential Expansion Areas

1 2

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The basin floors generally consist of the Mazuma and Ragtown soil series. The Mazuma series are very deep, well-drained soils that formed in alluvium and lacustrine materials from mixed rock sources with slopes of 0 to 15 percent. The Ragtown series are very deep, moderately well-drained soils that formed in moderately fine and finetextured lacustrine materials that occur on lake plain terraces with slopes of 0 to 4 percent (Natural Resource Conservation Service, 2017).

The alluvial soils found within fans and basins, in conjunction with the fine soil particles 7 from lacustrine sources, are susceptible to wind erosion. This problem is made worse 8 by soil disturbance or loss of topsoil due to wildfires, vehicle movement, or grazing 9 activities (U.S. Air Force, 1999; 2010). Activities within NTTR target impact areas would 10 potentially increase the likelihood of erosion from removal of topsoil. The permeability of 11 the soils and strata underlying subsidence craters (induced by underground nuclear 12 testing) on Pahute Mesa may have increased over natural conditions due to rock 13 damage associated with detonations. Contamination of soils is another result of 14 conventional and nuclear detonations. Radioactive contamination, conventional 15 ordnance residues, and other spill contamination have been identified on the NTTR 16 17 (U.S. Air Force, 1999).

18 Alternative 3A – Range 77 – EC South Withdrawal (and Amended Alternative 3A-1)

The primary soil type within the Range 77 withdrawal area is the Stewval series (Table 3-42). The Stewval series consists of shallow and very shallow, well-drained soils found on mountains. The series is formed in colluvium derived from volcanic rocks with slopes typically ranging from 15 to 50 percent. The pedon is typically a gravelly, fine sandy loam (USDA, 1982).

- 24
- 25

Range $TT = EC$ South Withdrawal Alea		
Soil Series		Acres
Stewval-Rock outcrop-Pintwater- Gabbvally-Downeyville (s5669)		13,683
Yermo-Gynelle (s5665)		4,223
	Total	17,906

Table 3-42. Soil Types Within Alternative 3ARange 77 – EC South Withdrawal Area

26 Alternative 3B – 64C/D and 65D Withdrawal and Administrative Incorporation

27 The predominant soil type within the 64C/D and 65D withdrawal areas is the Weiser series (Table 3-43). The Weiser series consists of very deep, well-drained soils on 28 erosional fan remnants. Elevations are generally 2,000 to 3,800 feet with slopes of 2 to 29 8 percent. These soils are formed in alluvium, typically from limestone parent material 30 (USDA, 1982). Another common soil type in this area is the St. Thomas series, 31 consisting primarily of shallow, well-drained soils that formed in colluvium and residuum 32 from limestone and dolomite, which the primary soil types found in the mountains. 33 These soils generally occur on hills and mountains with 8 to 75 percent slopes. 34

Table 3-43. Soil Types Within Alternative 3	В
64C/D and 65D Withdrawal Area	

Soil Series	Acres
St. Thomas-Rock outcrop-Kyler (s5576)	11,910
Tecopa-St. Thomas-Rock outcrop (s5747)	14,042
Typic Torriorthents-Gypill-Cave-Badland (s5742)	3,297
Unsel-Univega-Pahroc-Leo-Koyen-Keefa (s5869)	2,615
Weiser-Tonopah-Tencee-Colorock-Canutio (s5574)	28,007
Total	59,871

3 Alternative 3C – Alamo Withdrawal

The predominant soil type within the Alamo withdrawal areas is the Cave family of soils 4 (Table 3-44). The Cave family consists of shallow and very shallow, well-drained soils. 5 These soils typically occur on erosional and nonburied fan remnants and are found at 6 7 elevations of 1,900 to 3,800 feet with slopes of 0 to 15 percent. Another common soil type in this area is the Weiser series, which consists of very deep, well-drained soils on 8 erosional fan remnants. Elevations are typically 2,000 to 3,800 feet with slopes of 2 to 9 10 8 percent. These soils are formed in alluvium, typically from limestone parent material (USDA, 1982). 11

12 13

Table 3-44. Soil Types Within Alternative 3C Alamo Withdrawal Area

Soil Series	Acres
Cave family-Cave-Ajo (s5577)	55,783
Nickel-Blackmount-Arizo (s1124)	10,270
Penoyer-Koyen-Jolan-Handpah-Geer (s5599)	2,874
Rock outcrop-Findout-Dedas-Breko-Akela (s5604)	34,658
St. Thomas-Rock outcrop-Kyler (s5576)	53,729
Typic Torriorthents-Gypill-Cave-Badland (s5742)	1,545
Weiser-Tonopah-Tencee-Colorock-Canutio (s5574)	47,558
Zukan-Welring-Tortugas-Pookaloo (s5572)	25,575
Total	231,992

14 3.10.1.5 Mineral Resources

15 **Existing NTTR Boundary (Alternatives 1 and 2)**

The creation of the NTTR in the 1940s and subsequent withdrawals removed large 16 amounts of public land from the potential for resource exploration. In accordance with 17 the Engle Act of 1958 (43 CFR, USC 155 et seq.), all mineral exploration within land 18 withdrawal areas must be compatible with military use. In 1986, the Secretary of the Air 19 20 Force was given authority for exclusive military use of the NTTR by enactment of P.L. 99-606 and the MLWA of 1986 (U.S. Air Force, 1999). On September 2, 2016, BLM 21 published a Notice of Application for Withdrawal Extension; Notice of Application for 22 Withdrawal Expansion; and Opportunity for Public Meeting regarding the segregation of 23

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1 lands in relation to the NTTR land withdrawal in the *Federal Register*. This notice 2 temporarily segregates the proposed withdrawal lands (including proposed expansion

areas) from all forms of appropriation under the public land laws, including mining laws,

4 mineral leasing laws, and geothermal leasing laws for a period of two years (McEldery,

5 2016).

6 As part of the withdrawal extension process, a mineral resource analysis was required

to be prepared by a qualified geologist; the Air Force completed this analysis in 2017

8 (U.S. Air Force, 2017I).

9 Mineral Resources on the NTTR

Mining activity on the NTTR began in the mid-1800s and ended in 1942, when the range was closed to mining activity. Most of the known gold and silver deposits were discovered in the early 1900s (U.S. Air Force, 1999). With the exception of the Groom Mountain Range, little or no mineral exploration or related activity has been allowed in the last 50 years. The Air Force compiled a list of active mining claims in the proposed expansion areas, collected from the BLM Land & Mineral Legacy Rehost 2000 System database (U.S. Air Force, 2017I).

Minerals previously discovered on the NTTR include gold, silver, copper, lead, zinc, mercury, tungsten, and turquoise. In addition, industrial resources such as sand, gravel, and limestone occur on the NTTR (Nevada Bureau of Mines and Geology, 2014). Other potential commercially viable resources, including sodium, potassium, alunite, and potash, also occur in this area (U.S. Air Force, 1999; 2017l) (Figure 3-33).

22 Metallic Minerals

Gold and silver deposits are located primarily in the northern part of the NTTR. Large areas of high resource potential were defined in the Nellis Air Force Range Renewal LEIS (U.S. Air Force, 1999) and supported by the most recent reinvestigation (U.S. Air Force, 2017I) for the following areas and mining districts: Jamestown, Cactus Range, Mellan Mountain, near Cedar Pass and north and south of the Gold Reed and Gold Crater, Stonewall, Wilsons, Silverbow, Quartz Mountain, and north of Limestone Ridge in the Belted Range.

Areas of potential copper and molybdenum deposits include the northern Cactus Range, the northern Pahute Mesa, the Cactus Peak prospect, and Cactus Springs mining district. Other anomalies occurred in the Kawich Range and in the Corral Springs, Gold Reed, and Quartzite Mountain prospect areas (U.S. Air Force, 2017l).

Several areas within the NTTR have high potential for lead and zinc deposits. The Groom district has produced both lead and zinc. A high potential for lead and zinc were also observed in the eastern Goldfield, Cactus Springs, Antelope Springs, and Jamestown and Gold Crater mining districts (U.S. Air Force, 2017I). No large mercuryproducing districts are present in the vicinity of the NTTR, although the Gold Reed district and the Transvaal Hills are areas with the potential for mercury (Nevada Bureau of Mines and Geology, 2014; U.S. Air Force, 1999; 2017I) (Figure 3-34).

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Figure 3-33. Mining Districts on the NTTR

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Figure 3-34. Potential for Mineral Deposits on the NTTR

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1 Nonmetallic (Industrial) Minerals

A variety of nonmetallic minerals of economic importance with various industrial uses occur on the NTTR. These resources are described in the previous land withdrawal LEIS (U.S. Air Force, 1999) and recent resource assessment updates (U.S. Air Force, 2017I). Following are descriptions of specific resources in the vicinity of the NTTR.

No barite or borate deposits are known to occur within the boundaries of the NTTR. No
substantial deposits of halite or other evaporate minerals have been found on the
NTTR, although the Clayton Valley on the range has shown trace amounts in surface
sediments (U.S. Air Force, 2017l).

- 10 The potential exists for extraction of building stone materials from ash-flow tuffs in the southwestern part of the NTTR (Nevada Bureau of Mines and Geology, 2014). In 11 addition, slate guarries in the Desert Range are the only known mining sites for building 12 stone in the southern NTTR. Greenstone-flagstone was reportedly produced in this area 13 in the 1920s (U.S. Air Force, 1999). These deposits may have potential for use as 14 structural slate or as paving stone or flagstone (U.S. Air Force, 2017I). Within the 15 NTTR, two areas of clay deposits occur along the west side of Pahute Mesa (Figure 16 17 3-35).
- The potential for deposits of clay minerals in the northern portion of the NTTR is 18 moderate to high; however, no major sources of high-grade clay have been identified 19 (U.S. Air Force, 2017I). The potential for a variety of construction aggregate materials 20 to occur within the NTTR is also moderate to high (U.S. Air Force, 2017I). Paleozoic 21 rocks in the southeastern area of the NTTR, as well as within the valleys and alluvial 22 fans in the northern area of the NTTR, contain high-guality sand and gravel and crushed 23 24 stone. Another type of construction aggregate, volcanic cinder, occurs near the southwestern boundary of the NTTR. The two primary deposits of volcanic cinders are 25 located in close proximity at Sleeping Butte and Little Black Peak (U.S. Air Force, 26 2017I). 27
- There is the potential for 100 million tons of cement and or high-calcium limestone on the NTTR (U.S. Air Force, 2017I). Limestone and dolomite are present in the southern portion of the NTTR with deposits of Tertiary tufa in the Spotted Range potentially suitable for cement limestone. The southern area of the NTTR probably contains significant amounts of material suitable for lime or cement production. These deposits are not easily accessible, which minimizes the potential for economic development. No significant source of gypsum has been discovered on the NTTR (U.S. Air Force, 2017I).

No substantial concentrations of lithium were discovered in playas examined on the NTTR (U.S. Air Force, 2017I). Several locations on the NTTR contain fluorspar (fluorite). These include a small prospect pit 1 kilometer north of Little Black Peak in the southern portion of the NTTR, the Zabriskie shaft in the Limestone Ridge area, and the eastern Goldfield mining district in the northern area of the NTTR (U.S. Air Force, 2017I).

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Figure 3-35. Potential for Construction Material on the NTTR

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A single occurrence of perlite is located on the western end of the NTTR 1 mile east of Obsidian Butte, in an area referred to Tolicha Wash. The deposits occur in an area kilometer in diameter, but accessing the perlite would require removal of the overburden, making it economically impractical (U.S. Air Force, 2017I).

5 Sources of silica such as the Eureka Quartzite are exposed in many areas of the 6 southern NTTR. However, samples from the Eureka Quartzite contain impurities, so it 7 is generally unsuitable as a source of silica. Samples of quartzite from other units on the 8 NTTR generally have higher amounts of impurities than the Eureka Quartzite, making 9 these sources commercially nonviable as well (U.S. Air Force, 1999; 2017l).

10 The northern portion of the NTTR has a high potential for high-grade zeolite deposits of 11 considerable size. However, these zeolite deposits are relatively impure with low 12 commercial value and are not desirable for exploitation (U.S. Air Force, 2017).

13 Energy Resources

No economically significant uranium deposits are located within the NTTR. Areas overlying Cenozoic volcanic rock strata and adjacent sedimentary basins are classified as having a low potential for uranium deposits (U.S. Air Force, 2017I). The potential for uranium deposits are lower in areas overlying Paleozoic rocks, such as those in the South Range. Therefore, the potential for uranium recovery in significant concentrations is low.

Furthermore, the potential for other energy resources on the NTTR is low. No discoveries of oil and gas, coal, tar sand, or oil shale have been reported in the region (Nevada Bureau of Mines and Geology, 2014). The occurrence of coal is limited in Nevada and has not been identified within the study area. The only geologic unit that could possibly contain any coal material is the Chainman Shale east of the Hot Creek Valley/Eleana Range line in the NTTR, but it is unlikely (U.S. Air Force, 2017I).

26 Alternative 3A – Range 77 – EC South Withdrawal (and Amended Alternative 3A-1)

The Range 77 area was open to mineral location, but with the implementation of the BLM segregation notice, it is currently not available for mineral exploration.

The Transvaal Hills have been identified as having moderate potential for hot springtype mercury deposits and also the potential for deeper deposits. There are no records of drilling in the Transvaal mining district; as such, information concerning the presence of more deeply deposited mercury is available only from geophysical studies (U.S. Air Force, 2017l).

As the alluvial materials in the EC South area are derived from the weathering of volcanic rocks, they are less likely to be useful as construction aggregate and additionally are considered to have a low potential for sand and gravel deposits. Limestone and dolomite do not outcrop within the EC South area, demonstrating no potential for either cement or high-calcium limestone or dolomite. The EC South area has a moderate potential for clay deposits based on the presence of altered Tertiary

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- volcanic rocks and alluvial deposits derived from the erosion of these rocks (U.S. Air Force, 2017I).
- 3 There is a low potential for several nonmetallic minerals to occur within the EC South
- 4 area. The EC South area is considered to have a low potential for borates, lithium, and
- 5 fluorspar (U.S. Air Force, 2017I). At present, there is one active mining claim within the
- 6 proposed Range 77 expansion area (U.S. Air Force, 2017I). This claim, Tank #15
- 7 (NMC635691), was originally made in 1991 and remains active.

8 Alternative 3B – 64C/D and 65D Withdrawal and Administrative Incorporation

Portions of the 64C/D and 65D area and the Administrative Incorporation area were
 open to mineral location, but with the implementation of the BLM segregation notice,
 they are currently not available for mineral exploration.

There are no known mining districts within the 64C/D and 65D area, nor are there well-documented records of past prospecting in the area (U.S. Air Force, 2017I).

There is a moderate potential for several construction aggregates within the 64C/D and 14 65D areas. Paleozoic carbonate rocks outcrop over a large portion of the Indian Springs 15 Parcel (in the western portion of the area) and in the Administrative Incorporation area. 16 The highest potential for economically viable sand and gravel deposits is adjacent to 17 areas of Paleozoic carbonate rocks, which outcrop in the 64C/D and 65D area. In 18 addition, limestone deposits are found in the northern portion of the Indian Springs 19 Parcel in the 64C/D and 65D area. There is moderate potential for cement limestone in 20 the 64C/D and 65D area. There is moderate potential for high-calcium limestone in the 21 area as well. Limestones in this area tend to be coarsely crystalline, which adversely 22 impacts their use in lime manufacture. There is also moderate potential for cement 23 limestone in the 64C/D and 65D area (U.S. Air Force, 2017I). 24

The Paleozoic carbonate rocks in the 64C/D and 65D area represent potential host rocks for fluorspar and breccia deposits. In the 2014 assessment of the eastern DNWR, no fluorspar prospects were identified in the 64C/D and 65D area. The 64C/D and 65D area is considered to have a low potential for clay deposits, dolomite, borates, and lithium (U.S. Air Force, 2017I).

30 Alternative 3C – Alamo Withdrawal

Within the vicinity of the Alamo areas, the only recorded mining production occurred at the June Bug Mine in the Gass Peak mining district, where lead-zinc ore was mined in

1916 and 1917. Metallic mineral deposits within the eastern DNWR are within the Gass

34 Peak thrust fault (U.S. Air Force, 2017I).

Paleozoic carbonate rocks commonly outcrop in the Alamo areas and are considered to have a high potential for sand and gravel deposits suitable for use as construction aggregate. In addition, there are a few outcrops of upper Devonian to lower Mississippian carbonates in the southwestern portion of the Alamo areas that have moderate potential for high-calcium limestone, although the majority of the Alamo areas has a low potential for cement limestone based on the prevalence of dolomitic carbonates. One isolated outcrop of cement limestone was identified within the southern portion of the Alamo areas (U.S. Air Force, 2017I). The majority of the Alamo areas is underlain by pre-Tertiary rocks that have low potential for clay deposits. The exception is in the northern portion of Alamo areas, where suitable sediments occur.

6 The Alamo areas are considered to have low potential for recoverable deposits of 7 several nonmetallic minerals. In previous assessments of the eastern DNWR (1993 8 and 2014), no fluorspar prospects were identified in the Alamo areas. Similarly, the 9 potential for lithium in these areas is considered low (U.S. Air Force, 2017I). Favorable 10 host rocks for borates do not occur in the Alamo areas and, as such, the potential for 11 borates in the Alamo areas is considered low. The Alamo areas are also considered to 12 have a low potential for dolomite suitable for industrial uses (U.S. Air Force, 2017I).

13 **3.10.1.6 Paleontological Resources**

14 **Existing NTTR Boundary (Alternatives 1 and 2)**

Fossils are present within many sedimentary rock formations on the NTTR. These fossils are predominantly marine in origin; however, terrestrial plant and animal fossils also occur (U.S. Air Force, 1999). Fossils are present in four general ages of sedimentary rocks, representing aquatic and terrestrial life from the Cambrian period through the Cenozoic 600 million years B.P. to the last 1.6 million years B.P. Characteristic fossils recovered over this period include brachiopods, corals, pelecypods, and trilobites (Dickerson, 2013).

Previous efforts have documented Lower Paleozoic rocks (450 to 600 million years B.P.) in the Belted Range in the northern part of the NTTR. During the Paleozoic Era through the Devonian Period, a shallow sea gradually flooded the area with the water, deepening into an ocean basin to the northwest. Fossils represent the reef communities that occupied the shallow warm water. By the Permian Period, sea levels began to recede and portions of Nevada emerged as dry land (Dickerson, 2013; U.S. Air Force, 1999).

Upper Paleozoic (245 to 300 million years B.P.) rock outcrops are widespread on the NTTR. These strata compose the bulk of the Eleana Range, where fossils have been discovered. Pleistocene deposits, representing the last 1 million years, outcrop along washes and alluvium. No fossils have been discovered in these materials; however, older gravels and sands could potentially contain fossils (U.S. Air Force, 1999).

34 Alternative 3A – Range 77 – EC South Withdrawal (and Amended Alternative 3A-1)

Unlike the eastern NTTR, the western side of the NTTR is less likely to contain fossilbearing bedrock layers, owing to the volcanic origin of many of the formations. There are, however, sedimentary outcrops in the nearby Cactus Range that contain fossils such as broyozoans, cephalopods, brachiopods, corals, and gastropods (Dickerson, 2013).

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1 Alternative 3B – 64C/D and 65D Withdrawal and Administrative Incorporation

Fossil outcrops within the Range 64C/D and 65D withdrawal area are predominantly Paleozoic in age. The Spotted and Pintwater Ranges to the north contain a wide variety of Paleozoic fossils in sedimentary and metamorphic bedrock layers. The Halfpint Range, although formed of igneous, sedimentary, and metamorphic bedrock layers, contains a variety of fossil types found in only sedimentary formations. These include, but are not limited to, stromolites, trilobites, cephalopods, brachiopods, corals, and gastropods (Dickerson, 2013).

9 Alternative 3C – Alamo Withdrawal

Fossil outcrops within the Alamo areas are predominantly Paleozoic in age. The East Desert Range and Sheep Range have demonstrably been shown to contain a variety of fossil types found in sedimentary formations (USFWS, 2009). These include, but are not limited to, stromolites, cephalopods, brachiopods, corals, and gastropods (Dickerson, 2013).

15 **3.10.2 Environmental Consequences**

16 **3.10.2.1 Analysis Methodology**

The analysis methodology involved evaluating impacts from the alternatives to earth resources on the NTTR and potential expansion areas from four typical categories of activity that currently occur on the NTTR. This assessment focuses on potential economic, physical, and chemical damage to geology, paleontology, mineral resources, and soils.

Physical damage includes disturbances to the structural and/or biological properties of earth resources that could potentially compromise their current condition and function. Examples include, but are not limited to, compaction or other damage from direct impacts (foot traffic, munitions use), rutting, and human-induced soil erosion. Chemical damage occurs when resources are altered due to the introduction of hazardous materials (e.g., contamination of soil from chemical fluid leaks or spills).

Soil erosion involves the detachment of surface material, subsequent transport, and deposition by water or wind. Erosion is difficult to control and can be greatly exacerbated by various activities. Accelerated erosion caused by human activity occurs at rates much greater than under typical natural conditions.

Impacts to these resources can be evaluated according to type, context, intensity, and duration of the activities under consideration. Together, these attributes help define the potential significance of the impacts.

35 3.10.2.2 Alternative 1 – Extend Existing Land Withdrawal and Management of 36 NTTR (North and South Range) – Status Quo

Aircraft operations would have minimal to no direct impacts on earth resources (geologic, soil, or paleontological) for Alternative 1. As intensity of operations would remain at status quo levels, the severity of the impact would be low given the durable nature of the resource and low probability of impacts based on previous studies.

Battis (1983) indicated that sonic booms are unlikely to cause damage to geologic features. The expected motions produced by sonic booms are comparable to those produced by local earthquakes. At these levels of motion, structurally sound rocks are unaffected by seismic waves, and sonic booms are unlikely to initiate either fracture or spalling in rocks. However, it is possible that in rocks where natural erosive mechanisms have had an effect, sonic booms could accelerate the processes to some small or insignificant degree.

A second study conducted by Battis (1988) considered vibrational effects to features on the ground from jet aircraft overflights at altitudes from 60 to over 300 meters AGL. It was concluded that these tested aircraft overflights had no significant vibration effects and as such, impacts to geologic features would be considered highly unlikely.

An extension of the current NTTR lands could restrict economic opportunity associated with extraction of some mineral resources. Potentially valuable deposits of mineral resources are present throughout the NTTR. Safety footprints required to support the various military missions on the ranges in conjunction with current and future aircraft operations would necessarily restrict public and industrial access to the NTTR. In terms of mineral exploration, the extension of the NTTR land withdrawal would prevent the discovery and use of economically viable resources, as is the current situation.

Use of ordnance on the NTTR would typically result in some degree of ground 21 disturbance and, in turn, may expose soils to erosion or potentially damage 22 paleontological resources. A current assessment and mapping of the conditions of soils 23 and areas of erosion have not been completed for most of the NTTR (U.S. Air Force, 24 2010). Without a mapping and subsequent ground-truthing effort, it is difficult to assess 25 the current baseline condition of soils. In general, the most sensitive areas prone to 26 ground-disturbing activities should be avoided through BMPs and avoidance of these 27 sensitive areas. These areas may include, but are not limited to, ephemeral streams 28 and drains, as well as watershed areas (U.S. Air Force, 2010). In the absence of 29 specific evidence, significant adverse impacts to soils have not been identified under the 30 baseline condition, and that would be expected to continue for Alternative 1. 31

As is current practice under the NTTR natural resources management program, the following guidelines could be implemented by the Air Force before and during any ground-disturbing activity to prevent or minimize soil loss through erosion.

• Using field observations and soil maps assess erosion conditions and use BMPs to reduce erosion and sedimentation during construction projects. This is especially critical along and around ephemeral streams and drains, as well as watershed areas.

- Rapidly re-establish vegetation as soon as possible to avoid potential problems
 with blowing dust and water erosion.
- If a mission activity requires excavation, the top 6 to 12 inches of soils should be removed and stockpiled separate from any deeper soils where practical. Upon

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1 completion of the action, the stockpiled soil should be spread as a final layer over 2 any exposed areas (not covered by facilities or impermeable surfaces).

Landscaping on soils should be restricted to native plants that are adapted to the soils on the site. Plants requiring extensive use of irrigation and addition of soil amenities should be avoided.

6 Current target impact areas would remain the same and are generally located on or 7 near playas away from sedimentary formations that typically contain fossil resources. 8 Because this alternative would maintain the current boundaries of the NTTR and not 9 increase the intensity of munitions use, no significant impacts are anticipated with 10 respect to earth resources within the NTTR. The continued use of existing ranges 11 would ensure that any potential chemical contaminants introduced into the soil from 12 munitions would be confined to currently approved areas of use.

Impacts to mineral resources through a change in public/industrial access to the NTTR
 lands would be the same as discussed above for aircraft operations.

Construction, the use of vehicles, and overland troop movement on the NTTR would 15 typically result in some degree of ground disturbance and, in turn, may expose soils to 16 erosion or potentially damage paleontological or other geologic resources. In cases of 17 construction, the NDEP requires a General Construction Stormwater Permit if the 18 project would discharge to waters of the state and disturb 1 or more acres or if it is part 19 of a larger plan for development that would ultimately disturb 1 acre or more. 20 Stormwater permits would contain BMPs subject to approval by NDEP. BMPs could 21 include stormwater diversion, erosion control, or any number of best practices. 22

If NDEP determines that a project less than 1 acre in size would impact receiving waters or its tributaries within a 1/4-mile radius of the project, the project would also require a construction stormwater permit. If the project requires a construction stormwater permit, an NOI would be completed for coverage under the Construction Stormwater General Permit.

Current target areas would remain the same and are generally located on or near playas away from sedimentary formations that typically contain fossil resources. Because this alternative would preserve the current boundaries of the NTTR and not greatly increase the intensity of activities, no significant impacts are anticipated with respect to earth resources within the NTTR. It is anticipated that any construction projects in the future would be designed to avoid impacts to geologic and paleontological resources.

Conceptually, emitters would be placed along existing roads or two tracks, and the emitter operations would pose no threat to earth resources. No impacts to earth resources would be anticipated from operations at emitter sites. Placement of the emitters, depending on the future locations selected, may result in minor soil disturbance from site preparation. It is anticipated that future emitter sites would be selected to avoid impacts to geologic and paleontological resources.

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13.10.2.3Alternative 2 – Extend Existing Land Withdrawal and Provide Ready2Access in the North and South Ranges

Alternative 2 would have the same footprint and range of activities as discussed for 3 Alternative 1 with a 30 percent increase in intensity of utilization, and impacts to earth 4 resources from air operations, munitions use, ground disturbance, and emitter 5 operations would be increased above the levels discussed for Alternative 1 (Section 6 3.10.2.2). With a 30 percent increase in intensity of operations, and given the extent of 7 activities, the severity of the impact would be low given the durable nature of the 8 It is assumed that there will be approximately 7.5 acres of ground 9 resource. disturbance associated with the installation of threat emitters and repeaters as well as 10 4 acres of road improvements. With the implementation of required BMPs, minor 11 impacts to soils or paleontological resources would be anticipated under Alternative 2 12 owing to the potential for ground disturbance associated with installation of threat 13 emitters, munitions use, and any other construction and maintenance activities. 14

15 As with Alternative 1, restriction of access to mineral resources the extension of the NTTR land withdrawal would prevent the discovery and use of economically viable 16 resources, as is the current situation. With Alternative 2, which represents the level of 17 activity proposed under Alternative 1 plus a 30 percent increase in operational tempo, 18 troops traversing the areas proposed for wilderness have a minor potential to disturb 19 soils and contribute to erosion in areas of high slope and loosely consolidated soils. It is 20 anticipated that any construction projects, including preparing and placement of emitter 21 sites, in the future would be designed to avoid impacts to geologic and paleontological 22 resources. Depending on the scope of the activities, such projects could be subject to 23 additional consideration under NEPA and other appropriate regulations. 24

25 3.10.2.4 Alternative 3 – Expand Withdrawal of Public Lands for the NTTR

- Alternative 3 includes subalternatives, as described in Section 2.3.3:
- Alternative 3A Range 77 EC South Withdrawal
- Alternative 3A-1 Amended Range 77 EC South Withdrawal
- Alternative 3B Range 64C/D and 65D Withdrawal and Administrative
 Incorporation
 - Alternative 3C Alamo Withdrawal

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A 30 percent increase in aircraft operations would have no direct impact on earth 32 resources (geologic, soil, or paleontological) within the proposed expansion areas for 33 Alternatives 3A, 3A-1, 3B, and 3C. With a 30 percent increase in intensity of air 34 operations, and given the extent of flight activities, the severity of the impact would be 35 insignificant given the durable nature of the resource. The creation of the safety or 36 operational security footprints would have no potential to affect earth resources. Public 37 access would be limited under Alternatives 3A, 3A-1, 3B, and 3C as is current practice 38 on the NTTR. This limitation of access would likely result in a beneficial impact to earth 39 resources by reducing traffic through areas that currently are no access-restricted or 40

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1 limited. Impacts to earth resources from vibrations would not be expected to occur and

2 would be the same as those discussed for aircraft operations for Alternative 1 in Section

3 **3.10.2.2**.

Though munitions use would continue with a 30 percent increase in operations within 4 current ranges, no munitions use would occur in the proposed expansion areas for 5 Alternatives 3A, 3A-1, 3B and, as such, none of these subalternatives would have an 6 7 impact on earth resources (geologic, soil, mineral, or paleontological) related to munitions use. Munitions use would occur within Alternative 3C areas and would also 8 continue within current ranges. Munitions to be utilized within the Alternative 3C area 9 would include small arms, blanks, smoke grenades and hand flares, among others. 10 Current target impact areas within the NTTR boundaries would remain the same and 11 are generally located on or near playas away from sedimentary formations that typically 12 contain fossil resources. 13

For Alternatives 3A, 3A-1, and 3B, approximately 25 miles and 30 miles of new fencing 14 would be installed, respectively. Alternative 3C would include installation of 15 approximately 65 miles of new fencing. Construction, the use of vehicles, and overland 16 17 troop movement with a 30 percent increase in operations on the NTTR would typically result in some degree of ground disturbance, which may, in turn, expose soils to erosion 18 or potentially damage paleontological resources. Under Alternatives 3A, 3A-1, and 3B, 19 no significant increase in impacts in mountainous areas would occur. For Alternative 20 3C. a greater increase in foot traffic in mountainous areas may occur from IW activities. 21 In addition, approximately 13 acres of construction-related ground disturbance may 22 occur from runway construction associated with Alternative 3C. Construction of the 23 runway would result in an initial surface disturbance, and use of the runway would 24 potentially result in soil compaction from aircraft operations. Soil compaction can cause 25 damage to the soils structure as a result of repeated contact with heavy vehicles. This 26 compaction can affect upper soil horizons restricting drainage and leading to a potential 27 28 alteration of surface water infiltration. Repeated mechanical stress causing compaction can affect soil structure reducing the ability of a soil to hold and conduct water, 29 nutrients, and air necessary for plant root activity. Some compaction may be beneficial 30 to seed development because of the increased contact between a germinating seed 31 and soil and moisture. Too much compaction can prevent seed emergence and root 32 development. In addition, the fueling operations associated with FAARP would have 33 the potential to contaminate soils if a spill was to occur. In this scenario, NTTR 34 personnel would follow procedures set forth in the installation spill plan as discussed in 35 Section 3.12 (Hazardous Materials and Solid Waste). 36

The NDEP requires a General Construction Stormwater Permit if the project would discharge to Waters of the State and disturb 1 or more acres or if it is part of a larger plan for development that would ultimately disturb 1 acre or more. Stormwater permits would contain BMPs subject to approval by NDEP. BMPs could include stormwater diversion, erosion control, or any number of best practices. If NDEP determines that a project less than 1 acre in size would impact receiving waters or its tributaries within a 1/4-mile radius of the project, the project would also require a construction stormwater

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permit. If so, an NOI would be completed for coverage under the Construction
 Stormwater General Permit.

Ground disturbance under Alternatives 3A, 3A-1, and 3B, discussed above, would not be significant and therefore would not have a significant impact on earth resources (geologic, soil, or paleontological) within the proposed expansion areas. Additionally, no significant impacts from the ground disturbance activities described above are anticipated with respect to earth resources for Alternative 3C. It is anticipated that any construction projects in the future would be designed to avoid impacts to geologic and paleontological resources.

Emitter operations pose no threat to earth resources, and no impacts to earth resources 10 would be anticipated from operations at emitter sites. Emitter operations would not 11 occur in the proposed expansion areas for Alternatives 3A, 3A-1, and 3B, and there 12 would be no impact on earth resources (geologic, soil, mineral, or paleontological) 13 within the proposed expansion areas for Alternatives 3A, 3A-1, and 3B. For Alternative 14 3C, emitters would conceptually be placed along existing roads or two tracks and, 15 depending on the future locations selected, and site preparation for new emitters in 16 conjunction with the implementation of required BMPs, may result in minor soil 17 disturbance. There will be approximately 7.5 acres of ground disturbance associated 18 with the installation of threat emitters and repeaters as well as 4 acres of road 19 improvements. Consequently, it is anticipated that there would be 13 acres of total 20 ground disturbance for Alternative 3C, due to threat emitter installation and roadway 21 22 improvement.

It is anticipated that future emitter sites would be selected to avoid impacts to geologic and paleontological resources. Any proposed emitter sites could be subject to additional consideration under NEPA and other appropriate regulations.

For Alternatives 3A and 3A-1, safety footprints required in conjunction with current and 26 future military activity would restrict public and industrial access to the proposed 27 expansion area (Range 77). For Alternative 3B, there is a moderate potential for several 28 construction aggregates within the Range 64C/D and 65D areas. These include sand 29 30 and gravel deposits, limestone deposits, cement limestone, and high-calcium limestone. Fluorspar and breccia deposits could also potentially occur. For Alternative 3C, metallic 31 mineral deposits within the eastern DNWR are located outside of the proposed 32 expansion areas, primarily within the Gass Peak thrust fault. There is a high potential 33 34 for sand and gravel deposits and moderate potential for high-calcium limestone.

In terms of mineral exploration, the extension and expansion of the NTTR withdrawal 35 could prevent the discovery and exploitation of economically viable resources, as is 36 currently the situation. On September 2, 2016, BLM published a Notice of Application 37 for Withdrawal Extension; Notice of Application for Withdrawal Expansion; and 38 Opportunity for Public Meeting regarding the segregation of lands in relation to the 39 NTTR land withdrawal in the Federal Register (McEldery, 2016). 40 This notice temporarily segregates the proposed withdrawal lands from all forms of appropriation 41 under the public land laws, including the mining laws, mineral leasing laws, and 42 geothermal leasing laws. 43

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Another consideration regarding the level of impact imposed by segregation and any 1 subsequent withdrawal is access to active mining claims. One active mining claim is 2 located within the current withdrawn lands and proposed expansion areas, and it is 3 located within the Range 77 expansion area proposed for Alternative 3A and 3A-1. No 4 active mining claims would be impacted by the selection of Alternative 3B or 3C, and 5 currently, the USFWS-managed DNWR areas in the Alternative 3C proposed 6 withdrawal area are not open to mining. If the Air Force withdraws the Range 77 parcel 7 associated with Alternative 3A or 3A-1, then a subsequent potential restriction of access 8 to this active claim could potentially represent an impact to earth resources. 9 The significance of these impacts is difficult to quantify until the final disposition of this claim 10 is resolved between the claimants and the Air Force. The potential for impacts could 11 also be altered depending on the term of withdrawal to be implemented for 12 Alternative 4. 13

14 **3.10.2.5** Alternative 4 – Establish the Period of Withdrawal

For Alternative 4, the period of withdrawal would be established and combined with 15 other alternatives, conjunctively determining the temporal and spatial limits of the 16 withdrawal. The potential for mineral or other geologic resource exploration in many 17 areas of the Proposed Action would be affected by the geographic extent and time 18 period of the withdrawal. The longer the term of the withdrawal and the greater the 19 geographic extent of the withdrawal, the greater the opportunity for future negative 20 impacts due to potential lack of access to industry and the public. Conversely, earth 21 resources such as paleontological and soil resources would benefit from a probable 22 reduction in impacts from mineral exploration and a restriction of public access. 23 Additionally, how the land use is managed after withdrawal (restricted, multiple use, 24 etc.) would greatly impact future mineral and resource exploration. Currently, USFWS-25 managed DNWR areas are not open to mining. 26

Alternative 4A would have a minor potential to affect earth resources and offer the most 27 flexibility for future economic development, as it represents the shortest withdrawal 28 period proposed (20 years). Alternative 4B (50 years) would also have a moderate 29 potential to affect earth resources and would offer less flexibility than Alternative 4A for 30 31 future economic development because Alternative 4B represents a longer withdrawal period than Alternative 4A. The indefinite withdrawal period proposed for Alternative 4C 32 would offer less flexibility than Alternative 4A or Alternative 4B for future economic 33 development, as it represents the longest withdrawal period. Protections to soils and 34 paleontological resources offered by Air Force land access controls would be beneficial 35 to a greater degree with Alternative 4B than with Alternative 4A, and to the greatest 36 degree with Alternative 4C. 37

38 3.10.2.6 No Action Alternative

In the event that the land withdrawal for the NTTR is not extended, much of the approximately 2.9 million acres currently closed to the public would potentially be open to use under BLM and USFWS administration. Access to mineral resources under the

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No Action Alternative could be less restrictive under BLM management than under Air Force administration, resulting in beneficial impacts to local mining interests. Mining access could be granted and mining decisions made by BLM with State of Nevada involvement. Appropriate environmental documentation and safeguards would be the responsibility of the permitting federal agency, which, in this case, would be the BLM and USFWS.

Conversely, potential mining in the released lands could result in removal or significant
 alteration of geologic features or existing topsoil. The removal or shifting of topsoil
 could potentially result in increased soil erosion.

Depending on the location, type, and intensity of future BLM-permitted developments and uses, impacts to unique geologic features or hazards to paleontological resources could occur.

13 **3.11 WATER RESOURCES**

14 This section describes the affected environment for water resources, along with an 15 analysis of potential environmental consequences to those resources from the 16 Proposed Action and alternatives.

17 3.11.1 Affected Environment

18 **3.11.1.1 Description of Resource**

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.11.1.

The affected environment for water resources includes surface waters, floodplains, groundwater, and water rights and improvements. These features are detailed in subsections below; water quality standards applicable to these resources are discussed as well. Special studies conducted in support of the proposed range withdrawal include a Water Requirements Study (U.S. Air Force, 2017m), as well as a Wetlands, Floodplains, Seeps, and Springs Report (U.S. Air Force, 2017h). Much of the baseline information for this analysis has been derived from these reports.

26 **3.11.1.2 Region of Influence**

The ROI for water resources includes all the surface waters, floodplains, groundwater, and water rights and improvements located within the boundaries of the existing NTTR and potential expansion areas. The ROI also includes surface waters and groundwater resources outside the existing and proposed geographical boundaries that may be affected by the Proposed Action and alternatives.

32 **3.11.1.3 Water Quality Standards**

Water quality standards define the water quality goals of a surface water body by designating beneficial uses of that water body and setting criteria necessary to protect the beneficial uses. Water quality standards associated with designated beneficial uses

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within the state of Nevada are contained in NAC 445A.11704 through 445A.2234. 1 Beneficial uses include livestock watering, irrigation, aquatic life, recreation, municipal 2 or domestic supply, industrial supply, wildlife propagation, waters of extraordinary 3 ecological or aesthetic value, and enhancement of downstream water quality. Water 4 quality standards may be narrative or numeric (NDEP, 2016a). Narrative standards 5 apply to all surface waters of the state and primarily consist of general requirements for 6 waters to be free of various pollutants. Numeric standards are identified for some 7 pollutants in specific water bodies and include criteria designed to protect beneficial 8 uses and maintain antidegradation requirements. Numeric standards for toxic materials, 9 which are based on EPA criteria, are provided in NAC 445A.1236. 10

Most surface waters of the NTTR are intermittent or ephemeral. With the exception of 11 Breen Creek, the NTTR has no perennial streams (U.S. Air Force, 2010). No surface 12 water bodies are present on the NTTR or proposed expansion areas that have 13 designated beneficial uses. However, all surface waters are subject to the narrative 14 standards that are applicable to all waters of the state. Regulations allow for the 15 classification of a water body not currently classified in the NAC if there is a permit 16 request to discharge into that water body. There are no such known requests for waters 17 within the existing NTTR or potential expansion areas. In addition, beneficial uses of 18 surface water on the NTTR would be subject to water quality criteria or standards 19 specific to the use. Sections of the NAC containing water guality standards and criteria 20 are included in Appendix J, Water Resources, Section J.1, Nevada Administrative Code 21 445A. 22

The State of Nevada implements drinking water requirements established in the Safe 23 Drinking Water Act. The Nevada Safe Drinking Water Program is administered by the 24 NDEP's Bureau of Safe Drinking Water (NDEP, 2014). Drinking water standards consist 25 of maximum contaminant levels (MCLs) established for various water quality 26 constituents. Primary MCLs are established to protect against adverse health effects 27 28 and are enforceable for public drinking water supplies. Secondary MCLs are established for aesthetic reasons such as taste, color, or odor and are not enforceable for public 29 drinking water supplies. Action levels are established for selected constituents that, if 30 exceeded by a percentage of samples, require treatment of the water source prior to 31 distribution. MCLs are applicable to contaminants that are introduced by point or diffuse 32 33 sources.

Nevada Revised Statutes (NRS) 445A.300 to 445A.730 implement other provisions of 34 the CWA and regulate point and diffuse pollution sources of surface and groundwater. 35 These statutes also provide for the oversight of sewage systems and water treatment 36 plants and monitoring of drinking water distribution. The law applies to all lakes, ponds, 37 impounding reservoirs, marshes, water courses, waterways, wells, springs, irrigation 38 systems, drainage systems, and all bodies or accumulations of water, whether surface 39 or underground. The Water Pollution Control Law established programs for executing 40 the permit authority delegated to the state under both the CWA (NPDES permits) and 41 Safe Drinking Water Act (groundwater protection). 42

1 3.11.1.4 Surface Water

2 Existing NTTR Boundary (Alternatives 1 and 2)

3 Hydrology

4 Surface water resources on the NTTR originate from 5 precipitation (rain and snow), snowmelt, and groundwater 6 (springs and seeps). In Nevada, average annual

7 precipitation depends mainly on elevation and ranges from 4 inches on the valley floors to over 40 inches on mountain summits (U.S. Air Force, 2017m). In the vicinity of the 8 NTTR, average precipitation ranges from 4 inches (desert floor) to about 13 to 16 9 inches in mountain areas (Blainey, Webb, & Magirl, 2007; U.S. Air Force, 2010). 10 Summer precipitation often occurs during periods of storm activity that is of short 11 duration but intense. Severe thunderstorms can produce temporary flash flooding and 12 ponding in valleys and other low-lying areas. With the exception of such thunderstorms, 13 much of the warm weather precipitation is lost within a short time through evaporation 14 and transpiration (uptake and transport of water to the atmosphere through vegetation), 15 which are known collectively as evapotranspiration. Winter precipitation falls as snow or 16 rain, depending on the elevation. Melting snowpacks may contribute water to drainages 17 during winter, spring, and summer and may provide runoff volume that is greater than 18 the amount of water lost to evapotranspiration (U.S. Air Force, 2010). 19

Surface water may originate from springs or seeps in areas where the groundwater table intersects the ground surface. Springs in the mountains discharge from perched water zones or emerge in areas where groundwater has migrated along rock fractures. Springs typically flow for only short distances before infiltrating into the ground. Pools may occur at some large springs. Seeps also originate from groundwater but have a more diffuse source and very low flow rate.

Surface water resources on the NTTR are scarce due to low precipitation, high 26 evapotranspiration rate, low humidity, and wide daily temperature extremes. 27 Evaporation in the NTTR region has previously been estimated at about 56 to 60 inches 28 of surface water per year (Houghton, Sakamoto, & Gifford, 1975). More recently, 29 evapotranspiration rate estimates at sites south and east of the NTTR have ranged from 30 4 to 63 inches, depending on the altitude, vegetation present, and modeling method 31 (DeMeo et al., 2008; Moreo et al., 2014). The evapotranspiration potential is, therefore, 32 often greater than annual precipitation. As a result, few perennial streams or other 33 surface water features are present on the NTTR. Streams with sufficient volume flow 34 into playas of the major valleys. Due to the high clay content in most playa soils, little 35 surface water infiltrates the ground; most water is lost through evaporation. With the 36 exception of the Amargosa River, Breen Creek, and some man-made features, the only 37 38 perennial surface water on the NTTR comes from springs and seeps.

Multiple survey projects designed to identify all seeps and springs within the NTTR boundary were undertaken at various times between 2004 and 2013. The results were compiled in separate reports, each covering all or a portion of the range (Nellis AFB, 2013; 2014a; 2014b; 2014c) (Nellis AFB, 2014d; 2014e; 2014f). Numerous perennial

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.11.1.4.1, Surface Water -Existing NTTR Boundary Alternatives 1 and 2 Hydrology.

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and intermittent springs and seeps were identified in the North and South Ranges. A
summary of the survey methods and results for these surveys is provided in Appendix J,
Water Resources, Section J.2, Summary of Previous Surface Water Investigations on
the Nevada Test and Training Range. In addition, other surface water features such as
construction ponds, wells, water accumulation areas, dugouts, and wildlife water
development sites were documented.
More recently, a comprehensive review of surface water information available from

2004 to 2015 and the results of field surveys in the potential expansion areas conducted 8 in 2016 were combined into a single report (U.S. Air Force, 2016f; U.S. Air Force, 9 10 2017h). The report identifies 135 total water features on the existing NTTR and potential expansion areas, including 46 perennial springs, 20 intermittent springs, 7 perennial 11 seeps, 36 intermittent seeps, 1 surface water accumulation, 4 construction ponds, and 12 22 wildlife water developments. The locations of streams, springs, seeps, and wells for 13 which GIS data are available are shown on Figure 3-36. Most active springs occur on 14 the North Range (U.S. Air Force, 2016e; U.S. Air Force, 2017h). The figure also shows 15 the 27 hydrographic basins associated with the NTTR, which are described in Section 16 3.11.1.6, Groundwater. 17

18 Jurisdictional Surface Waters

Activities that adversely affect waters of the United States by filling, flooding, excavation, or drainage are regulated under Section 404 of the CWA. Jurisdictional waters under the CWA include ephemeral, intermittent, and perennial streams, tributaries, and wetlands. To be considered jurisdictional, a feature needs to display an ordinary high

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.11.1.4.1, Jurisdictional Surface Waters.

water mark and a significant connection to a traditionally navigable water body. 25 Potentially jurisdictional stream channels, drainage basins/watersheds, and wetlands on 26 the NTTR were identified (U.S. Air Force, 2016e). Multiple data sources were used to 27 identify these features, including NWI maps. However, jurisdictional status 28 determination for NWI wetlands and other water features typically can only be confirmed 29 by field investigation. The channels, basins, and wetlands identified in the study provide 30 an indicator that jurisdictional waters may be present, and this information can be used 31 for future planning efforts. Future ground-disturbing activities proposed in withdrawn 32 lands would require site-specific jurisdictional determination, delineation, and impact 33 assessment. 34

Potential jurisdictional watersheds were identified as basins that drain into channels 35 connected to navigable waters. The only applicable navigable waters in the study area 36 are the Amargosa River and the Las Vegas Wash. The southwestern portion of the 37 North Range coincides with the Amargosa watershed, and a small area of the South 38 Range coincides with the Las Vegas Wash watershed. Any surface waters, washes, or 39 wetlands found within these areas are potentially jurisdictional. The majority of 40 watersheds in the study area drain into closed basins, which are not connected to 41 navigable waters and are, therefore, not considered jurisdictional. NWI wetlands have 42 been mapped in several portions of the existing withdrawn land (Figure 3-36). 43

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1 Water Quality

Surface water quality varies greatly in different parts of Nevada and at different times of the year (USGS, 2013a). Water quality of springs and seeps on the NTTR is primarily influenced by the physical and chemical characteristics of the rocks through which groundwater flows prior to discharge. Surface water quality is also affected by factors such as chemical characteristics of rocks or soil that contact water on the ground surface.

8 Water quality is often evaluated in terms of the concentration of dissolved solids 9 present, although other substances such as pollutants and naturally occurring 10 chemicals can affect water quality as well. Concentrations of dissolved solids are 11 usually highest during periods of low stream flow and near the termination of drainages 12 due to the concentrating effect of evaporation. Conversely, concentrations are lowered 13 during periods of high stream flow (Berris et al., 2003). Surface water in playas, when 14 present, often has particularly high dissolved solids concentration.

The results of recent water quality testing of numerous perennial and intermittent 15 streams and wildlife water developments conducted in 2014 and 2015 are provided by 16 Adams Ecology, Inc. (2016f). While the results of water sample testing were generally 17 good, MCLs were exceeded at numerous water sources for one or a combination of 18 aluminum, arsenic, iron, manganese, and lead. MCLs were exceeded at a smaller 19 number of locations for pH, fluoride, chloride, nitrate/nitrite, sulfate, calcium, and 20 sodium. Results were not consistent at every location between years; some constituent 21 levels either rose above or fell below MCL values between 2014 and 2015. 22

Water discharges on the NTTR are regulated by the NDEP, Bureau of Water Pollution
 Control. Surface water discharges fall under the requirements of the NPDES, created by
 the CWA. Currently two areas on the NTTR fall under requirements for NPDES
 permitting: Tonopah Test Range and Creech AFB.

27 Alternative 3A – Range 77 – EC South Withdrawal (and Amended Alternative 3A-1)

28 The overall hydrology and surface water quality of Range 77 is the same as that discussed above for the existing NTTR withdrawal. One unnamed spring is known to 29 30 occur in the area, and appears to be an intermittent spring. Numerous potential seeps and springs (identified from satellite imagery) on the existing NTTR and potential 31 expansion areas were investigated in 2016 (U.S. Air Force, 2016f; U.S. Air Force, 32 2017h). The locations of the investigated features are included in Appendix J, Water 33 Resources, Figure J.1, Potential Seeps and Springs Investigated during August 2016, 34 and confirmed seeps and springs in the potential expansion areas are included in 35 Appendix J, Water Resources, Section J.3, Confirmed Seeps and Springs in the 36 Potential Expansion Areas. A potential spring in the southern portion of Range 77 was 37 investigated during this effort but was not verified as a spring. Expansion into this range 38 would result in inclusion of additional area of the upper Amargosa River watershed 39 within the NTTR boundary. Any surface waters, washes, or wetlands within this 40 watershed are potentially jurisdictional. NWI wetlands are not mapped within Range 77. 41

1 Alternative 3B – 64C/D and 65D Withdrawal and Administrative Incorporation

2 The overall hydrology and surface water quality of Range 64C/D and 65D are the same as that discussed above for the existing NTTR withdrawal. There are no known seeps 3 or springs in the area. Several potential springs were investigated in 2016 (Appendix J, 4 Water Resources, Figure J.1, Potential Seeps and Springs Investigated During August 5 2016), but none were confirmed (Appendix J, Water Resources, Section J.3, Confirmed 6 Seeps and Springs in the Potential Expansion Areas) (U.S. Air Force, 2016f; U.S. Air 7 Force, 2017h). There are no potentially jurisdictional surface waters, washes, or NWI 8 9 wetlands identified within the site.

10 Alternative 3C – Alamo Withdrawal

The overall hydrology and surface water quality of the Alamo withdrawal areas are the 11 same as that discussed above for the existing NTTR withdrawal. Numerous potential 12 springs and other surface waters were investigated in 2016 (Appendix J, Water 13 Resources, Figure J.1, Potential Seeps and Springs Investigated During August 2016). 14 Field investigation confirmed the presence of a total of 12 springs, wildlife water 15 developments, and surface water features (stormwater catchments) in the area 16 (Appendix J, Water Resources, Section J.3, Confirmed Seeps and Springs in the 17 Potential Expansion Areas). Some of these water features consist of guzzlers and 18 enhanced springs. Two additional springs occur very close to the eastern border. A 19 large portion of the Las Vegas Wash occurs within this potential expansion area, and 20 any surface waters, washes, or wetlands within the watershed are potentially 21 jurisdictional. NWI wetlands are mapped in association with Desert Lake. 22

23 **3.11.1.5 Floodplains**

24 Existing NTTR Boundary (Alternatives 1 and 2)

A floodplain is generally described as a flat area of land adjacent to a stream or other 25 surface water that is subject to flooding during periods of high discharge. Floodplains on 26 the NTTR are mostly associated with ephemeral or intermittent waters. Floodplain 27 28 boundaries are typically described in terms of average frequency of inundation. The 100-year floodplain is defined as the area that has a 1 percent chance of inundation by 29 a flood event in any given year (once per 100 years on average). The 500-year 30 floodplain has a 0.2 percent chance of flooding in any year (once per 500 years on 31 32 average).

Hydrologic modeling was completed in order to identify areas that are subject to 33 flooding, particularly the 100- and 500-year floodplains (U.S. Air Force, 2017h). The 34 modeling incorporated information from a previous (1997) floodplain inventory report, 35 current FEMA flood zone data, and calculation of floodplain areas through analysis of 36 water basin characteristics. Water basin analysis included identification of stream and 37 drainage basins, as well as estimates of runoff volume, flow rate, and overland flow. 38 Basins were categorized based on internal or external drainage. Runoff volume 39 calculations were conducted for internally drained basins to determine water surface 40 elevations in playas. Flow rate calculations were conducted for externally drained 41

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basins to determine the peak flow rate at the outlet. Overland flow calculations were
 conducted for cross sections of the proposed expansion areas.

Based on this information, the 100- and 500-year floodplains associated with a 24-hour rain event, as well as floodplains associated with playas and alluvial fans, provisionally

5 occurring within the NTTR are shown on Figure 3-36. Alluvial fans would generally be

- 6 impacted by concentrated runoff, while other areas would be characterized as sheet
- 7 flow. The identified floodplains may be used as a general planning tool for present and
- 8 potential future use of the property. The modeling required use of publicly available data
- 9 of limited accuracy and detail and, therefore, does not have the detail necessary for
- 10 designing and constructing infrastructure. Additional modeling and drainage analysis
- 11 would be required prior to construction of fixed structures.
- 12 Alternative 3A Range 77 EC South Withdrawal (and Amended Alternative 3A-1)
- 13 Based on the results of the hydrologic modeling described above, a small floodplain
- area was identified along the Amargosa River (Figure 3-36).

15 Alternative 3B – 64C/D and 65D Withdrawal and Administrative Incorporation

- Based on the results of the hydrologic modeling described above, small floodplain areas
- were identified along the western portion of Range 64C/D and 65D (Frenchman Lake)
- and in the southern portion, west of Creech AFB (Figure 3-36).
- 19 Alternative 3C Alamo Withdrawal
- Based on the results of the hydrologic modeling described above, floodplains associated with Desert Lake were identified within the Alamo areas (Figure 3-36).

22 **3.11.1.6 Groundwater**

23 Existing NTTR Boundary (Alternatives 1 and 2)

24 Hydrogeology

Hydrogeology refers to the occurrence and flow ofgroundwater. Underground formations of water-bearing

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.11.1.6.1.

rock or pockets of water within rock fractures are called aquifers. Hydrogeologic systems and associated aquifers may be categorized as local or regional, based on the distance between recharge and discharge points, and may have varying degrees of connectivity. The NTTR is located within the Great Basin carbonate and alluvial aquifer system. An extensive regional groundwater system exists in this area due to the permeability of carbonate rocks. The depth of groundwater beneath the NTTR varies greatly but averages about 200 feet (U.S. Air Force, 2017m).

Aquifers underlying the NTTR include basin-fill (alluvial), volcanic rock, and carbonate rock aquifers (Heilweil & Brooks, 2011). Basin-fill aquifers consist of unconsolidated gravel, sand, and clay that have eroded from mountains into adjacent basins. Alluvial fans are prominent hydrologic features of these basins. The fill material allows rapid infiltration of water as it flows over the fans. Basin-fill aquifers are common throughout

1 the NTTR. Depth to groundwater is generally shallow but varies from a few feet to over 1,000 feet. Volcanic rock aguifers consist of rocks with varying degrees of porosity. This 2 aquifer type has potentially high water storage and transmissivity due to pores and 3 fractures but may also have areas of dense welding that inhibit flow. Volcanic rock 4 aguifers are primarily found on the North Range. Carbonate rock aguifers are typically 5 the deepest type and consist of limestones and dolomites. Cavernous carbonate rock 6 has been found at depths of 5,000 feet and may extend locally as deep as 15,000 feet 7 (USGS, 2009). These rocks have numerous features that facilitate significant water 8 movement. Carbonate rock aquifers are common on the southeastern portion of the 9 10 range.

Groundwater moves from recharge to discharge points, typically from areas of higher to 11 lower elevation. Groundwater flow in the region of the NTTR consists of a system of 12 shallow, local flows superimposed on deeper intermediate and regional flows (Belcher & 13 Sweetkind, 2010). Many of the shallow basin-fill and volcanic rock aguifers are confined 14 to individual mountain-valley watersheds (U.S. Air Force, 2010). Flow within these local 15 systems is generally thought to parallel surface topography. Deeper regional water flow 16 does not necessarily coincide with local surface topography. Regional groundwater flow 17 is generally to the west and southwest (Belcher & Sweetkind, 2010). Natural resource 18 areas occurring west and southwest of the NTTR include Ash Meadows National 19 Wildlife Refuge (including Devil's Hole), Nopah Range Wilderness Area, Death Valley 20 National Park, and the Amargosa Wild and Scenic River, among others. Overlying 21 shallow aguifers have various degrees of connectedness to the regional system. 22 Therefore, pumping from the shallow aguifers may impact the regional aguifer. 23

Nevada divides the state into management units called hydrographic basins. These 24 regions are defined by areas drained by a single major stream or by a drainage system. 25 The quantity of water that can be withdrawn from any given basin is controlled by 26 perennial yield, measured in acre-feet per year (AFY), which is the maximum amount of 27 28 water that can be tapped without exceeding the natural recharge rate. Information on the 27 basins associated with the NTTR is provided in Appendix J, Water Resources, 29 Section J.4, Hydrographic Basins within the Nevada Test and Training Range. The 30 basins are shown on Figure 3-36. 31

32 Recharge and Discharge

The hydrographic basins included in the NTTR boundary represent an estimated 33 potential water source of over 49 million acre-feet of groundwater storage (U.S. Air 34 Force, 1991). Groundwater recharge in the NTTR region is primarily supplied by 35 infiltration of snowmelt and winter precipitation that falls in the mountain areas (U.S. Air 36 37 Force, 2010), although groundwater may also flow laterally between local basins. Infiltration in mountain areas occurs mostly through volcanic or carbonate rocks, while 38 infiltration in lower elevations occurs primarily through alluvial fans in basin-fill aguifers 39 (Belcher & Sweetkind, 2010). It is estimated that only about 5 percent or less of annual 40 precipitation in the NTTR region reaches the water table, with the remainder being lost 41 to evapotranspiration (U.S. Air Force, 1991; Moreo et al., 2014). Groundwater discharge 42 occurs through (1) seeps and spring flow, (2) evaporation, (3) transpiration, (4) pumping 43

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for irrigation or other uses, and (5) subsurface flow between aquifers (U.S. Air Force,
 2017m; Belcher & Sweetkind, 2010; USGS, 2009). Spring and seep flow and
 evapotranspiration are the primary types of discharge. Many springs, particularly those
 down-gradient of the NTTR, are supplied by discharge from the regional aquifer.

5 Water Quality

Groundwater quality is often expressed in terms of the composition and concentration of 6 dissolved solids, although other factors may be used as well. Groundwater dissolves 7 minerals from the rocks with which it comes in contact. Most of these minerals are 8 harmless at low concentrations but may become hazardous in large concentrations. 9 10 Water is generally not considered desirable for drinking if the concentration of dissolved minerals is greater than about 1,000 milligrams per liter (mg/L) (USGS, 2013b). The 11 most common dissolved materials in groundwater samples taken from supply wells on 12 the Nevada Test Site included sodium, potassium, calcium, magnesium, silicon dioxide, 13 bicarbonate, chlorine, sulfate, nitrate, fluorine, bromine, and phosphate (Paces et al., 14 2012; Chapman & Lyles, 1993). Numerous other trace elements were present as well. 15

Water quality of basin-fill aquifers varies within and between basins (USGS, 2009). 16 Groundwater tends to be fresh at the basin margins and on alluvial fan slopes, with 17 increased dissolved solid concentration in the central portion of basins (Lopes, 2006). 18 The groundwater beneath playas of smaller closed valleys may be brackish. Dissolved 19 solids commonly include calcium, sodium, magnesium, and bicarbonate (U.S. Air Force, 20 2017m). Volcanic-rock aquifers are typically dominated by calcium, sodium, and 21 bicarbonate, while carbonate-rock aquifers contain predominantly calcium, magnesium, 22 and bicarbonate. Geothermal waters can contain high concentrations of chemicals such 23 as arsenic, boron, fluoride, and lithium (U.S. Air Force, 2017m). Arsenic concentrations 24 in groundwater are generally high in Nevada (Walker & Montecinos, 2007). 25

The USGS previously conducted a groundwater quality study of the carbonate-rock 26 aquifer of the Great Basin in Nevada and Utah (Schaefer, Thiros, & Rosen, 2005). One 27 well near the southern border of the Nevada Test Site was sampled. Primary and 28 secondary drinking water standards were exceeded for some constituents such as 29 arsenic, chloride, radon, and dissolved solids. Pesticides and their metabolites were 30 present in very low concentrations. Other than this study, groundwater quality 31 information is largely limited to regional data on dissolved solids concentrations and the 32 dominant chemical type (U.S. Air Force, 2010). Groundwater in the North Range is 33 typically rich in sodium bicarbonate, with dissolved solids concentrations of less than 34 500 mg/L. Dissolved solids concentrations in the South Range are generally higher 35 (from 500 to 1,000 mg/L), and the dominant chemicals are calcium bicarbonate and 36 37 sodium bicarbonate. There are 14 active wells permitted within the NTTR that are monitored for drinking water standards (U.S. Air Force, 2017m). The MCLs for regulated 38 parameters have previously not been exceeded for any of the wells where data were 39 available (U.S. Air Force, 1998). 40

Historic nuclear testing at the Nevada Test Site (now known as the NNSS) resulted in areas of radioactive groundwater contamination. Although such nuclear testing is no longer conducted, this type of contamination can persist for thousands of years. The contamination is generally moving southwest from the NNSS at a rate of up to 300 feet per year (U.S. Air Force, 2017m). Groundwater testing is conducted regularly for occurrence of radionuclides (e.g., tritium) on and near the NNSS. Off-site sampling occurs at public and private community wells and at wells on the NTTR. The most recently published sampling results (for 2015) revealed no contamination at any public or private wells or springs (National Security Technologies, LLC, 2016). However, tritium was detected at very low levels in an early detection well on the NTTR.

8 Alternative 3A – Range 77 – EC South Withdrawal (and Amended Alternative 3A-1)

Overall groundwater characteristics of the Range 77 withdrawal area are the same as those discussed above for the existing NTTR withdrawal. The potential withdrawal area is associated with hydrographic basins 146 and 228. Basin 146 is currently overallocated, while only 5 percent of groundwater is allocated in basin 228 (U.S. Air Force, 2017m).

14 Alternative 3B – 64C/D and 65D Withdrawal and Administrative Incorporation

Overall groundwater characteristics of the Range 64C/D and 65D withdrawal area are the same as those discussed above for the existing NTTR withdrawal. The potential withdrawal area is associated with hydrographic basins 160, 161, 225, and 211. Basin 161 is currently substantially overallocated, while basin 211 is allocated at about 100 percent (U.S. Air Force, 2017m). Allocations are shown as 0 percent for basins 160 and 225.

21 Alternative 3C – Alamo Withdrawal

Overall groundwater characteristics of the Alamo withdrawal areas are the same as those discussed above for the existing NTTR withdrawal. The potential withdrawal area is associated with hydrographic basins 168, 169B, 209, 210, 211, and 212. Most of these basins are at or over their allocations (U.S. Air Force, 2017m).

26 **3.11.1.7 Water Rights and Improvements**

27 **Existing NTTR Boundary (Alternatives 1 and 2)**

The NRS assign jurisdiction over surface and groundwater rights and appropriations to the Nevada State Engineer's Office. Surface water appropriations and adjudication of vested surface water rights are included in NRS 533. Appropriations are based on availability and seniority of appropriations. Groundwater appropriations are covered under NRS 534 and are based on the perennial yield of each basin with special provisions for temporary appropriations and adjudication of overallocated basins. Specific standards for well drilling are further detailed in NAC 534.

35 Surface Water

Available information indicates that surface water is currently appropriated from 83 springs and other sources for use within the proposed NTTR withdrawal extension and expansion areas (U.S. Air Force, 2017m). A total of 27 surface water rights are

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appropriated to the Air Force/DoD. The BLM holds five surface water permits, while the USFWS holds six permits. The remaining water rights are owned by other federal agencies or are privately appropriated. The 83 total appropriations represent about 374 acre-feet annually (AFA), with the Air Force holding permits for about 188 AFA (50 percent) of this total. Privately held water rights account for only 21 AFA, or 7 percent of the total.

7 The majority of surface water rights owned by federal agencies have apparently been transferred from original owners whose principal use was likely ranching (U.S. Air 8 Force, 2017m). These surface water appropriations are presumably not currently used 9 for direct mission support activities by the Air Force. Therefore, some appropriated 10 surface water on the NTTR likely goes unused for its intended purpose but may be used 11 by wildlife. Most of the USFWS's water rights are used to support wildlife. Surface water 12 rights and appropriations for each individual basin are provided in the Water Resources 13 Report (U.S. Air Force, 2017m). 14

15 Groundwater

There are currently 44 groundwater rights permits within the proposed NTTR withdrawal 16 extension and expansion areas (U.S. Air Force, 2017m). These permits are associated 17 with a total of 11,273 AFA. The Air Force holds 19 of these permits, corresponding to 18 1,837 AFA (16 percent of the total). Twenty-four of the water rights are privately held. 19 The majority of groundwater rights owned by federal agencies appear to have been 20 transferred from the original owners whose principle uses were for ranching. These 21 appropriations are presumably not being used for direct mission support, so the 22 allocated groundwater may go unused. Of the 27 hydrographic basins associated with 23 the NTTR, 10 are currently either fully allocated or overallocated. Detailed information 24 for each basin is provided in the Water Resources Report (U.S. Air Force, 2017m). 25

Nevada State Division of Water Resources records indicate that there are a total of 26 176 water wells present within the boundaries of the proposed NTTR withdrawal 27 extension and expansion areas (U.S. Air Force, 2017m). Nineteen of these rights are 28 appropriated by the Air Force (Nellis AFB or U.S. Air Force). The remaining rights are 29 held by other federal agencies or are privately held. Air Force groundwater use records 30 (from 2014), obtained from Nevada Division of Water Rights records and Air Force 31 correspondence, indicate that about 1.592 AFY were allocated for all wells combined, 32 while only 255 AFY (16 percent) were actually used (U.S. Air Force, 2017m). The 33 percentage of allocation used for individual wells ranged from 0 to 109 percent. 34

35 Alternative 3A – Range 77 – EC South Withdrawal (and Amended Alternative 3A-1)

There are no surface water rights identified in the Range 77 withdrawal area. Two well logs are associated with Alternative 3A, but none occur within the boundary of Alternative 3A-1. One groundwater right occurs near the boundary of Alternative 3A.

39 Alternative 3B – 64C/D and 65D Withdrawal and Administrative Incorporation

- 40 There are no surface water rights identified in the Range 64C/D and 65D withdrawal
- 41 area. One groundwater right and several well logs are associated with this area.

1 Alternative 3C – Alamo Withdrawal

- 2 Three surface water rights are present in the Alamo withdrawal areas. In addition, three
- 3 groundwater rights and three well logs are associated with the area.

4 3.11.2 Environmental Consequences

5 3.11.2.1 Analysis Methodology

6 Water resources that could be affected by each component

7 of test and training activities were identified. Potential 8 impacts to these resources under each alternative were For the Native American perspective on information in this section, please see Appendix K, paragraph 3.11.2.1.

then evaluated from a programmatic perspective. Historical nuclear device testing at the 9 NNSS has resulted in radiological contamination of groundwater in the area. However, 10 management of this contamination is conducted by NNSS under DOE's Environmental 11 Management Program and is not within the scope of this LEIS. A Federal Facility 12 Agreement and Consent Order (FFACO) was established in 1996 between the State of 13 Nevada, DOE, and DoD to formalize cleanup and monitoring commitments related to 14 previous nuclear testing (DOE, 2011). Due to the depth of affected groundwater and the 15 complex geology of the area, there is currently no technology adequate to remove the 16 contamination from groundwater (DOE, 2016b). Therefore, DOE has an agreement with 17 the State of Nevada outlining protection strategies for nearby communities. The strategy 18 consists of establishing a network of groundwater sampling wells that are used to 19 forecast the location, direction, speed, and extent of contaminant migration. A total of 20 11 sampling wells are located on the NTTR. The NNSS is required to prepare annual 21 reports that provide monitoring results, among other information. The most recent report 22 covers 2015 activities (National Security Technologies, LLC, 2016). 23

3.11.2.2 Alternative 1 – Extend Existing Land Withdrawal and Management of NTTR (North and South Range) – Status Quo

- Aircraft operations and emitter operations would not result in direct or indirect impacts to water resources and are not
- evaluated in this section.
- 29 For Alternative 1, the current levels and locations of

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.11.2.2.1.

munitions use would continue. Munitions may be deployed from aircraft and by ground personnel. On the North Range, munitions use consists of live and inert ordnance deployed on target impact areas and blank small-arms ammunition. SNL activities also include explosion testing. Most target impact areas are located in valleys. On the South Range, target areas are restricted to playas located below 4,000 feet altitude. Small arms are also used on the South Range.

Potential impacts to water resources include contamination that could result from introduction of metals (e.g., ordnance casings, target debris), explosive material contained in UXO, and explosives residues. Munitions are not purposely used within or dropped directly into surface waters. Impacts would result from contaminants infiltrating or being carried to water resources. In general, metal and chemical constituents may

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flow to receiving surface waters in runoff during heavy rainfall. Contaminated soil may 1 also be transported to surface waters by wind. Metal and chemical constituents may 2 reach groundwater and associated aquifers as water at the surface infiltrates the 3 ground, or through wells. Metal and chemical materials that reach streams or aquifers in 4 sufficient quantity may exceed water quality standards. Floodplains are associated with 5 numerous playas and alluvial fan systems on the NTTR. Munitions use would occur in 6 some playas and other potential floodplain areas but would not alter the hydrologic 7 function of floodplains. Potential impacts would be associated with transport of metal 8 and chemical materials. 9

Contamination potential is generally influenced by the geography, hydrology, and 10 climate of the NTTR region. Target impact areas are typically located in valley bottoms 11 that are, in many cases, closed basins. The lack of connection to surface waters outside 12 these basins minimizes the potential for contaminant runoff. In addition, contaminants 13 tend to be immobilized by the clay that is prevalent in valley soils. Groundwater 14 recharge on valley floors is typically limited and occurs primarily in mountain areas and 15 through alluvial fans. Some types of ordnance use occurs in areas other than valley 16 floors. However, the depth to groundwater at the NTTR reduces the potential for 17 downward contaminant migration. Current management guidelines specify that 18 exploding ordnance is not to be used within 200 feet of a well or natural spring (U.S. Air 19 Force, 2010). 20

An investigation of possible contamination of surface soils (which could indicate 21 potential for transport to water features) at representative bombing target areas (U.S. 22 Air Force, 1996) showed that explosives and heavy metals were present in the soils but 23 that concentrations were relatively low overall and posed little human risk. A 24 contamination analysis report prepared in support of this LEIS (U.S. Air Force, 2017n) 25 provides information on more recent investigations into potential off-site migration of 26 ordnance-related contaminants. As described in the report, DoD Directive 4715.11 27 28 requires assessment of operational ranges to protect the public from explosive hazards. The assessments include evaluation of hydrology and hydrogeology, as well as analysis 29 of potential off-range migration of munitions constituents where hydrologic evaluation 30 indicates such migration may occur. Accordingly, range assessments were conducted 31 for the NTTR in 2007 and 2015. The 2007 assessment concluded that there was no 32 viable off-site exposure pathway for surface water or groundwater. An analysis 33 completed in 2015 included sampling of groundwater and soil in ephemeral washes 34 near the southern boundary of the NTTR. Lead and explosive residues were found in 35 soil samples, but the levels were below established background levels at the NTTR and 36 were not expected to pose unacceptable risk to humans or wildlife. Groundwater 37 samples contained lead but at levels below Air Force and EPA screening levels. There 38 was one detection of 2,6-dinitrotoluene above the EPA tap water screening level; the 39 concentration was below levels considered to affect human health. The 2015 results 40 show that at least some munitions constituents are present in groundwater. The 41 presence of ordnance-related materials in washes suggests that conveyance to surface 42 waters is possible. However, the study results do not currently indicate contaminant 43 levels that would raise risk concerns for human health or wildlife. 44

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Depleted uranium (DU) rounds are used in a discreet area of the South Range. DU 1 rounds are not currently used at any other location and would not be used within any 2 potential expansion areas. Activities are subject to requirements of the Nuclear 3 Regulatory Commission (NRC) license (initially granted in 1982) and an established 4 management plan. Although spent DU rounds are collected and recycled annually, 5 some rounds remain in the soil. A summary of various DU investigations are provided 6 by S&B Christ Consulting (2017n). Multiple studies have found little to no migration of 7 DU particles or oxides to soil outside the target area, and little to no radiation has been 8 detected approximately 350 feet from targets. The Air Force conducted a site 9 assessment in the 1990s and concluded there were no effects to water resources. 10 Similarly, an environmental assessment prepared in 2006 concluded that impacts to 11 water resources are unlikely because of the depth to groundwater, slow vertical 12 migration through the soil, and lack of surface waters (U.S. Air Force, 2006). Previous 13 sampling results suggest there has been little surface water transport of DU particles. 14 Modeling results suggest that a 10-year storm would likely not cause any transport of 15 DU particles, while a 100-year storm could result in transport up to 400 feet. Therefore, 16 migration beyond the licensed target area is unlikely. Although DU particles are present 17 in the soil near targets, there is no known contamination of water resources. The 18 average number of DU rounds expended annually between 2002 and 2015 is about 19 8,150, and it is expected that future use levels would be comparable. 20

Munitions use does not have a direct effect on water rights. Indirect effects are 21 associated with facilities that support personnel and potential maintenance and 22 operation activities for targets, threat emitters, or other infrastructure. Munitions use also 23 results in safety-related restrictions to public access of surface and groundwater. Use 24 records indicate total Air Force well water appropriations on the NTTR are underutilized; 25 therefore, allocated groundwater may go unused and be unavailable for the public. The 26 Air Force holds a number of surface water rights that are presumably not required for 27 direct mission support; therefore, some surface water may also go unused. There would 28 be no requirement for additional Air Force surface or groundwater appropriations. Public 29 water rights related to livestock that are not used for this purpose could be lost. Access 30 to water resources for water quality sampling or wildlife management would continue to 31 be coordinated through the Air Force. 32

For Alternative 1, the current types and locations of activities potentially resulting in 33 ground disturbance would continue. Such activities may be generally categorized as 34 placement of targets and other equipment, MCO activities, and IW activities. Targets, 35 ground equipment (e.g., radar, electronic jamming devices), threat emitters, and 36 monitoring and tracking equipment are placed throughout the NTTR. Facilities 37 construction may also be required. Threat emitter placement requires construction of a 38 39 base (150 feet by 150 feet). MCO and IW exercises involve ground forces. During IW activities, troops navigate terrain primarily on foot but may also use vehicles. Troop 40 movement usually occurs on established roads or in mountainous terrain but 41 occasionally occurs in riparian areas. Troops may be inserted at drop/landing zones. 42 Most vehicle operation is restricted to existing roads and existing trails, but some off-43 road use occurs. MCO exercises mostly occur on the North Range, while IW exercises 44

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may occur on the North or South Ranges. However, on the South Range, IW activities 1 are restricted to established impact areas. In general, potential direct impacts to water 2 resources could result from personnel movement or vehicle operation in streams, 3 springs, seeps, or wetlands. Substantial ground disturbance in floodplains, such as that 4 associated with large construction projects, could affect floodplain function. Potential 5 indirect effects consist of soil erosion caused by equipment placement, personnel and 6 vehicle movement, troop insertion, and target and road maintenance activities. Erosion 7 can lead to sedimentation or introduction of contaminants into surface waters. In 8 sufficient quantity, sediments and contaminants can negatively affect water quality. 9

Ground-disturbing activities with the potential for direct impacts, including construction 10 and vehicle operation, are avoided within streams and wetlands. Personnel movement 11 generally does not occur in wetlands, although some riparian areas may be wetlands 12 (site-specific determinations would be necessary). Potential indirect impacts to streams, 13 wetlands, and other surface waters related to erosion are possible but are generally not 14 expected to be substantial due to the small amount of soil disturbance during IW 15 activities and soil-specific mitigations that could be implemented for larger activities, 16 such as MCO exercises (Section 2.8, Mitigation). IW training involves a relatively small 17 number of troops who strive to maintain a small mission footprint. Most movement is on 18 foot and on established roads or mountainous terrain. Soil impacts are generally 19 considered negligible due to the small number of troops involved and the infrequency of 20 disturbing any given area. However, MCO activities may involve a substantially larger 21 number of personnel and equipment. All proposed activities with the potential to directly 22 or indirectly impact streams, springs, seeps, or wetlands would be evaluated by NTTR 23 personnel, and avoidance and minimization actions would be identified as applicable. 24 Soil-specific mitigation measures that would decrease the potential for erosion impacts 25 to surface waters could potentially include minimizing the size of troop units, rotating 26 troop movement corridors, and avoiding movement through areas that show signs of 27 erosion. With implementation of these actions, there would be no direct adverse impacts 28 to wetlands or other surface waters. 29

Although some existing improvements may be located within floodplains (U.S. Air 30 Force, 2017h), large construction projects in floodplains generally do not occur on the 31 NTTR. Occasional personnel movement, vehicle operation, or placement of relatively 32 small equipment (e.g., threat emitters, tracking equipment) in floodplains would not alter 33 flood flow characteristics or cause adverse effects to existing structures. However, 34 disturbance of floodplain soils, particularly on alluvial fans or other elevated areas, may 35 increase sediment and contaminant conveyance during periods of water flow. This may 36 spread sediments and any associated contaminants, concentrate them in playas, or 37 carry them off-site. All construction and mission activities are evaluated by NTTR 38 personnel to determine potential impacts to floodplains, and avoidance and 39 management actions are identified as applicable. 40

13.11.2.3Alternative 2 – Extend Existing Land Withdrawal and Provide Ready2Access in the North and South Ranges

3 Aircraft operations and emitter operations would not result

4 in direct or indirect impacts to water resources and are not

5 evaluated in this section.

6 Potential impacts due to munitions use would generally be 7 the same as Alternative 1 and would include introduction of

/ Ine same as Alternative 1 and would include introduction of

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.11.2.3.1.

metals, explosive material, and explosives residues into surface water or groundwater. 8 Impacts would result from contaminants infiltrating the ground or being carried to water 9 resources by runoff or wind. Metal and chemical constituents that reach surface water 10 or groundwater and associated aquifers may negatively affect water quality. Differences 11 under Alternative 2 would consist of additional locations used for test and training 12 activities and an increase of 30 percent in ordnance use associated with MCO and IW 13 activities on the South Range. MCO and IW activities would increase the amount of 14 15 ordnance used on the existing impact areas and could introduce the use of blanks in interstitial areas not currently utilized. Increased ordnance use would result in a 16 corresponding increased potential for ordnance and target constituents to reach surface 17 waters and groundwater. Aircraft ordnance would be used on existing target areas, but 18 the specific locations and quantities of blanks are unknown. NEPA analysis (including 19 water resource evaluation) would be conducted for all new activities. Future operations 20 or new facilities could result in additional water use. It is likely that Air Force 21 requirements could be fulfilled through current or transferred rights. Surface water and 22 groundwater not used by the Air Force could go unused due to public access 23 restrictions. The USFWS holds water rights on the South Range for the purpose of 24 wildlife support, and these water rights would not be voided under Alternative 2. Access 25 protocols to the South Range for water quality and wildlife management actions would 26 be developed at the appropriate time. 27

The types of activities resulting in ground disturbance would generally be the same as 28 Alternative 1 and would include placement of targets and other equipment (e.g., radar, 29 electronic jamming devices, threat emitters), MCO activities, and IW activities. Facilities 30 construction may also be required. Ground forces navigate terrain primarily on foot but 31 32 may also use vehicles. Potential direct impacts to water resources could result from personnel movement or vehicle operation in surface waters and wetlands. Potential 33 indirect effects consist of soil erosion caused by equipment placement, personnel and 34 vehicle movement, troop insertion, and target and road maintenance activities. Erosion 35 can lead to sedimentation or introduction of contaminants into surface waters. In 36 sufficient quantity, sediments and contaminants can negatively affect water quality. 37 Differences under Alternative 2 would consist of a 30 percent increase in personnel 38 movement, vehicle operation, and target/equipment placement due to MCO and IW 39 activities on the South Range. Some activities would likely occur in areas of the South 40 Range that have not been previously used for MCO or IW events. Personnel movement 41 and placement of emitters and other equipment could occur in interstitial areas and at 42 locations above 4,000 feet. Troop movement and vehicle use would be avoided in 43
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seeps, springs, and wetlands. However, ground disturbance in other areas may result in erosion and deposit of sediments and contaminants into surface waters. The potential would be greater relative to Alternative 1 due to the increase in range utilization. All new activities with the potential to directly or indirectly impact water resources would be subject to review by appropriate NTTR personnel and NEPA analysis, and avoidance and minimization actions would be identified as applicable.

7 3.11.2.4 Alternative 3 – Expand Withdrawal of Public Lands for the NTTR

8 Alternative 3 includes subalternatives, as described in 9 Section 2.3.3:

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.11.2.4.1.

- Alternative 3A Range 77 EC South Withdrawal
 Alternative 3A-1 Amended Range 77 EC South
- 12 Withdrawal
- Alternative 3B Range 64C/D and 65D Withdrawal and Administrative
 Incorporation
- Alternative 3C Alamo Withdrawal

16 Aircraft operations and emitter operations would not result in direct or indirect impacts to

- water resources on lands proposed for expansion with Alternatives 3A, 3A-1, 3B, or 3C
- and are thus not discussed further in this section.

The proposed expansion areas for Alternative 3A or 3A-1 would serve only as a safety 19 buffer and as an operational security and safety buffer for Alternative 3B. There would 20 be no ordnance use within the geographic boundaries associated with the proposed 21 expansion areas of Alternatives 3A, 3A-1, and 3B and, therefore, no potential for 22 surface water or groundwater contamination due to ordnance use. Non-Air Force water 23 permits could be abrogated or acquired by the Air Force to avoid safety and security 24 issues. Public access restriction could affect water quality sampling in the upper 25 Amargosa River watershed for Alternatives 3A and 3A-1. Access protocols for activities 26 27 related to water quality for Alternatives 3A, 3A-1, and 3B and wildlife management for Alternative 3B would be developed. 28

For Alternative 3C, the 30 percent increase in munitions use would include small-arms 29 blanks expended during IW activities and would result in increased potential for 30 ordnance constituents to reach water resources. Metals, explosive material, and 31 explosives residues could reach surface water or groundwater as a result of infiltration, 32 runoff, or wind. Metal and chemical constituents that reach surface water or 33 groundwater and associated aquifers may negatively affect water quality. Although the 34 potential for metal and chemical contamination is decreased by the typical target 35 locations (closed basins), soil conditions, and depth to groundwater, some munitions 36 constituents (lead and 2,6-dinitrotoluene) have been found in groundwater on the 37 NTTR. However, the concentration of these materials does not currently indicate 38 contaminant levels that would raise risk concerns for human health or wildlife. IW 39 activities involve a small number of troops and are designed to leave no evidence of 40 troop presence. Accordingly, munitions are limited to items such as blank small-arms 41

ammunition, flares, smoke grenades, and other training munitions such as paint balls. 1 These types of munitions have a relatively low potential to introduce metals and 2 explosive materials into surface water or groundwater. Although the specific locations 3 and quantities of blanks or other items are unknown, NEPA analysis would be 4 conducted for all new activities. Future actions could result in the requirement for 5 additional industrial water for construction and maintenance of new structures. 6 Increased requirements could possibly be fulfilled through current or future transferred 7 rights. Additional water could also potentially be obtained through application to the 8 Nevada Division of Water Rights, although most water basins associated with the 9 Alternative 3C proposed expansion area are currently at or over allocation. With the 10 exception of Corn Creek station, all surface water rights on the DNWR are currently 11 used for wildlife and do not support human consumption. Any future requirements for 12 additional water would be assessed through NEPA-related environmental analysis. 13 Surface water and groundwater not used by the Air Force could go unused due to public 14 access restrictions. Access to the South Range for water quality and wildlife 15 management actions would likely be more restricted, and access protocols would need 16 to be developed. 17

For Alternatives 3A, 3A-1, and 3B, there would be no ground disturbance within the 18 geographic boundary of the proposed expansion areas, other than installation of fencing 19 and limited associated potential for erosion-related impacts to water resources within 20 the proposed expansion area. Substantial soil disturbance would be avoided during 21 perimeter fencing construction, resulting in minimal potential for erosion. Erosion control 22 measures would be implemented as applicable. For Alternatives 3A and 3A-1, fencing 23 would cross two headwater areas of the Amargosa River. For Alternative 3B, perimeter 24 fencing would cross areas of intermittent surface water. Fence construction would occur 25 in accordance with BLM design standards for such areas and could include alternate 26 methods (flotation boards, floating gaps, etc.) as applicable. The overall 30 percent 27 increase in operations described under Alternative 2, along with the corresponding 28 potential for impacts to water resources resulting from erosion and deposit of sediments 29 and contaminants into surface waters, would be included under Alternatives 3A, 3A-1, 30 and 3B. Impacts could occur as a result of placement of targets and other equipment 31 (e.g., radar, electronic jamming devices, threat emitters), MCO and IW activities, and 32 facilities construction. Ground forces navigate terrain primarily on foot but may also use 33 vehicles. While IW activities involve a small number of troops and typically leave little to 34 no evidence of troop activity, MCO activities may involve a substantially greater number 35 of personnel, but these personnel are associated with aircraft training and not ground 36 37 disturbance activities. Potential direct impacts to water resources could result from personnel movement in surface waters and wetlands. However, vehicle operation is not 38 39 planned to occur in surface waters or wetland areas based on current management actions implemented on the NTTR. Potential indirect effects consist of soil erosion 40 41 caused by equipment placement, personnel and vehicle movement, troop insertion, and target and road maintenance activities. Erosion can lead to sedimentation or 42 introduction of contaminants into surface waters. In sufficient quantity, sediments and 43 contaminants can negatively affect water quality. All new activities with the potential to 44 directly or indirectly impact water resources would be subject to review by appropriate 45

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1 NTTR personnel and NEPA analysis, and avoidance and minimization actions would be 2 identified as applicable.

For Alternative 3C, ground disturbance would result from MCO and IW activities, 3 potentially including personnel and vehicle movement, construction of two runways, 4 road improvements, and placement of emitters and communication sites. Ground 5 disturbance resulting from an overall 30 percent increase in operations may result in 6 7 erosion and deposit of sediments and contaminants into surface waters. NWI wetlands have been identified with a potential IW insertion point, although direct impacts to 8 jurisdictional wetlands would be avoided. For Alternative 3C, fuel spills could occur 9 during FAARP activities and, in general, fuel would have the potential to migrate to 10 groundwater or be carried to surface waters during rainfall. However, spill response 11 actions are a component of FAARP and are incorporated into training preparation. 12 FAARP activities could occur in a dry lake bed where runoff to surface waters is 13 unlikely, and the typically high clay content of such areas decreases the infiltration of 14 contaminants through the soil. Any additional water requirements would likely be met by 15 an existing permitted source. Additional water could potentially be obtained by 16 application through the Nevada Department of Water Resources, although the Alamo 17 areas primarily consist of water basins that are at or over allocation. All activities would 18 be subject to review by appropriate NTTR personnel and NEPA analysis, and 19 avoidance and minimization actions would be identified. For Alternative 3C, perimeter 20 fencing would cross two areas of intermittent surface water in the northeastern portion; 21 placement would occur in accordance with BLM design standards for sites containing 22 permanent or intermittent water. The potential loss of recreational areas associated with 23 the Alternative 3C proposed expansion area could result in a shift of recreational 24 activities to other locations in the region. However, potential direct and indirect (erosion) 25 impacts to surface waters resulting from recreational activities would not be expected to 26 increase in magnitude or duration, and there would be no overall effects to water 27 28 resources.

29 **3.11.2.5** Alternative 4 – Establish the Period of Withdrawal

The proposed withdrawal periods associated with Alternative 4—Alternative 4A (20-year 30 withdrawal period), Alternative 4B (50-year withdrawal period), and Alternative 4C 31 (indefinite)-must be implemented in conjunction with one or more of the other 32 alternatives or subalternatives. Because Alternative 4 reflects periods of time, which do 33 not in and of themselves affect water resources, there are no specific impacts 34 associated with Alternative 4, except to provide a point in time at which impacts from 35 other chosen Alternatives may end. For example, generally, increased duration of the 36 withdrawal period would correspond to increased deposition of ordnance and target 37 constituents, as well as erosion potential. Restricted access to water resources for 38 water quality and wildlife management actions would also be extended, although it is 39 expected that access protocols would be developed. 40

For the Native American

Appendix K, paragraph

K-44 and K-60.

perspective on information in this section, please see

3.12.1.1.1 Hazardous Materials

and Solid Waste on both pages

1 3.11.2.6 No Action Alternative

2 Implementation of the No Action Alternative would result in the cessation of much of the water-related potential for impacts due to military testing and training. Other 3 appropriated land uses (e.g., mining, livestock) could be reintroduced and would likely 4 require evaluation regarding impacts to water resources. If the land were returned to the 5 BLM and USFWS, water rights would remain the property of the Air Force unless the 6 BLM or USFWS requested that the water rights be vacated or transferred to the BLM or 7 USFWS. Federal agencies would follow the Nevada State Division of Water Resources 8 process for transferring or vacating water rights. 9

10 3.12 HAZARDOUS MATERIALS AND SOLID WASTES

11 **3.12.1 Affected Environment**

12 3.12.1.1 Description of Resource

13 This section describes the affected environment as it relates

to hazardous materials and solid and hazardous wastes. This section also discusses hazardous constituents that could be released from operational activities (e.g., fuels) or from munitions used in training activities, as well as management and reporting activities related to these constituent releases. Proposed activities may also impact existing U.S. Air Force contamination sites, including sites managed under the Environmental Restoration Program (ERP) or DOE.

20 3.12.1.2 Region of Influence

The ROI for hazardous materials and solid and hazardous and wastes is defined as the boundary of the NTTR and potential expansion areas, including ERP/contaminated sites and other areas where hazardous materials would be utilized and hazardous wastes would be generated or solid wastes would be generated and disposed of as part of the Proposed Action.

26 3.12.1.3 Hazardous Materials

Installation operations and maintenance processes, such as aircraft, vehicle, equipment
and facilities maintenance, target refurbishment, and electronic countermeasures
emitter repair, require the use of hazardous materials. These materials include paints,
solvents, thinners, adhesives, aircraft fuel, diesel, gasoline, lubrication oils, brake and
hydraulic fluids, cleaners, batteries, acids, chlorofluorocarbon refrigerants, herbicides,
insecticides, rodenticides, and compressed gases.

To administer these materials, the NTTR has implemented a comprehensive hazardous material management process, including the use of a hazardous materials dispensary (HAZMART). This process provides management for the procurement, handling, storage, and issuing of hazardous material. The HAZMART process includes review

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and approval by Air Force personnel to ensure users are aware of environmental, health, and safety risks.

Air Force contractors must also store and use hazardous materials in compliance with 3 applicable regulations and Air Force instructions. The Air Force maintains data within 4 the supply system that can be used to generate listings of the hazardous materials used 5 for various purposes/processes at the ranges and operations areas. Range personnel 6 may obtain hazardous materials at the HAZMART or through other on-base government 7 supply outlets, such as the Contractor Operated Parts Store or the Contractor Operated 8 Civil Engineering Supply Store. Requests for hazardous materials that are processed 9 through one of these alternate supply outlets are also reviewed for environmental, 10 health, and safety risks. 11

Emergency response procedures and site-specific contingency plans have been 12 established for all hazardous materials locations. For example, site-specific spill 13 prevention, control, and countermeasures plans are in effect and include procedures 14 and responsibilities for responding to a hazardous material spill or other incidents. 15 Additionally, the NTTR has developed programs to comply with all federal/state 16 hazardous materials reporting requirements. This effort includes submittal to the state 17 and local emergency planning committees and local fire departments of annual Tier II 18 forms, which are updated inventories of hazardous materials (e.g., jet fuel, diesel) or 19 extremely hazardous substances in excess of specific threshold limits. 20

BLM has also implemented a Hazard Management and Resource Restoration Program, 21 better known as Hazardous Materials Management (HAZMAT), to manage hazardous 22 materials associated with operations (primarily vehicle operations and maintenance and 23 This program supports the DOI's goal of protecting lives, 24 pest management). property and improving the health of landscapes 25 resources. and and watersheds. Typical hazards and hazardous materials addressed by the HAZMAT 26 Program include hazardous substance releases from abandoned mine facilities and 27 landfills, illegal dumping of hazardous materials, UXO, and physical safety hazards 28 associated with abandoned structures, oil spills, wire burns, cast-off equipment and 29 radioactive material. 30

In addition, the USFWS has implemented a comprehensive program to manage hazardous materials associated with operations and maintenance. USFWS Service Manual Parts 560-564, Pollution Control and Environmental Compliance, provides guidance for employees to reduce or eliminate the quantity of toxic and hazardous chemicals and materials used and to manage and properly dispose of hazardous materials at USFWS facilities.

37 3.12.1.4 Hazardous Waste Management

Hazardous wastes at the NTTR are generated during operations and maintenance activities. The types of wastes generated include combustible solvents from parts washers, fuel filters, metal-contaminated spent acids from aircraft corrosion control, waste paint, solvents and paint-related wastes (e.g., paper with chrome from overspray), corrosive liquids, sludge from wash racks, waste aviation fuel from the

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cleaning out of tanks, and used plastic or glass blasting media. Other wastes generated 1 include waste fluorescent lamps and other mercury-containing equipment (e.g., 2 thermostats) and used batteries. Waste lamps and batteries are managed and recycled 3 as universal wastes and do not count toward hazardous waste accumulation totals. 4 Small quantities of hazardous wastes may also be generated from munitions use. 5 These wastes would be associated with unexploded chemical residues and managed 6 as reactive hazardous wastes. 7

Hazardous wastes are initially stored at initial accumulation points (IAPs) at shops and 8 other work locations. The number and location of hazardous waste generators or 9 "shops" may change over time to reflect changes in mission objectives, including the 10 addition of new tenant and contractor organizations, relocation of military units, changes 11 in industrial processes, and changes in the regulations. No more than 55 gallons of 12 hazardous waste or 1 quart of acutely hazardous waste can be accumulated at these 13 IAPs. Once this storage limit is reached, the waste is transferred to a central 14 accumulation point (CAP) (Nellis AFB, 2010). 15

Nellis AFB is a large-quantity generator of hazardous wastes and operates a CAP 16 designated to service all on-base hazardous waste generators and IAPs located in 17 Areas 1, 2, and 3. Tonopah Test Range is also a large-guantity generator and operates 18 a separate CAP designated to service all hazardous waste generators and IAPs at 19 Tonopah and Tolicha Peak. These CAPs may store wastes on-site for up to 90 days 20 (Nellis AFB, 2010). 21

There are two temporary CAPs operated in accordance with the Resource Conservation 22 and Recovery Act (RCRA) (permit # NV5570024112) to collect hazardous waste from 23 the point of use for characterization and shipment for disposal. The NTTR CAP is a 24 large quantity generator that collects waste from NTTR and Tolicha Peak. This storage 25 area may hold waste for up to 90 days as specified for a large quantity generator. Both 26 CAPs are inspected every year by the NDEP, and neither has been found in violation or 27 noncompliance in the past three years (U.S. Air Force, 2017n). Creech AFB is 28 classified as a hazardous waste small-quantity generator and operates a 180-day CAP 29 to service Creech AFB, Silver Flag Alpha, and Point Bravo hazardous waste generators 30 and IAPs (Nellis AFB, 2010). 31

The off-installation disposal of hazardous wastes is coordinated through the Defense 32 Logistics Agency, which prepares the required paperwork for transport and disposal of 33 these wastes through a licensed waste contractor. Nellis AFB has implemented a 34 Hazardous Waste Management Plan that identifies hazardous waste generation areas 35 and addresses the proper packaging, labeling, storage, and handling of hazardous 36 The plan also addresses record keeping; spill contingency and response 37 wastes. requirements; and education and training of appropriate personnel in the hazards, safe 38 handling, and transportation of these materials (Nellis AFB, 2010). 39

40 The Air Force and their subcontractors have policies and procedures in place to prevent hazardous waste spills from occurring. Pre-positioned spill kits containing absorbent 41 materials, cleanup material, and personal protective equipment are stored at each IAP 42 and CAP. When spills do occur, they are cleaned up following the procedures described 43

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in the Hazardous Waste Management Plan and reported to the Installation
 Environmental Spill Coordinator or the Nevada Division of Emergency Management, as
 appropriate (Nellis AFB, 2010).

Under their respective programs (as discussed in Section 3.12.1.3, Hazardous Materials), BLM and the USFWS also manage and dispose of hazardous wastes, primarily in accordance with applicable NDEP and federal requirements. These agencies also work with EPA, NDEP, and potentially responsible parties (both public and private) to fund and expedite the cleanup of hazardous waste sites.

9 **3.12.1.5** Department of Defense Environmental Monitoring Program

10 The following addresses U.S. Air Force (DoD) 11 contamination sites managed/identified under various 12 programs. No contamination sites are located within the 13 proposed expansion areas associated with Alternative 3.

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.1.5.1.

14 Environmental Restoration Program

The DoD developed the ERP, formerly the Installation Restoration Program, to identify and investigate potentially hazardous material disposal sites on DoD property. The objective of the ERP is to evaluate whether migration of any hazardous contaminants into the surrounding environment has occurred and control or eliminate hazards to human health and the environment.

The majority of ERP sites on NTTR consist of explosive ordnance disposal (EOD) pits with a mixture of target debris, metal and munitions residue that were closed in the mid-1990s. However, ERP sites also include spills, sewage lagoons, and other sites that required correspondence with the NDEP (U.S. Air Force, 2017n). ERP sites are located on active ranges but areas associated with the specific sites are not currently used/disturbed.

The ERP process begins with a preliminary assessment. If the preliminary assessment 26 identifies that a particular site may be contaminated, then a site investigation is 27 conducted. The site investigation consists of field activities designed to confirm the 28 presence or absence of contamination. A remedial investigation may then be performed 29 if it is necessary to quantify and identify the site contaminants, the extent of the 30 contaminant plume, and pathways of contaminant migration. The findings from the 31 preliminary assessment, site investigation, and remedial investigation may result in 32 either additional investigations or a finding that no further action (NFA) is required. 33

The ERP includes 98 contaminated sites, all of which were issued decision documents by the NDEP by 2007. Ninety-seven out of the 98 ERP sites acquired NFA determinations by decision documents as of 2008. The remaining site is a fuel station spill (case ST-54) located in the North Range that has NDEP "no action at this time" correspondence. Consequently, there were no ERP sites on the NTTR requiring further investigation or remediation, and there were no immediate plans for further corrective action (U.S. Air Force, 2017n).

1 Areas of Concern

A similar identification and characterization for areas of concern (AOCs) was conducted by the Air Force in February 2003. These AOCs included contamination related to munitions and industrial activity. Thirty-four of 73 identified sites were also included under the ERP For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.1.5.1.1.

(discussed above). Forty-seven AOCs were located at the South Range and 24 AOCs
were at the North Range. The locations of two AOCs included were unknown. The
report concluded that, based on available information, the two AOCs that were not
located (i.e., AOCs 205 and 206) were possibly AOCs 204 and 512 (two known sites)
and were mistakenly repeated in the narrative as AOC 205 and 206 (U.S. Air Force,
2003).

The 73 AOCs consisted of inactive ranges, munitions and target debris piles, known or possible disposal pits that may have contained target debris, munitions debris and/or construction debris, potential open burn/open detonation areas, and aircraft crash sites. (Note: The term "inactive range" applies to a military range that is not currently being used, but that is still under military control and considered by the military to be a potential range area and that has not been put to a new use that is incompatible with range activities.)

Minor corrective actions were recommended for 31 AOCs, to include: 9 AOCs are recommended to have engineering controls implemented to repair disposal pit covers or to fill and cap, with soil, partially filled trench disposal pits; 4 AOCs are recommended to have engineering controls implemented to fill and cap open trenches with soil; 25 AOCs have debris remaining at the sites (the debris is recommended for removal and proper disposal; and 22 AOCs are recommended to have permanent markers placed at the site to identify the location of disposal pits (U.S. Air Force, 2003).

Twenty-two AOCs were recommended to have permanent markers placed at the site to 27 identify the location of disposal pits. Four AOCs in the southern region of the NTTR and 28 eight AOCs in the North Range are recommended for a site investigation to evaluate the 29 possibility of contamination. The identified AOCs have undergone site investigation and 30 were found to be in concurrence with NDEP requirements and to not pose a threat to 31 human health (U.S. Air Force, 2016g). Currently, no known AOCs remain open. 32 However, these closures may be revisited in the future if laws become more stringent, if 33 the land is returned to public use, or if future information indicates the need to 34 investigate further. 35

36 **Resource Conservation and Recovery Act Facility Assessment**

- 37 Preliminary reviews were conducted to identify locations of
- 38 potential environmental contamination. Locations identified
- 39 for further site inspections were classified as either solid
- 40 waste management units (SWMUs) or AOCs (discussed
- 41 previously). A SWMU is defined by EPA as any discernible

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.1.5.1.1.1.

- 42 waste management unit at a RCRA-permitted facility from which hazardous constituents
- 43 might migrate, regardless of whether the unit was intended for the management of solid

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1 and/or hazardous wastes. This definition includes landfills, container storage facilities,

2 underground storage tanks, aboveground storage tanks, wastewater treatment units,

3 and areas contaminated by routine, systematic, and deliberate discharge from process

areas. It does not include product storage areas and accidental spills from production
 areas.

The SWMUs and AOCs found on the NTTR include electronic countermeasure sites, 6 oil/water separators, acid neutralizing basins and oil interceptors, EOD and target debris 7 disposal pits, initial and central hazardous waste accumulation points, and underground 8 storage tanks and aboveground storage tanks. A total of 272 SWMUs and AOCs were 9 evaluated during the RCRA Facility Assessment. Further investigations were 10 recommended if documented releases had occurred, if a risk was present to human 11 health or the environment, or if a high potential for a significant release existed. All 68 of 12 the sites have been reevaluated and sampled, as appropriate, in accordance with the 13

recommendations (U.S. Air Force, 1999).

15 Munitions Residue

The NTTR has been an active test and training range since 1940, supporting air-to-air gunnery training, advanced weapons testing, simulated target training, and live munitions exercises. Munitions have been used on the range since 1943, and resulting contamination includes LIXO, explosive residue, and target debris

19 contamination includes UXO, explosive residue, and target debris.

The Coronet Clean policy was instituted in 1975 as a revised means of handling munitions through routine maintenance for active range targets, through a process known as range clearance. Note: "Range clearance" is defined as the surface-removal or disposal of material potentially presenting an explosive hazard from the targets

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.1.5.1.1.1.1.

and surrounding areas. This material includes UXO, classified ordnance, inert ordnance debris, and any other range material fired on, or upon a military range. This program entails the identification and removal of target debris and UXOs. However, explosive residue introduced to the soil is left in place. Munitions are managed as follows (U.S. Air Force, 2017n):

- EOD personnel or UXO contractor sweeps out around the target area following
 specific criteria at least every two years.
- Any UXO encountered is inspected. If it is determined that it can be safely
 moved, it is consolidated next to a UXO that cannot be moved and then exploded
 in place.
- 36 3. Once the UXO is deemed safe, the debris is recycled or disposed of in a landfill.
- 4. The disturbed area surrounding the target is backfilled and graded if vegetation
 control is needed. New targets may be placed or reconstructed following grading
 activities.

40 Munitions residue may contain hazardous constituents. These constituents are 41 associated with brass casings and lead rounds (for live rounds) and may include 42 copper, lead, and zinc. Established procedures require that expended brass cases be collected and sent off for recycling; however, items such as lead rounds may not be

2 recovered. Nonhazardous solid waste, such as scrap metal, plastic, paper, etc., may

also be generated depending on the type of munition used.

Releases to the environment from munitions use require reporting to EPA under the 4 Emergency Planning and Community Right-to-Know Act (EPCRA) Toxic Release 5 Inventory (TRI) program. Training is subject to a TRI reporting threshold of 6 10,000 pounds per year for most common chemicals, with lower reporting thresholds for 7 chemicals classified as persistent bioaccumulative toxic. These toxic chemicals include 8 9 lead, with a threshold of 100 pounds. The NTTR has established procedures to comply with TRI reporting requirements and tracks all munitions use on the ranges. In cases 10 where a threshold is exceeded, the NTTR reports on a "Form R" report to EPA the 11 quantity of munitions-related hazardous constituents released to the environment or 12 recovered and recycled. Table 3-45 presents the total quantity of chemicals exceeding 13 applicable thresholds under TRI from 2011 to 2015. 14

		Pounds Released per Calendar Year				
Chemical	2011	2012	2013	2014	2015	Average (2011–2015)
NTTR			-			
Copper	67,457	20,147	18,803	36,076	22,780	33,053
Lead	55,173	17,568	17,223	20,374	10,646	24,197
Manganese	19,947					3,989
Tonopah Test						
Range						
Lead	-	-	100	262	280	128

15 **Table 3-45. NTTR Total On-Site Chemical Releases from Munitions Use (2011 to 2015)**

Source: (EPA, 2016d)

16 **Depleted Uranium Target Assessment**

DU is a mildly radioactive substance resulting from uranium residue that has had most of the radioactive isotopes removed for nuclear fuel or weapons. DU is approximately 30 percent less radioactive than naturally occurring uranium. DU munitions represent a fraction of the For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.1.5.1.1.1.1.1

overall munitions-related contamination. However, due to health concerns surrounding
 use of radiological munitions, they are treated as a category apart from other munitions.

23 Use of factological munitions, they are treated as a category apart from other munitions.

The DU licensed area at the NTTR is located at Range 63 and is the only target area in the United States authorized for air-to-ground firing of DU rounds. The location was determined acceptable to support testing, training, and development of DU munitions due to its remote location. The NRC granted the license to the Air Force in 1982 to use DU rounds at Range 63, and the range has undergone review since licensure (U.S. Air Force, 2017n).

The USFWS requested suspension of the use of DU in 1993 due to concerns for plants and wildlife. The Air Force initiated site assessments to address USFWS concerns. The

assessment findings revealed no effects on soil, water, air quality, wildlife or plants; the

33 USFWS concurred with the Air Force. The target resumed activity in 2002 after a

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1 management plan was developed. Between 2002 and 2015, an average of 2 approximately 8,150 pounds of DU rounds were expended annually at Range (U.S. Air

³ Force, 2017n).

A 2009 decontamination estimate report documented that approximately 180 tank and vehicle targets were listed on the DU library manifest, each with varying degrees of contamination (Bay West and SAIC, 2009). The following summarizes the report findings:

- The primary DU-contaminated material includes the targets themselves.
- Although DU rounds may be present in the targets, their radiation levels are relatively insignificant when compared with the tanks used as targets.
- Of the approximately 180 tanks in the DU library, 18 tanks may be cleaned,
 decontaminated, and qualified for free release, while 162 tanks would not qualify
 for free release but would require disposal as low-level radioactive waste.

Brooks AFB conducted a radiological soil survey of approximately 250 acres to 14 determine the extent of DU contamination and migration in the soil at Target 63-10. 15 16 Their analysis found little to no migration of DU in the soil to land outside of the target array, which corresponded with findings from previous studies. Concentrations of DU 17 typically diminished with distance from the target array and little to no radiation levels, or 18 contamination was observed 350 feet from each of the six tanks. DU contamination was 19 limited to DU rounds and target fragments at approximately 2,000 feet from the center 20 of the target array (Bay West and SAIC, 2009). 21

The use of DU is managed under the *Depleted Uranium Management Plan for the Nevada Test and Training Range at Target 63-10.* The plan includes provisions for the control of DU exposure and disposal or recycling of target debris, range residue, and spent DU ammunition. The plan consults NRC regulations and the *Low-Level Radioactive Waste Policy Act.* Coronet Clean operations are conducted on Target 63-10; the process includes (U.S. Air Force, 2017n):

- EOD personnel or specialty contractors sweep out to a minimum radius of
 300 feet from the farthest targets or when the munition density factor is less than
 five items per acre. Live targets are swept out to a minimum of 500 feet.
- The DU rounds are collected and managed in accordance with the radiation permit and AFI 13-212, Volume 1, Range Planning and Operations, dated April 2015 [AFI 13-212V1]. Target 63-10 is cleared annually, and the rounds are processed through the Air Force radiation safety officer and shipped out for recycling at least annually as well.

36 Surface Soil Sampling at NTTR Bombing Targets

Munitions-related contaminants represent the majority of contamination on the NTTR, with the most recent overall estimate attributing to approximately 99 percent of contamination by weight to munition constituent impacted soil (Bay West and SAIC, 2009). The Air Force has

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.1.5.1.1.1.1.1.

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1 conducted assessments to evaluate the potential for munition constituents to migrate

2 from an operational range to off-range areas and assess associated risks to human

3 health or the environment.

A limited field study was conducted in 2004 that entailed historical records review and 4 environmental sampling. The analytical data from this study did not reveal migration of 5 munition constituents (Weston Solutions, Inc., 2004). A range assessment and 6 7 reevaluation of the sample data from the 2004 limited field study was conducted in 2007 to develop a conceptual site model and further evaluate exposure pathways (Weston 8 Solutions, Inc., 2007). This assessment concluded that there were no viable exposure 9 pathways for soil, surface water/sediment, or groundwater. The 2007 Range 10 Assessment recommended reevaluation of the NTTR in five years (Weston Solutions, 11 Inc., 2007). 12

The most recent Air Force operational range assessment was finalized in May 2015. 13 The report included a two-phase process: gualitative (Phase I) and guantitative (Phase 14 II) assessments. The Phase I assessment was based on review of existing information 15 only, and Phase II consisted of collecting new information obtained through sampling. 16 17 In June 2014, soil samples were collected near the southern boundaries of both the North and South Ranges. Analysis of two samples from ephemeral washes within 18 depositional areas in the South Range detected lead and explosive residues, indicating 19 that contamination was migrating. However, the results were not found to pose an 20 unacceptable risk to humans based on EPA soil screening levels for lead and available 21 studies on the effects of explosive residue on terrestrial organisms. Additionally, the 22 lead detections were below the established background value for lead at the NTTR 23 (U.S. Air Force, 2017n). 24

Groundwater samples were also collected from four wells previously sampled during the 26 2004 limited field study. Total and dissolved lead was detected in groundwater samples, 27 but amounts were below Air Force internal drinking water screening levels and the EPA 28 tap water Regional Screening Levels. One detection of 2,6-dinitrotolulene (DNT) was 29 above the EPA tap water Regional Screening Level; however, the amount of DNT is 30 below levels that affect human health based on other studies by EPA and the Agency 31 for Toxic Substances and Disease Registry (U.S. Air Force, 2017n).

The information collected during the Phase II assessment provided sufficient evidence 32 that munition constituent contamination may be migrating from on-range sources to off-33 range areas. The Air Force signed a memorandum of record in April 2015 34 acknowledging the threat of munition constituent migration outside the NTTR. The 35 memorandum stated "the Air Force Civil Engineer Center (AFCEC) shall facilitate and 36 coordinate with the range, installation and other stakeholders regarding range-specific 37 response planning activities in order to determine appropriate scope of a follow-on 38 effort" (U.S. Air Force, 2017n). 39

40 Spills and Aircraft Crashes

41 **Spills** – Spills may occur through accidental releases of 42 fuel, oils, etc., during routine operations. Any spills over the

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.1.5.1.1.1.1.1.1.

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reportable quantity that are introduced to the environment must be reported to NDEP. 1 Spill response plans are in place for cleanup regardless of whether the conditions are 2 reportable or not. Spill kits are also located within the major facilities on the NTTR. 3 Small, routine spills may be managed by shop personnel using available spill response 4 equipment (pads, booms, etc.). Emergency Services or the Civil Engineering Squadron 5 may be contacted to clean or contain a large spill, depending on the size and the 6 material. Cleanup may also be completed by Range Support Services consisting 7 primarily of subcontractors if the spill is beyond in-house capabilities (U.S. Air Force, 8 9 2017n).

Small spills that are cleaned up and do not leave any residual contamination are closed with a simple letter to NDEP providing the details of the incident and the remediation completed. Larger spills that cannot be fully and immediately cleaned up are registered with NDEP for further investigation and proposed remediation. The following quantities of disposed material are related to recent large spill cleanups (U.S. Air Force, 2017n):

- 203 cubic yards of petroleum-impacted soils disposed of in calendar year 2014
- 135,940 pounds of petroleum-contaminated soils collected from various spill
 locations disposed of in fiscal year 2015

Aircraft Mishaps – Military aircraft mishaps occur as a result of the extensive testing and training conducted on the NTTR. The primary environmental concern is associated with the release of fuel or other hazardous chemicals during a mishap. The Air Force has emergency

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.1.5.1.1.1.1.1.1.1.

response procedures in place to handle such incidents. In the event that an aircraft goes missing or notifies the air traffic control tower of an issue, Emergency Services are alerted and efforts are made to pinpoint the location of the aircraft. Nellis AFB has an MOU with BLM to coordinate efforts in the prevention, detection, and suppression of wildland fires occurring at the NTTR. Prevention, detection, and suppression of wildland fires occurring on the DNWR portion of the South Range should be coordinated with the USFWS.

Secondary effects of an aircraft mishap include the potential for fire and environmental contamination. The extent of these secondary effects is situationally dependent and, therefore, is difficult to quantify. The terrain overflown in the ROI is diverse. For example, should a mishap occur, highly vegetated areas during a hot, dry summer would have a higher risk of experiencing extensive fires than would more barren and rocky areas during winter.

When an aircraft crashes, it may release hydrocarbons associated with petroleum 36 products, such as fuels and lubricants. Those products not consumed in a fire could 37 contaminate soil and water. The potential for contamination is dependent on several 38 39 factors. The porosity of the surface soils determines how rapidly contaminants are absorbed. The specific geologic structure in the region determines the extent and 40 direction of the contamination plume. The locations and characteristics of surface and 41 groundwater in the area also affects the extent of contamination to those resources. 42 Contamination assessments by the Air Force would consider local geologic and 43

hydrologic conditions to ensure that contamination plumes are adequately 1 characterized, to include evaluating potential impacts to local aquifers. 2

The first priority of an emergency responder is to protect human life, followed by 3 incident stabilization and then environmental cleanup. Environmental concerns are 4 addressed through the implementation of established spill response guidelines, as 5 previously discussed. The closure of any spill site must comply with standards set by 6 7 NAC 445A. A summary of recent aircraft mishaps is provided in Section 3.13.1.4, Health and Safety: Flight Risks. 8

3.12.1.6 Department of Energy Environmental Restoration Program 9

The Air Force allowed the U.S. Atomic Energy Commission 10 (i.e., AEC) to conduct detonation of simulated weapons in 11 1963 to evaluate the dispersal of plutonium. A FFACO 12 was subsequently implemented on May 10, 1996 to 13

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.1.6.1.

address the contamination of AEC/DOE legacy sites both on and off the NTTR. The 14 FFACO is a three-party agreement between the State of Nevada, acting by and through 15 NDEP, DOE (formerly AEC), through the National Nuclear Security 16 Administration/Nevada Field Office (NNSA/NFO) and the DOE/Office of Legacy 17 Management (DOE/LM), and DoD. DoD's responsibilities are limited to those areas at 18 the NTTR where DoD has conducted activities. Likewise, DOE is responsible for legacy 19 20 radiological sites located on the NTTR. The FFACO outlined a process to identify legacy sites potentially containing historical contamination, investigate these sites, and 21 implement corrective actions based on public health and environmental considerations. 22

DOE no longer conducts atmospheric or underground nuclear testing. However, 23 previously contaminated sites remain. As discussed above, the radiological 24 contamination located on the NTTR is the sole responsibility of DOE as outlined in the 25 MOU DE-GM08-98NV13467 between the DOE Nevada Operations Office and the Air 26 Warfare Center Nellis AFB. The MOU states that DOE is responsible for full 27 decontamination of Air Force lands potentially contaminated by DOE operations 28 29 (including the DOE legacy sites) on the NTTR (U.S. Air Force, 2017n).

Efforts to identify nuclear testing materials under the 1996 FFACO identified 30 contamination from 878 former underground test locations, 100 atmospheric test 31 locations, and more than 1,000 other sites from AEC/DOE testing on the NTS and 32 portions of the NTTR according to the comprehensive NTTR Decontamination Estimate 33 report dated November 2009. The 2009 report identified a total of 69 AEC/DOE testing 34 sites relevant to the NTTR. A 2016 investigation identified an additional 4 sites, bringing 35 the total to 73 sites. Sixty-five of these sites have been closed (U.S. Air Force, 2017n): 36

- 40 sites have been clean closed 37
- 16 sites have been closed in place 38 •
- 8 sites have been closed but continue to require monitoring 39 •
- 5 sites have undergone uncharacterized closure, been designated for NFA, or 40 41

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• 6 sites are currently undergoing characterization, investigation, or remediation

The process of implementing corrective action for these sites may range from no action to clean closure, where clean closure equates to removal of contamination. The corrective action strategy may involve the drafting of multiple documents, including corrective action investigation work plans and reports, corrective action work plans and reports, corrective action decision documents, health assessments, and risk assessments.

Closure in place under the FFACO means "the stabilization or isolation of pollutants, 8 hazardous wastes and solid wastes, with or without partial treatment, removal activities 9 and/or post-closure monitoring, completed in accordance with corrective action plans." 10 This remaining level of contamination may require use restrictions (i.e., access controls) 11 and/or long-term monitoring but at a minimum requires implementation of administrative 12 controls to prevent unauthorized future land use (i.e., use restrictions). There are 13 currently no plans for further remediation. DOE continues to conduct inspections at 14 these sites to ensure that required fencing is in good condition and that postings remain 15 and are legible (U.S. Air Force, 2016h). 16

Seven of the eight remaining open sites are areas where atmospheric testing or 17 plutonium dispersion testing occurred and comprise Corrective Action Unit (CAU) 102 18 Schooner/Western Pahute Mesa, CAU 411 Double Tracks, CAU 412 Clean Slate I, 19 CAU 413 Clean Slate II, CAU 414 Clean Slate III, CAU 415 Project 57 and CAU 542 20 Small Boy/Frenchman Flat. The remaining site (CAU 575 consisting of two sites) is a 21 decontamination area and waste disposal site that is open per the FFACO but was 22 closed in December 2014 based on data obtained from the 2014 site investigation (U.S. 23 24 Air Force, 2017n).

Investigations will determine if contamination at the open sites could result in a dose of 25 25 millirems per year (mrem/yr) or greater to the most exposed individuals based on 26 current and future land use. Land use scenarios will be determined in conjunction with 27 the Air Force. Any areas identified as presenting a dose of 25 mrem/yr or greater will 28 require a corrective action. At this time, corrective actions are assumed to include 29 fencing and posting of the areas requiring corrective action, annual inspections, and 30 recording of use restriction data for the areas in the NNSS Management and Operating 31 Contractor GIS database, the FFACO database, and the Air Force GIS database (U.S. 32 Air Force, 2016h). Table 3-46 provides a timeline of the study activities that have 33 occurred. 34

Site	Activities	Year	Work Completed
CAU 102 Schooner/Western	Annual NNSA/NFO	1989- Present	Groundwater testing at monitoring wells
	Corrective action investigation	1999	Geophysical surveys, well drilling and completion, and sampling and analysis of both clean and contaminated wells; included geochemical modeling, geophysical and

 Table 3-46. Summary of Study Activities at Plutonium Dispersion Sites

Site	Activities	Year	Work Completed
			geologic modeling, and groundwater flow and transport modeling
	Groundwater radiochemistry	2001 2002 2004	Groundwater flow and radionuclide migration and inventory
	Groundwater chemistry analysis and interpretations	2002 2004 2006	Geochemical and isotopic data analysis and interpretation
	Groundwater Transport Modeling	2009	Analysis to understand the behavior of radionuclide migration and to define the sensitivity of flow model conceptualization.
CAU 411 Double Tracks	Initial site characterization	1994- 1995	Ground-based radiological surveys, vertical soil profiling, soil sampling, soil treatability studies, geophysical surveys at ground zero
	Interim corrective action	1996	Soil and debris removal and off-site disposal, KIWI ¹ survey of excavated area
	Air monitoring	1996- 1999	Particulate size analysis, plutonium analyses, meteorological measurements
	Aerial radiological survey	2006	Aerial radiological survey of post-remediated site
	10 CFR 835 compliance survey	2010	Swipe sampling for removable contamination, in situ radiological measurements
	Preliminary investigation	2012	Visual surveys, soil sampling, ground-based radiological surveys
	Data quality objectives developed	2014	Identified and defined the type, amount, and quality of data needed to determine whether closure objectives have been achieved
CAU 412 Clean Slate I	Initial site characterization	1996	Ground-based radiological surveys, vertical soil profiling, soil sampling, soil treatability studies, geophysical surveys at ground zero
	Interim corrective action	1997	Soil and debris removal and off-site disposal, KIWI survey of excavated area
	Air monitoring	1996-1998	Particulate size analysis, plutonium analyses,

Table 3-46. Summary of Study Activities at Plutonium Dispersion Sites

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Site	Activities	Year	Work Completed
			meteorological
	· · · · · · · ·		measurements
	Aerial radiological survey	2006	Aerial radiological survey of post-remediated site
	10 CFR 835 compliance	2010	Swipe sampling for
	survey		removable contamination, in
			situ radiological
	Preliminary investigation	2012	Visual surveys, soil sampling
	i reininary investigation	2012	ground-based radiological
			surveys
	Data quality objectives	2014	Identified and defined the
	developed		type, amount, and quality of
			data needed to determine
			have been achieved
CAU 413	Operation Roller Coaster	1963	Pu distribution
Clean Slate II	-	1964	studies/mapping
	Environmental surveillance	1964	Ground-based alpha
	radiation surveys	1965	radiation surveys
	Nevada Applied Ecology	1900	FIDLER surveys soil and
	Group studies	1010	vegetation sampling
	TTR annual sampling	1992	Soil sampling
	1996 corrective action	1996	Radiological surveys (KIWI,
	investigation		HPGe detector, FIDLER), soil
			sampling, depth prome
			geophysical surveys at
			ground zero
	Technology demonstration	1998	Segmented gate system
	project		processing of contaminated
	Aerial radiation surveys	2006	Aerial radiation surveys
		2000	
	Radiological posting	2010	Swipe sampling for
	compliance survey		removable contamination, in
			situ radiological
	Preliminary investigation	2012	Visual surveys FIDI FR
		2012	surveys, removable
			contamination surveys
	Meteorological and	2008-	Monitoring of airborne
	airborne particulate	2012	particulates, amplent gamma
			conditions
	Corrective action	2015-	Collection of soil samples and
	investigation	2017	thermoluminescent
			dosimeters at sample plots,
			for buried contamination
	1	I	isi sansa somannianon,

Table 3-46. Summary of Study Activities at Plutonium Dispersion Sites

Site	Activities	Year	Work Completed
			geophysical surveys at ground zero, removal of contaminated debris outside CA fence, soil samples of soil mound surface and interior, FIDLER* surveys, and removable contamination
CAU 414 Clean Slate III	Operation Roller Coaster	1963 1964	Pu distribution studies/mapping
	Environmental surveillance radiation surveys	1964- 1969	Ground-based alpha radiation surveys
	Nevada Applied Ecology Group studies	1975	FIDLER surveys, soil and vegetation sampling, depth profile sampling
	Particle size studies	1963 1996	Pu associated with particle size
	TTR annual sampling	1993	Soil sampling
	1996 corrective action investigation	1996- 1997	Radiological surveys (KIWI, HPGe detector, FIDLER), soil sampling, depth profile sampling, treatability testing, geophysical surveys at ground zero
	Aerial radiation surveys	2006	Aerial radiation surveys
	Radiological posting compliance survey	2010	Swipe sampling for removable contamination, <i>in</i> <i>situ</i> radiological measurements
	Preliminary investigation	2012	Visual surveys, FIDLER surveys, removable contamination surveys
	Meteorological and airborne particulate monitoring	2008- 2012	Monitoring of airborne particulates, ambient gamma radiation, and meteorological conditions
	Debris investigation	2016	FIDLER surveys, removable contamination surveys, visual surveys
CAU 415 Project 57	Operation Plumb bob preliminary report	1958	Details origin, objectives, and results to date for Project 57
	Surface alpha monitoring	1961	Detailed results of the surface alpha monitoring program (Program 74)
	Biomedical and aerosol studies	1961	Results of the animal studies program (Program 72); results of the air sampling program conducted in conjunction with the animal studies
	Particle size studies	1975	Pu associated with particle size

Table 3-46. Summary of Study Activities at Plutonium Dispersion Sites

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Site	Activities	Year	Work Completed
	Feasibility and Alternate Procedures for Decontamination and Post- Treatment Management	1975	Comparative study to evaluate vegetative recovery and soil surface conditions 17 years post-test
	Nevada Applied Ecology Group studies	1976	FIDLER surveys, soil and vegetation sampling, depth profile sampling
	Environmental surveillance radiation surveys	1977	Ground-based alpha radiation surveys
	Aerial radiation surveys	1979	Aerial radiation surveys
	Soil removal decontamination estimate	1980	Estimate of the amount of soil removal necessary to achieve a remediation action level of 160 picocuries per gram of Pu
	Soil and plant studies	1982	Soil and plant studies on Pu little dispersion and bioavailability
	Soil particle size study	2001	Soil samples to determine Pu and Am activities in relation to soil particle size
	10 CFR 835 compliance survey	2007- 2012	Ground-based radiation survey at fence perimeter
	Preliminary Investigation	2014-2017	All final corrective actions, including best management practices will be documented in a final closure report where future surveillance and inspection requirements will be defined
CAU 541 Small Boy	Nevada Applied Ecology Group study	1981- 1986	In situ soil measurements by gamma spectroscopy and limited confirmatory soil sampling to estimate inventory of man-made radionuclides
	Aerial radiation survey	1995 1997 2010	Aerial radiation surveys
	Preliminary field investigation	2012	FIDLER, PRM-470 ² , visual surveys, limited sampling event at and around ground zero
	Desert Research Institute geochemical study	2013	Isotopic analysis of standing water on the Frenchman Flat playa
	Groundwater radiochemistry	2001 2002 2004	Groundwater flow and radionuclide migration and inventory
	Groundwater chemistry analysis and interpretations	2002 2004 2006	Geochemical and isotopic data analysis and interpretation

Table 3-46. Summary of Study Activities at Plutonium Dispersion Sites

Site	Activities	Year	Work Completed
	Groundwater transport modeling	2009	Analysis to understand the behavior of radionuclide migration and to define, both qualitatively and quantitatively, the sensitivity of flow model conceptualization and flow and transport parameterization
	Development of data quality objectives	2014	Identify and define the type, amount, and quality of data needed to determine, develop and evaluate corrective actions
	Final Corrective Action Decision Document/Closure Report	2016	NDEP's Bureau of Federal Facilities reviewed and approved a Final Corrective Action Decision Document/Closure Report

Table 3-46. Summary of Study Activities at Plutonium Dispersion Sites

Am = Americium; CFR = Code of Federal Regulations; FIDLER = field instrument for detection of low-energy radiation (gamma emissions); HPGe = high-purity germanium; Pu = plutonium

1. A radiation detector using sodium iodide

2. Ground-based organic plastic scintillator instrument that detects gamma emission

1 3.12.1.7 Solid Waste Management

Solid wastes and construction debris are generated from
 day-to-day operations and infrastructure projects. Solid
 waste at the NTTR is managed according to Integrated

5 Solid Waste Management (ISWM) Plans. The industrial

6 facilities in particular are incorporated into two ISWM

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.1.7.1.

Plans: one for the North Range and the other for the South Range and Tolicha Peak
 (U.S. Air Force, 2017n).

The ISWM Plans address the management of solid waste, which includes any 9 discarded material as defined in 40 CFR 261.2. Solid waste includes municipal solid 10 waste, industrial solid waste, construction and demolition debris, and material sent to 11 the qualified recycling program per AFI 32-7001. The qualified recycling program is 12 meant to reduce disposal costs, generate revenue, and divert wastes from landfills. 13 When material becomes a solid waste, it is sorted into an appropriate container for 14 recycling or disposal. Disposal generally involves a landfill or combustion in a waste-to-15 These disposal methods are used only for waste that cannot be energy facility. 16 reduced, reused, or recycled (U.S. Air Force, 2017n). 17

18 The NTTR has one Class II permitted municipal (nonhazardous) solid waste landfill and

one Class III construction waste landfill. Disposal data for the landfills is submitted to

20 NDEP at regular intervals as required by their landfill permits. Municipal solid wastes

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and construction debris generated from the South Range is transported and disposed of at off-site landfills (U.S. Air Force, 2017n).

The Class II municipal solid waste landfill is located within the NTTR, on the west side of Cactus Flats. The landfill was put into service and officially approved as the primary solid waste landfill for the NTTR by NDEP in January 1991. The landfill covers an area of 21 acres and has a total disposal capacity of 581,400 cubic yards. It was designed to accept less than 20 tons per day and serve a maximum population of 10,000 people.

8 The maximum population served over the last few years has been less than 500 people,

9 depending on site activities (NDEP, 2016b).

10 **3.12.2 Environmental Consequences**

11 3.12.2.1 Analysis Methodology

The analyses focused on the context and intensity of potential effects related to hazardous materials usage and management and hazardous and solid waste generation and management under the proposed alternatives. Potential impacts related to hazardous materials and For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.2.1.1.

hazardous wastes were analyzed for the following three effects: (1) increased likelihood of an uncontrolled release of hazardous materials that could contaminate soil, surface water, groundwater, or air; (2) generation of hazardous or solid waste types or quantities that could not be accommodated by the current management system; and (3) adverse impacts to existing sites under the environmental restoration and monitoring programs.

3.12.2.2 Alternative 1 – Extend Existing Land Withdrawal and Management of the NTTR (North and South Range) – Status Quo

25 Hazardous Materials

NTTR personnel would continue to use hazardous
materials in day-to-day operations. These materials include
paints, solvents, thinners, adhesives, aircraft fuel, diesel,
gasoline, lubrication oils, brake and hydraulic fluids,
cleaners, batteries, acids, chlorofluorocarbon refrigerants,

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.2.2.1.

herbicides, insecticides, rodenticides, and compressed gases. These materials would continue to be stored in proper containers, employing secondary containment as necessary to prevent/limit accidental spills.

All spills and accidental discharges of hazardous materials would be reported. Emergency response procedures and site-specific contingency plans have been developed for all hazardous materials locations at the NTTR, and the Nellis AFB Spill Prevention and Response Plan would continue to be used and updated, as required.

Usage of hazardous materials would continue to be tracked and documented through the existing HAZMART. This automated "pharmacy system" is used to track and control hazardous materials and waste from procurement through disposal. Hazardous materials that are not currently in the HAZMART inventory would have to go through an approval process to ensure that they would not pose undue health or environmental hazards before they could be used. This approval process involves a review by various organizations, including Bioenvironmental, Safety, and the Environmental Office.

The quantities of hazardous materials used under this alternative would be consistent with quantities currently employed at the NTTR. Any unanticipated changes in the overall quantity of hazardous materials used/stored would be documented and reported to state and local emergency planning committees/local fire departments using the annual Tier II forms or Form R, as required. Hazardous materials would continue to be transported in accordance with the USDOT requirements and regulations.

Hazardous materials used in aircraft operations or during aircraft maintenance activities would be managed according to the established procedures described above. Additionally, any releases of hazardous materials resulting from operations or maintenance would be mitigated according to established spill plans; consequently, no adverse impacts would occur.

There would be no impacts associated with hazardous materials from munitions use because there are no hazardous waste associated with munitions. Impacts related to hazardous waste related to munitions used are discussed below.

Fuel and other hazardous materials associated with construction equipment or vehicles would be used and stored according to established procedures. Additionally, any releases of hazardous materials would be mitigated according to established spill plans; consequently, no adverse impacts would occur. Troop movement would have no impact associated with hazardous materials.

At transmitter sites, hazardous materials use would likely be limited to fuel and 25 lubricants used in vehicles and ancillary support equipment, such as standby electric 26 generators. These hazardous materials would be managed according to established 27 procedures, including the use of secondary containment for fuel or oil storage 28 containers. Potential releases would likely be limited in nature and would be associated 29 with events such as ruptured hydraulic lines or leaking fuel tanks. Regardless, any 30 31 releases of hazardous materials resulting from emitter operations would be mitigated according to established spill plans; consequently, no adverse impacts would occur. 32

33 Hazardous Waste Management

Under Alternative 1, the types of hazardous wastes generated would remain at baseline levels. The total quantity of hazardous wastes generated would also not be expected to change under this alternative. If any additional waste streams were to be identified as part of new

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.2.2.1.1.

weapons systems or new maintenance procedures, the Air Force would establish new IAPs at generation locations, and personnel managing these locations would be properly trained in waste management. Management of hazardous wastes would be performed according to prescribed procedures already in place, and the Hazardous

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1 Waste Management Plan would also be updated as required. Existing hazardous waste

2 management procedures are adequate for the quantity and types of wastes generated at

3 the NTTR.

The Air Force would continue to manage the 90-day accumulation sites, and existing waste generation tracking procedures would remain in place. The Defense Reutilization and Marketing Service on Nellis AFB would to be responsible for the disposal of hazardous wastes generated on the NTTR. No changes to permits, hazardous waste generator status, or management would be required, and no adverse environmental impacts are anticipated.

Hazardous wastes generated during aircraft maintenance activities would be managed
 according to the procedures described above. Consequently, no significant impacts
 would occur.

Small quantities of hazardous wastes may be generated from munitions use. These wastes would be associated with unexploded chemical residues and would be managed as reactive hazardous wastes according to established procedures. Consequently, no significant impacts would occur.

Ground disturbance, including foot or vehicle movement, would not be expected to 17 directly generate hazardous waste. However, there is a potential for solid waste/litter to 18 be generated. In addition to miscellaneous trash, this could include items such brass 19 casings, chemical light sticks, and meals ready-to-eat (MREs) (with activated or 20 unactivated heating elements). Chemical light sticks are nontoxic and environmentally 21 safe, while MREs are exempt from RCRA hazardous waste regulations. Soldiers may 22 dispose of waste MREs, either activated or unactivated, as nonhazardous solid waste. 23 To minimize any potential solid waste impacts, personnel would implement the following 24 practices: pack out debris or properly dispose of litter, remove and properly dispose of 25 solid debris (casings, light sticks, MREs, etc.) in accordance with NTTR operating 26 procedures, and conduct post-mission surveys to ensure debris has been removed. 27 With implementation of these practices, no adverse impacts would occur. 28

Any hazardous wastes generated from emitter equipment maintenance (e.g., waste paint, solvents) would be managed according to established procedures described above. Consequently, potential for adverse impacts related to hazardous wastes from emitter operations would be minimal.

33 Environmental Restoration and Monitoring Programs

34 ERP and AOCs

There are no plans for further corrective actions at the NTTR, and no known AOCs or ERP sites remain open.

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.2.2.1.1.1.

- 37 Established ERP decision documents, including soil surveys that have been accepted
- ³⁸ by NDEP for these sites would continue. However, site closures may be revisited in the
- ³⁹ future if laws become more stringent, if the land is returned to public use, or if future
- 40 information indicates the need to investigate further.

Munitions Residue

2 The cleanup and maintenance of munitions residues from target areas would continue

using Coronet Clean procedures. These procedures include sweeping out around
 target areas following specific criteria and safely detonating and/or disposing of any

5 UXO that is encountered.

1

Releases to the environment from munitions utilized in
 proficiency and/or qualification training require reporting to
 the EPA under the TRI program. The Air Force currently
 complies with TRI reporting requirements and would
 continue to track ordnance use associated with the

proposed activities. Table 3-45 lists chemicals exceeding applicable thresholds under TRI. The table includes the average quantity of these chemicals released from 2011 to 2015. It would be anticipated that the estimated increase in training activities under Alternative 2 would result in an associated, proportional increase in the quantity of chemicals released; however, based on the type/quantity of constituents that would be released as part of proposed activities, no new thresholds would be exceeded and no additional reporting would be required by the U.S. Air Force.

18 Depleted Uranium Target Assessment

19 The NTTR would continue to use DU munitions and store

targets in the DU library per its NRC permit on Range 63.

21 The use of DU is managed under the Depleted Uranium

22 Management Plan for the Nevada Test and Training Range

23 at Target 63-10. The plan includes procedures for the

control of DU exposure and disposal or recycling DU-related wastes. These procedures
 include sweeping Range 63-10 periodically to remove and safely dispose of DU-related
 debris.

The total quantity of DU contamination would continue to increase (an approximate average of 4,400 pounds of DU rounds are expended annually). However, current studies indicate that DU residues are not migrating outside of the license area by water or other means. The Air Force would develop a closure plan if the DU program is eliminated. This plan would include provisions to remove UXO and remediate any

large releases, as required. Any releases over reportable quantities, whether from spills

or from an aircraft mishap, would be reported to NDEP. The cleanup and closure of a

spill or mishap site would also comply with standards set by NAC 445A.

32 remaining contamination.

33 Spills and Aircraft Mishaps

39

40

41

To minimize the possibility/impacts of any releases, the NTTR would continue to maintain trained oil-handling personnel, as well as spill response plans and adequate spill response equipment, at all possible spill sites. Emergency Services would respond to clean or contain

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.2.2.1.1.1.1.1.

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.2.2.1.1.1.1.1.

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.2.2.1.1.1.1.

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1 Department of Energy Environmental Restoration Program

The NTTR includes land permitted from the Air Force to DOE/NNSA. The NTTR is managed by the Air Force, but an adjacent complex is operated for DOE/NNSA, which would remain responsible for activities related to existing contamination from historical nuclear testing. There are no known actions planned to remediate existing contaminated sites, and there are no plans to restart testing with radioactive materials

7 within the NTTR boundary. Site investigations into the

extent of contamination and its potential to migrate would
 continue. These sites would be further investigated per
 agreement through stakeholders once funding becomes

11 available through DOE.

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.2.2.1.1.1.1.1.1.

12 There would be no impacts to environmental restoration

and monitoring program sites from aircraft operations.

As described in Section 3.12.1.5, Department of Defense Environmental Monitoring 14 Program, the cleanup and maintenance of munitions residues from target areas would 15 continue according to existing procedures. Additionally, releases to the environment 16 from munitions used in proficiency and qualification training require reporting to EPA 17 under the TRI program. The NTTR procedures comply with TRI reporting requirements 18 and would track munitions use associated with proposed activities. It is anticipated that 19 no new TRI thresholds would be exceeded and no additional TRI reporting would be 20 21 required from implementation of Alternative 1. Activities would not result in impacts to existing environmental restoration and 22

Activities would not result in impacts to existing environmental restoration and monitoring program sites, as disturbance to these sites would not occur from construction or troop movement. Regardless, should any unusual odor, soil, or groundwater coloring be encountered during operations in any areas, these activities would cease and Environmental Management personnel would be contacted immediately.

There would be no impacts to environmental restoration and monitoring program sites from emitter operations with Alternative 1.

30 Solid Waste

Solid wastes, including municipal solid waste, industrial solid waste, construction and demolition debris, would continue to be generated from day-to-day operations. The overall quantity of solid wastes generated at the NTTR would not be expected to change. Sufficient landfill

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.2.2.1.1.1.1.1.1.1.

capacity exists to accommodate current and future waste quantities. Additionally, as
 required by the Air Force, solid wastes would be recycled to the greatest extent
 possible, further minimizing any adverse impacts.

Solid wastes would be generated as a result of training activities (primarily munitionsfragments and residues and target-related debris). Existing solid waste collection and

41 disposal procedures would be adequate for the amount of wastes that would be

expected to be generated. Additionally, metallic debris (e.g., brass cases) from training
 operations would be recycled and, therefore, not disposed of as solid waste.
 Consequently, no adverse impacts to solid wastes would occur.

It is not anticipated that land-clearing activities during construction would generate a need for disposal of soil and/or woody waste (if any), as soils generated would be used as fill during construction projects and any woody wastes would be chipped and reused multiple and reused as multiple and reused as multiple and reused

7 as mulch on-site. Therefore, these materials would not impact solid waste resources.

8 Ground training on foot (dismounted maneuver) would involve movement without 9 leaving any evidence of troop presence. Personnel would be required to collect and 10 properly dispose of any generated debris/litter. Personnel would also conduct post-11 mission surveys to ensure debris has been removed. Consequently, it is anticipated 12 that no adverse impacts related to solid wastes would occur.

While aircraft and emitter operations may generate solid waste (i.e., trash or refuse), these wastes are managed according to solid waste management procedures. Therefore, it is not anticipated that there would be adverse impacts associated with solid wastes from aircraft or emitter operations.

3.12.2.3 Alternative 2 – Extend Existing Land Withdrawal and Provide Ready Access in the North and South Ranges

19 Hazardous Materials

Establishing ready access may provide an opportunity for more training to occur, which would result in an increased use of hazardous materials (e.g., fuel, lubricating oil) commensurate with the increase in the number of For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.2.3.1.1.

operations. All hazardous materials would continue to be managed according to established procedures and any accidental discharges of these materials would be reported and mitigated. Although the level of activity would increase by an estimated 30 percent, there would be no significant changes in the overall quantity of hazardous materials stored at the NTTR resulting from Alternative 2, so no additional reporting under EPCRA's Tier II program would be required; consequently, no adverse impacts would occur.

The environmental impacts to hazardous materials from munitions use and ground disturbance under this alternative would be the same as for Alternative 1; no adverse impacts due to munitions use or ground disturbance would occur with Alternative 2.

As discussed above, establishing ready access may provide an opportunity for more testing and training to occur, potentially increasing the number of emitters on the NTTR and associated use of hazardous materials. All hazardous materials associated with emitter operations and maintenance would continue to be managed according to established procedures, and any accidental discharges of these materials would be reported and mitigated. Consequently, no adverse impacts from emitter operations associated with Alternative 2 would occur.

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1 Hazardous Waste Management

2 Establishing ready access may provide an opportunity for

more air operations to occur. The increase in operations 3

would result in an associated increase in the quantity of 4

maintenance-related hazardous wastes. However, this 5

increase would not overly burden the current management 6

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.2.3.1.1.1.

7 system nor would it result in a change of the current generator status of the installation. All wastes would be managed in accordance with all applicable regulations and 8 disposed of by licensed vendors to approved disposal facilities; consequently, no 9

significant impacts with respect to hazardous wastes from aircraft operations would 10 occur with Alternative 2. 11

The environmental impacts related to hazardous wastes from munitions use with 12 Alternative 2 would be the same as under Alternative 1. No adverse impacts related to 13 hazardous wastes from munitions use with Alternative 2 would occur. 14

Ground disturbance, including foot or vehicle movement, would not be expected to 15 directly generate hazardous waste, although the potential increase in training may result 16 To minimize any potential impacts from solid wastes, in more solid waste/litter. 17 personnel would implement established practices that include properly disposing of 18 litter; removing and properly disposing of solid debris (casings, light sticks, MREs, etc.), 19 and conducting post-mission surveys to ensure debris has been removed. 20 With implementation of these practices, no adverse impacts related to waste generated from 21 ground-disturbing activities would occur with Alternative 2. 22

As discussed above, establishing ready access may provide an opportunity for more 23 emitter operations to occur. The increase in operations would result in an associated 24 25 increase in the quantity of emitter operation- and maintenance-related hazardous wastes. However, this increase would not overly burden the current management 26 system nor would it result in a change in the current generator status of the installation. 27 Thus, no adverse impacts related to hazardous wastes from emitter operations with 28 Alternative 2 would occur. 29

30 **Environmental Restoration and Monitoring Programs**

The environmental impacts to environmental restoration 31 and monitoring program sites from aircraft operations, 32 33

this section, please see Appendix K, paragraph 3.12.2.3.1.1.1.1. munitions use, ground disturbance, and emitter operations

with Alternative 2 would be the same as with Alternative 1, and no adverse impacts 34 35 would occur.

Solid Waste 36

37 The environmental impacts related to solid wastes from

aircraft operations munitions use, ground disturbance, and 38

emitter operations with Alternative 2 would increase but 39

- adverse impacts are anticipated to be minimal to none, as 40
- established procedures for cleanup would continue to be 41

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.2.3.1.1.1.1, Solid Waste.

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perspective on information in

1 implemented.

2 3.12.2.4 Alternative 3 – Expand Withdrawal of Public Lands for the NTTR

- 3 Alternative 3 includes subalternatives, as described in Section 2.3.3:
- Alternative 3A Range 77 EC South Withdrawal
- Alternative 3A-1 Amended Range 77 EC South Withdrawal
- Alternative 3B Range 64C/D and 65D Withdrawal and Administrative
 Incorporation
- 8 Alternative 3C Alamo Withdrawal

9 Hazardous Materials, Hazardous Waste Management, Environmental Restoration and 10 Monitoring Program Sites, and Solid Waste

No aircraft maintenance operations would occur in the proposed expansion areas for Alternatives 3A, 3A-1, 3B, and 3C; consequently, aircraft operations would result in no impacts to hazardous materials, hazardous wastes, or solid wastes. For Alternative 3C, which includes

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.2.4.1.

- construction of two runways, any accidental releases of hazardous materials (fuel or oil)
 from aircraft runway operations would be mitigated and reported as required.
 Consequently, significant impacts associated with hazardous materials would also not
 be anticipated.
- For Alternatives 3A, 3A-1, and 3B, no munitions use would occur in the proposed expansion areas, and for Alternative 3C, blank munitions use would occur. There would be no impacts to environmental restoration and monitoring program sites (as none are present).
- Alternatives 3A, 3A-1, 3B, and 3C would include some ground disturbance associated with the construction of perimeter fencing (25, 30, and 65 miles, respectively). Additionally, Alternative 3C would involve construction of two runways and roadway improvements, as well troop movement (by foot or vehicle). Any accidental releases of hazardous materials (fuel or oil) from construction operations would be mitigated and reported as required by federal and state law.
- As indicated in Section 2.3.3.4, Alternative 3C could conceptually involve construction of 30 runways that would be 6,000 feet long and 90 feet wide. Construction-related solid 31 wastes would be recycled to the greatest extent possible. Appropriate management of 32 construction and land-clearing debris, including recycling and reuse when possible, 33 would further limit the generation of solid waste; consequently, no significant impacts 34 related to solid wastes are anticipated. Additionally, any hazardous materials used 35 (e.g., fuels, lubricants) or wastes generated during construction would be managed 36 according to established procedures; thus, no adverse impacts would occur. 37
- No emitter placement, use, or maintenance activities would take place within lands proposed for withdrawal for Alternatives 3A, 3A-1, and 3B. Based on potential

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concepts, emitter placement, use, and maintenance activities would occur on withdrawn
 lands for Alternative 3C. Any accidental releases of fuel or oil from emitter operations
 would be mitigated and reported as required. Consequently, no significant impacts
 related to hazardous materials or hazardous wastes would occur under Alternatives 3A,
 3A-1, 3B, or 3C.

6 3.12.2.5 Alternative 4 – Establish the Period of Withdrawal

7 The proposed withdrawal periods associated with Alternative 4—Alternative 4A (20-year 8 withdrawal period), Alternative 4B (50-year withdrawal period), and Alternative 4C

9 (indefinite)—must be implemented in conjunction with one

or more of the other alternatives or subalternatives.
 Because Alternative 4 reflects periods of time, which do not

12 in and of themselves affect hazardous or solid wastes,

there are no specific impacts associated with Alternative 4,

14 except to provide a point in time at which impacts from

15 other chosen alternatives may end.

16 3.12.2.6 No Action Alternative

17 Hazardous Materials

18 Under this alternative, hazardous and toxic materials would

not be used by Air Force personnel, contractors, temporary 19 20 duty military units, or tenant organizations on the NTTR. maintenance processes Range such as vehicle 21 maintenance, target refurbishment, and electronic 22 countermeasures emitter maintenance would cease. 23

Hazardous materials would be removed from the range and taken to the HAZMART for reissue. Range emergency response/contingency plans and associated spill plans would remain in effect until range closure activities are completed.

Potential hazardous materials use in future public or commercial operations or any other land uses on what had been the NTTR would receive separate environmental review and would be administered by BLM and USFWS.

30 Hazardous Waste Management

Under this alternative, hazardous wastes would not be generated by routine NTTR maintenance activities because these activities would cease. Some hazardous wastes could be expected from the decommissioning and

35 shutdown of facilities in the major work areas on the range. Examples could include 36 waste petroleum products from fuel storage tanks, building materials contaminated with

³⁷ lead-based paint and lead solder, and small quantities of various chemicals.

³⁸ During demolition activities associated with this alternative, the use of petroleum, oil, ³⁹ and lubricants for equipment would create the potential for minor spills and releases.

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.2.5.1.

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.2.6.1, No Action Alternative Hazardous Materials.

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.2.6.1, Hazardous Waste Management.



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- 1 Compliance with best construction practices would reduce this potential to insignificant
- 2 levels. Existing hazardous waste disposal procedures would continue to be used until
- 3 all facilities have been closed following applicable regulations.
- 4 If large-scale demolition projects were initiated, the disposal of hazardous wastes could
- 5 be included in the demolition contract. Hazardous wastes generated by future activities
- on the NTTR would be managed in accordance with BLM and USFWS agreements and
- 7 permits and applicable federal and state regulations.

8 Environmental Restoration and Monitoring Programs

9 Decisions regarding the status and any additional cleanup

10 of existing AOCs, SWMUs, ERP sites, and munitions sites

11 would be made in consultations between the Air Force and

12 BLM and USFWS in accordance with the MOU. Munitions

13 would not be expended on range targets and disposal of

14 waste munitions would be completed in accordance with

- 15 DoD Manual 4715.26, Military Munitions Rule. Interim
- institutional controls and physical barriers would be required to protect public health and
- 17 safety until final closure is achieved at the sites. Lands that would not pose a risk to
- 18 humans would be managed under BLM's multiple use of lands and resource policies.
- ¹⁹ Under the No Action Alternative, DOE would accomplish their environmental restoration
- activities at the sites they are responsible for on the NTTR in accordance with the
- 21 FFACO.

22 Solid Waste

Solid wastes from Air Force operations at the major work
areas would not be generated, collected, or disposed of
under this alternative. Small quantities of nonhazardous
solid wastes would be expected to be generated during
range closure activities. The amount of waste would not

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.12.2.6.1.1.

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this section, please see

Appendix K, paragraph

Programs.

3.12.2.6.1, Environmental

Restoration and Monitoring

perspective on information in

be significant and would not present a potential health or environmental risk. The
 decision on disposal of these wastes would be made during development of closure
 plans.

- Nonhazardous solid wastes generated by future multiple use of NTTR land would be
- 32 administered in accordance with BLM and USFWS agreements and permits.

1 3.13 HEALTH AND SAFETY

2 3.13.1 Affected Environment

3 **3.13.1.1 Description of Resource**

4 This section discusses the affected environment in terms of

perspective on information in this section, please see Appendix K, paragraph 3.13.1.1.1.

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5 ground, flight, and munitions safety for activities conducted by units operating within the 6 ROI. *Ground safety* considers fire risk and management, as well as safety issues 7 associated with training operations. *Flight safety* considers aircraft flight risks such as 8 aircraft mishaps and bird/wildlife-aircraft strike hazards (i.e., BASH). *Munitions safety* 9 considers the use and handling of ordnance associated with operations and training 10 activities.

11 3.13.1.2 Region of Influence

The ROI for safety includes the NTTR and its immediate vicinity, as well as military training airspace used by aircrews who are training on the range. This ROI includes the range property and is expanded, on a limited basis, to include specific elements of military training airspace that support range operations, including the restricted airspaces or operating areas directly associated with range operations.

17 **3.13.1.3 Wildland Fire Risk and Management/Ground Safety**

18 Wildland Fire Risk and Management

Fire is defined as one of two types: wildfire (or wildland fire) and prescribed fire. 19 Generally, wildfires are an unplanned ignition caused by lightning, unauthorized and 20 accidental human-caused fires (including munitions-caused fires), escaped prescribed 21 fires, and other unplanned wildland fires. Prescribed fires are any fire intentionally 22 ignited by management to meet specific land management objectives identified in a 23 written and approved prescribed fire plan. Wildfire is by definition out of control until it 24 can be contained, suppressed, or goes out. Wildfire can be both beneficial and 25 destructive, sometimes both at the same time. Management-ignited fire (prescribed 26 27 fire) is controlled (unless it escapes) and can be low, moderate, or high intensity.

Fire can and often does provide an ecological benefit, but the situation and conditions vary and are often dependent on the natural resource management prescription. Any fire may have beneficial effects (e.g., high severity crown fire in late stage pinyonjuniper can be a normal and an expected ecological process).

However, wildfires can result in a number of serious impacts. Wildfire can threaten firefighter and military personnel safety, as well as military assets and infrastructure. Fires also have the potential to negatively impact mission requirements, resulting in target downtime or possibly limiting the future usability of target areas. Wildfires that start on the NTTR could spread to neighboring private and public lands, threatening homes in the wildland-urban interface/intermix and causing damage to natural and cultural resources. Wildfire smoke can also impact aviation and ground personnel
 safety, as well as nearby communities and sensitive populations. Smoke from
 prescribed fires could also be an impact; however, prescribed fire smoke is usually
 much less and can be mitigated in prescribed fire plans and prescribed fire operations.

The vegetation most susceptible to fire on the NTTR is the pinyon-juniper woodlands 5 and grasslands. Susceptibility to fire increases significantly as the canopy of the 6 woodland closes. Lightning is the most common ignition source of fires on the NTTR. 7 Military-related ignition sources could include munitions, flares, or aircraft/drone 8 9 crashes. All of the target areas are located in bare ground or grassland areas and not in pinyon-juniper woodlands, so exploding munitions is not usually a source of fire in 10 these areas. Grass/shrub range, especially when ephemeral annual grass fuels are 11 present, as well as juniper woodlands, would be susceptible to fires caused by lightning, 12 flares, or aircraft crashes. Uncommon but possible sources include military and 13 authorized access personnel (contractor) actions such as smoking, welding, and 14 equipment-related ignitions. One method of reducing contractor-related incidents is 15 through fire prevention, mitigation, and education, which seek to evaluate, mitigate, and 16 prevent human-caused fires. Fire prevention, mitigation, education, and outreach are 17 standard functions of most federal fire management programs and are used at the 18 NTTR. 19

Historically, every 8 to 12 years, vegetation in the North and South Ranges receives sufficient winter rainfall to produce vegetation that provides enough fuel load to support wildfires, which is common for the Mojave Desert system. In addition, many of the mountainous areas that do not support pinyon-juniper woodlands do support plant communities that are sparse, with minimal litter and fuel biomass (U.S. Air Force, 2012b).

Table 3-47 lists fires that have been reported at the NTTR during the period of 1984 to 26 2010. Between 1978 and 2010, DOE also recorded a total of 380 fires on DOE-27 managed lands. Approximately 6,100 acres were burned, with an average of roughly 28 200 acres per fire. Nearly 12 percent of these fires were associated with ordnance 29 training, with another 6 percent from other human-related causes (e.g., cigarettes, 30 vehicle exhaust, electrical, generator malfunction). The rest of the fires were the result 31 of lightning (52 percent) or were from undetermined sources (30 percent) (McEldery, 32 2016). 33

34

Table 3-47. Reported Fires at NTTR (1984 to 2010)				
Total Reported Fires	49			
Total Acres Burned	59,198			
Average Acres Burned per Year	2,193			
Average Fires per Year	1.8			
Average Fire Size (Acres)	1.741			

Source: (U.S. Air Force, 2012b)

35 Since fire records have not been maintained and wildfires have not been historically

- investigated on the NTTR, the total number and annual distribution of lightning-ignited
- 37 wildfires occurring on NTTR lands is not known. Several informal helicopter surveys

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1 conducted in February 2008 observed evidence of a number of unreported wildfires 2 occurring on the NTTR. These fires apparently ignited in remote, inaccessible areas,

3 making fire detection difficult. A significant number of these fires were likely caused by

4 lightning (U.S. Air Force, 2012b).

5 To minimize the danger of fires, climatic conditions may restrict the types of munitions 6 used during portions of the year. Weather that is conducive to fire on the NTTR can 7 occur at any time of the year at any elevation, but the predominant season at lower 8 elevations is during the spring and early summer, and late spring through summer at 9 higher elevations (U.S. Air Force, 2012b).

The Las Vegas National Weather Service office issues Fire Weather Watches and Fire 10 Weather Red Flag Warnings, indicating critical "fire weather" patterns that contribute to 11 extreme fire danger and/or fire behavior. A Fire Weather Watch alerts agencies to the 12 13 high potential for development of a Fire Weather Red Flag Warning in the next 12- to 72-hour timeframe. Fire danger and weather assessments are coordinated at the local, 14 regional and national levels. Note: The National Weather Service only identifies 15 potential fire-suitable weather. Other fire markers, such as the potential presence of 16 readily available fuels, are developed by other state and federal wildland fire agencies. 17

A Watch may be issued in the first 12-hour time period only for an expected dry 18 thunderstorm event. A Fire Weather Red Flag Warning alerts agencies when the Fire 19 Weather Red Flag weather criteria (defined below) are occurring or forecasted to occur 20 within the next 24 hours and are coupled with critical fuels conditions. Each Fire 21 Weather Watch or Red Flag Warning issuance, update, or cancellation that occurs 22 between normal forecast times will be relayed to the interagency dispatch offices that 23 are affected by the watch/warning. The criteria for a Fire Weather Red Flag Warning 24 include the following (U.S. Air Force, 2012b): 25

- Fuel moistures are critically low.
- Sustained winds are greater than or equal to 20 miles per hour (mph) or gusts greater than or equal to 35 mph, for three or more hours, and relative humidity is less than or equal to 15 percent.
- Dry thunderstorms are predicted with area coverage designated as widely scattered or as greater than 15 percent of a fire weather zone.

32 Some military testing and training events involve activities, such as aerial bombing, aerial flares employment, ground forces training, and target maintenance, that 33 inherently have a potential to ignite wildland fires. In most cases, these activities are 34 accomplished on or over playas where the potential for wildland fire ignition is low. 35 However, flares may be released anywhere over the NTTR during military operations 36 and present potential ignition sources if they land on the ground while still burning. The 37 following operational requirements were established to limit flare deployment to reduce 38 this concern (U.S. Air Force, 2012b): 39

• Set minimum flare release altitudes, depending on flare types, that allow the flares to burn out well before reaching the ground.

- The minimum flare release altitude is 5,000 feet AGL over manned sites, ground parties, in the MOAs and Pahute Alpha/Bravo, or within 3 NM of forested areas.
 However, minimum altitudes may be less than 5,000 feet if ground and surface conditions do not pose a potential for fire.
- During days with Fire Weather Watches or Red Flag Warnings and/or National
 Fire Danger Rating System adjective fire danger levels of "Very High" or
 "Extreme," no flares of any type will be permitted on the NTTR below 5,000 feet
 AGL.

The Air Force and DOI (including BLM and USFWS) follow the same national fire policy. 9 The Review and Update of the 1995 Federal Wildland Fire Management Policy 10 (January 2001) is the primary wildland fire policy document for federal agencies, and 11 establishes the guiding principles, policies, and implementation actions for wildland fire 12 management on federal lands. The DOI Departmental Manual 620 DM 1 Wildland Fire 13 Management Policy and Program Management (2017) sets policy for the BLM and the 14 USFWS and is essentially the same policy direction as that of the Air Force (prescribed 15 under AFI 32-7064, Integrated Natural Resources). These policies require agencies to 16 provide an integrated, intergovernmental approach to the management of wildland fires. 17 Wildfires occurring on federal lands will have a response consistent with firefighter 18 safety, known and potential hazards, and resource values at risk. Acceptable response 19 to a wildfire incident shall be consistent with the direction specified in the installation 20 Wildland Fire Management Plan and may incorporate the full range of suppression 21 options ranging from containment and monitoring to direct attack and full suppression, 22 while keeping firefighter and public safety as the top priorities. 23

In accordance with these policies, NTTR managers have developed and implemented a 24 Wildland Fire Management Plan to address fire-related issues (Note: Currently the 25 Wildland Fire Management Plan is not linked to BLM or USFWS fire management 26 plans.) Nellis AFB, the Small Arms Range, and Creech AFB are not included as part of 27 the plan because no potential for wildland fires exist at any of these areas. Potential 28 fires on these facilities have been defined as brush fires and fall under local fire control 29 laws. Additionally, Nellis AFB and the Small Arms Range have established agreements 30 with the City of North Las Vegas for coordination of resources for control of any brush 31 32 fires that might occur on that facility. Creech AFB has a mutual aid agreement with the Clark County Fire Department and an agreement with the DOE NNSS Fire & Rescue 33 (U.S. Air Force, 2012b). 34

Established procedures require that any wildland fire observed on the NTTR is documented by a fire report immediately after the fire. The Incident Commander is responsible for assisting BLM in completing a fire report (U.S. Air Force, 2012b).

Currently, the USAFWC has no internal personnel certified to fight wildland fires. All wildfire suppression requires the assistance of other federal and state agencies. If a wildland fire occurs on NTTR, fire suppression activities will be requested from BLM in the North Range or USFWS in the South Range, in accordance with established procedures. BLM will respond to wild land fires inside and near the Air Force boundary and within withdrawn lands. P.L. 106-65 states that BLM is responsible for naturally

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caused fires, while the Air Force is responsible for military caused fires. The Air Force 1 can also request BLM's assistance in fighting wildland fires. Note: The Memorandum of 2 Agreement between the BLM Nevada State Office and Nellis AFB titled "Wildland Fire 3 Management Activities at Nevada Test and Training Range" (2010) expired in 2015. 4 The 2010 agreement implies that the BLM would provide fire response upon Air Force 5 request to the South Range, which is USFWS-managed withdrawn lands. The BLM, 6 USFWS, and the Air Force are working to establish a new Memorandum of Agreement. 7 Ensuring the safety of firefighters and other persons affected by fire operations is 8 fundamental to successful fire suppression. Adherence to safety protocols is critical 9 before participation in any wildland fire management activity. All personnel being 10 deployed into an area immediately dangerous to life and health will be initially briefed 11 regarding appropriate personal protective equipment, hazards, lookouts, escape routes, 12 and safety zones. Communication links between firefighters and personnel in aircraft

and safety zones. Communication links between firefighters and personnel in aircraft overhead personnel will be established and tested before engaging in fire suppression

15 activities (U.S. Air Force, 2012b).

16 Ground Safety

Operational Safety – Operations and maintenance activities conducted at the NTTR 17 are performed in accordance with applicable Air Force safety regulations, published Air 18 Force Technical Orders, and standards prescribed by Air Force occupational safety and 19 health requirements, such as AFI 91-203, Air Force Consolidated Occupational Safety 20 Instruction. Contractors working on the base must prepare appropriate job site safety 21 plans explaining how job safety will occur throughout the life of a project. Contractors 22 must also follow applicable Occupational Safety and Health Administration (OSHA) 23 24 requirements.

To minimize the potential for starting fires, training activities are conducted according to established procedures that dictate restrictions on the types of munitions used during portions of the year to minimize the danger of fires. This includes evaluating the fire danger status and whether Fire Weather Watches or Red Flag Warnings have been issued.

Lasers - Many aircraft operating at the NTTR are equipped with laser targeting 30 capability. Approximately 80 percent of the targets on the NTTR are approved for laser 31 use. As part of this approval, each individual target and target complex is surveyed by a 32 quality assurance evaluator to ensure that no hazards, such as standing water or other 33 reflective surfaces are present in the target area. Only those targets that pose no threat 34 35 to human health or safety are approved for lasing. If necessary to ensure safety, detailed operational constraints applicable to specific targets (limitations on the axis of 36 attack, dive angles, etc.) are documented. Protection levels and requirements 37 associated with the use of lasers are outlined in AFI 48-139, Laser and Optical 38 Radiation Protection Program. Lasers would not be of sufficient power to start fires or 39 to pose health hazards to personnel outside the immediate training area. 40

Electromagnetic Radiation and Radio Frequency Emissions – To provide realism in
 training, threat simulation radio frequency (RF) electronic emitters (radars) are located

throughout the electronic combat ranges. The majority of this equipment is radar that
 simulates a threatening aircraft.

RF energy is absorbed by an animal or human body in the form of heat. At relatively low RF energy intensities, the heat induced can usually be accommodated by a body. Thus, any effects produced would generally be reversible. At high intensities, the thermoregulatory capabilities of any given species may be exceeded, which could lead to thermal distress or even irreversible thermal damage.

The radar units are normally placed on elevated ground and then emit skyward. They are not pointed at the ground or placed along roadways. The safe separation distances between the emitters and people or other equipment are provided in feet with the greatest distance under 1,000 feet (Bechtel SAIC Company, 2007).

RF emitters (radar jamming) used on aircraft pose no hazard to the public due to the 12 aircraft's altitude, the energy levels used by the equipment, and the speed of the 13 aircraft. Additionally, frequency management ensures that these transmitters do not 14 create interference with other federal or civil transmitters or receivers. Radio frequency 15 emissions near the Nevada Test Site are coordinated with the DOE, because there are 16 communication and other electronic equipment at the Nevada Test Site that are 17 sensitive to RF emissions. Thus, RF emissions are coordinated through the appropriate 18 Spectrum Management Office to facilitate testing and training (Bechtel SAIC Company, 19 2007). 20

Protection levels and requirements associated with the use of emitters are outlined in AFI 48-109, Electromagnetic Field Radiation (EMFR) Occupational and Environmental Health Program.

24 3.13.1.4 Flight Risks

25 Aircraft Mishaps

It is impossible to predict when and if an aircraft accident may occur. Maior 26 considerations in any accident are loss of life and damage to property. The probability of 27 an aircraft crashing into a populated area is extremely low, but it cannot be totally 28 29 discounted. Several factors are relevant in the case of the NTTR. The surrounding region is made up primarily of natural or rural areas with relatively low population 30 densities; military pilots are instructed to avoid direct overflight of population centers at 31 very low altitudes; and, finally, the limited amount of time the aircraft is over any specific 32 geographic area limits the probability that a disabled aircraft would crash into a 33 populated area. 34

The NTTR has established a comprehensive aircraft mishap prevention program, as required by AFI 91-202, U.S. Air Force Mishap Prevention Program (U.S. Air Force, 2016i), to minimize loss of Air Force resources and protect personnel from death or injuries. Elements of the mishap prevention program include establishing:

- A process for tracking and trending incidents, as well as methods for determining program effectiveness.
- Metrics for measuring performance.
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- Safety goals, objectives, and milestones that support Air Force established goals.
- Methods to identify and disseminate safety "best practices."

The Air Force defines four categories of aircraft mishaps: Classes A, B, C, and High 3 Accident Potential. Class A mishaps result in a loss of life, permanent total disability, a 4 total cost in excess of \$1 million, destruction of an aircraft, or damage to an aircraft 5 beyond economical repair. Class B mishaps result in total costs of more than \$200,000, 6 but less than \$1 million, or result in permanent partial disability, but do not result in 7 fatalities. Class C mishaps involve costs of more than \$10,000, but less than \$200,000, 8 or a loss of worker productivity of more than eight hours. The High Accident Potential 9 category represents minor incidents not meeting any of the criteria for Class A, B, or C. 10 Class C mishaps and High Accident Potential events, the most common types of 11 occurrences, represent relatively unimportant incidents because they generally involve 12 minor damage and injuries, and rarely affect property or the public. This document 13 focuses on Class A mishaps because of their potentially catastrophic results. 14

Over the last 10 years, there have been five Class A mishaps associated with manned 15 aircraft operations in the NTTR region. Additionally, there have also been four mishaps 16 associated with UAVs (Table 3-48). These smaller aircraft require no pilot on 17 board. UAVs can be remote-controlled (e.g., flown by a pilot at a ground control station) 18 or can fly autonomously using pre-programmed flight plans or more complex dynamic 19 automation systems. Most of these mishaps occurred on NTTR ranges; however, in 20 June 2016 an MQ-9 Reaper UAV crashed on the public, or east side, of the DNWR (in 21 Area 63B High). The crash site was located approximately 7.5 miles north west of the 22 Corn Creek visitor center and approximately 0.25 mile west of Alamo Road, a public 23 access road. The crash resulted in approximately 1 acre of Mojave Desert habitat being 24 burned. No injuries occurred (Christensen, 2016). 25

In case of an in-flight emergency, military pilots are trained to take all appropriate emergency measures, including avoiding populated areas if at all possible. Wellestablished emergency response procedures are currently in place, if a mishap does occur. When normal, scheduled flying is in progress, the NTTR maintains highly trained emergency response teams.

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Table 3-48. Historical Mishaps at NTTR (2006–2016)

Report Date	Type Aircraft	Location
August 2008	Tornado GR-4	TPK-39, NTTR
July 2008	F-15	Railroad Valley MOA
February 2009	HH-60	Nellis AFB, 60 miles east of Tonopah
June 2011	F-16C	20 miles west of Caliente, Nevada
August 2013	CV-22	Range 64F
October 2013	UAV	Range 63B
October 2013	UAV	Range 65C
December 2014	UAV	Range 64F
June 2016	UAV	Area 63B High
August 2016	HH-60	Basin and Range National Monument

Source: (Christensen, 2016)

AFB = Air Force Base; MOA = Military Operations Area; NTTR = Nevada Test and Training Range; UAV= unmanned aerial vehicle

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If an aircraft accident occurs on non-federal property, the agency initially responding 1 would likely be the local fire department. Mutual aid agreements for firefighting 2 assistance on the NTTR have been established with Las Vegas, North Las Vegas, 3 Boulder City, Henderson, and Clark County. Once the situation is stabilized, an 4 investigation area would normally be established around the accident scene. Air Force 5 personnel would secure the site, and the investigation phase would ensue. After all 6 required investigations and related actions on the site are complete. Air Force personnel 7 would remove the aircraft. 8

Since the NTTR includes portions of the DNWR, additional effects could result from an 9 aircraft mishap in these areas. The lands comprising the DNWR are managed by the 10 USFWS as a National Wildlife Refuge, with special steps taken to preserve wilderness 11 values of areas proposed for wilderness. To support these management objectives, the 12 Air Force is party to agreements with the USFWS that place some restrictions on 13 military operations conducted over some of these lands. These restrictions include such 14 steps as establishing minimum flight altitudes. Steps such as these not only minimize 15 intrusiveness on wilderness values, but also enhance safety by limiting the risks 16 associated with low-altitude flight. 17

Should a mishap occur in these areas, response and recovery operations could require the use of motorized vehicles and excavation to contain contamination. This type of activity is normally prohibited in wilderness areas. While these actions could result in damage to the wilderness characteristics of the area, the Air Force would attempt to minimize direct damage and intrusiveness to the greatest extent practicable, consistent with national security considerations and the need to protect life and property from further risk.

Overall, the goals of these response procedures are to: (1) save lives, property, and material by timely and correct response to mishaps; (2) quickly and accurately report mishaps to higher headquarters; and (3) investigate the mishap to prevent the recurrence of the same or a similar mishap.

29 Bird/Wildlife Aircraft Strike Hazard

Bird-aircraft strikes constitute a safety concern because of the potential for damage to aircraft or injury to aircrews or local populations if an aircraft crash should occur. From 2005 to 2014 (the most recent year that data is available), the Air Force BASH Team documented 47,135 bird/wildlife strikes across the entire Air Force. Of these, 17 resulted in Class A mishaps. During the same period, the Air Force logged over 1.9 million flying hours (U.S. Air Force, 2016j).

Although aircraft may encounter birds at altitudes of 30,000 feet above sea level or higher, most birds fly close to the ground. Over 97 percent of reported bird strikes occur below 3,000 feet AGL. Approximately 30 percent of bird strikes happen in the airport environment, and almost 55 percent occur during low-altitude flight training. Other wildlife, such as deer, also present a collision danger to aircraft during takeoff or landing.

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A bird-aircraft strike hazard exists at the NTTR and its vicinity due to resident and migratory bird species. Migratory waterfowl (e.g., ducks, geese, and swans) are hazardous to low-flying aircraft because of their size and their propensity for migrating in large flocks at a variety of elevations and times of day. Waterfowl are usually only a hazard during migratory seasons (fall and spring). These birds typically migrate at night and generally fly between 1,500 to 3,000 feet AGL during the fall migration and from 1,000 to 3,000 feet AGL during the spring migration.

The Air Force BASH Team maintains a database that documents all reported birdaircraft strikes. Historical information indicates that from 2006 to 2016, a total of 151 bird/wildlife-aircraft strikes occurred throughout the NTTR environment. These resulted in total damages in the amount of approximately \$480,000 (Shepherd, 2016). None of these resulted in a Class A mishap.

To minimize the potential for bird/wildlife-aircraft strikes, Nellis AFB has implemented an 13 aggressive BASH program, including development of a BASH Plan (Nellis AFB, 2003). 14 As part of this program, Nellis AFB has established a Bird Hazard Warning System to 15 report significant bird activity noted at the NTTR. This system is used for the immediate 16 17 exchange of information between ground agencies and aircrews concerning the existence and location of birds that pose a hazard to safe flying operations. Based on 18 the potential for bird hazards, the following Bird Watch Conditions have been 19 established: 20

- Bird Watch Condition SEVERE: heavy concentration of birds on or immediately above the active runway or other specific locations that represent an immediate hazard to safe flying operations. Aircrews must thoroughly evaluate mission need before operating in areas under condition SEVERE.
- Bird Watch Condition MODERATE: concentrations of birds observed in locations
 that represent a probable hazard to safe flying operations. This condition requires
 increased vigilance by all agencies and extreme caution by aircrews.
- Bird Watch Condition **LOW**: normal bird activity on and above the airfield with a low probability of hazard.

During periods of flight operations, the Bird Watch Conditions are updated in the hourly Automated Terminal Information System (ATIS) information. Additionally, when the Supervisor of Flying declares Bird Watch Condition MODERATE or SEVERE, the Supervisor of Flying immediately notifies the Air Traffic Control tower, and Base Operations, local flying squadrons, and the Wing Commander's office are also notified.

Each flying unit must verify the Bird Watch Condition prior to commencing flying operations. Additionally, the Bird Watch Condition is included in the hourly ATIS information if the condition is either MODERATE or SEVERE. The absence of an advisory on the ATIS means the Bird Watch Condition is LOW. Any change in Bird Watch Condition is transmitted on Control Tower Frequency by the Supervisor of Flying. Finally, all personnel working on or near the airfields must be perceptive to potentially hazardous bird activity and must immediately notify the Base Operations Office of any cuch activity (Nellis AER 2002)

42 such activity (Nellis AFB, 2003).

Operational changes are also made to avoid areas and times of known hazardous bird concentrations, to the extent permitted by a mission. Several actions may be implemented during periods of increased bird activity (Nellis AFB, 2003), such as raising traffic pattern altitude; changing traffic pattern direction or altitudes to avoid bird concentrations; avoiding takeoffs and landings at dawn/dusk, plus or minus one hour; limiting or prohibiting formation takeoffs and landings; and rescheduling local training or moving the training to a different location.

8 **3.13.1.5** Munitions Use and Handling

Personnel at Nellis AFB control, maintain, and store all ordnance and munitions 9 required for mission performance on NTTR. This includes training and inert bombs and 10 rockets, live bombs and rockets, chaff, flares, gun ammunition, small arms ammunition, 11 and other explosive and pyrotechnic devices. Ordnance is handled and stored in 12 accordance with Air Force Manual 91-201, Explosives Safety Standards, and all 13 munitions maintenance is carried out by trained, gualified personnel using Air Force-14 approved technical data. Sufficient storage facilities exist for the current types and 15 amounts of ordnance, and all facilities are approved and sited for the ordnance they 16 store. 17

Small arms training with blank rounds may also occur within withdrawal areas. Blanks are a type of cartridge containing gunpowder but no bullet or shot. Blanks use paper or plastic wadding to seal gunpowder into the cartridge. When fired, the blank makes a flash and an explosive sound (report), and the wadding is propelled from the barrel of the gun.

Chaff and flares are also used throughout the NTTR. Their use is controlled in accordance with standard operating procedures detailed in AFI 13-212V1. The types of use, locations, and altitudes authorized for release vary, depending on the type of chaff and flares used. When fire danger is extreme, all flare use is curtailed.

27 Chaff is small fibers of aluminum-coated mica packed into approximately 4-ounce bundles and ejected by aircraft to reflect radar signals. When dispensed from an 28 aircraft, chaff forms a brief "cloud" that temporarily hides the aircraft from radar 29 detection. Although the chaff may be ejected from an aircraft using a small pyrotechnic 30 charge, the chaff itself is not explosive. Chaff is composed of silicon dioxide fibers 31 ranging in diameter from 0.7 to 1 mil (thousandth of an inch), coated by an aluminum 32 alloy and a slip coating of stearic acid (fat). Analyses of the materials comprising chaff 33 indicate that they are generally non-toxic in the quantities used (U.S. Air Force, 1997b). 34

Silicon dioxide is an abundant compound in nature that is prevalent in soils, rocks, and 35 sands. The trace quantities of metals included in the mica fibers are not present in 36 sufficient quantities to pose a health risk. Aluminum is one of the most abundant metals 37 in the earth's crust and water. In general, aluminum is regarded as non-toxic. Trace 38 quantities of silicon, iron, copper, manganese, magnesium, zinc, vanadium, or titanium 39 may be found in the alloy. The quantities involved are a minuscule percentage of levels 40 that might cause concern. Stearic acid is found naturally as a glyceride in animal fat and 41 some vegetable oils. Chaff has also been test-fired in a controlled environment to 42

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1 determine its potential to break down into respirable particulates (PM₁₀). The findings of 2 the test detected no PM₁₀ (U.S. Air Force, 1997b).

3 Flares consist of small pellets of highly flammable material that burn rapidly at extremely

4 high temperatures. The purpose of defensive flares is to provide a heat source other

5 than the aircraft's engine exhaust to mislead heat-sensitive or heat-seeking targeting

6 systems and decoy them away from the aircraft.

⁷ Use of live munitions during training is limited to ranges within Restricted Airspace. Air ⁸ Force safety standards require safeguards on weapons systems and ordnance to ⁹ ensure against inadvertent releases. All munitions mounted on an aircraft, as well as ¹⁰ the guns carried in the aircraft, are equipped with mechanisms that preclude release or ¹¹ firing without activation of an electronic arming circuit.

If a malfunction prevents ordnance release during a mission, and the pilot must return to the base with "hung" ordnance (i.e., any ordnance of which an attempt to release, jettison, launch, or fire from an aircraft did not actuate as designed), the aircraft is parked in revetments in the hung ordnance area while the ordnance is rendered safe. This area is located east of Runway 03 Right and south of the Live Ordnance Loading Area (USFWS, 2012).

All ranges users must perform a dry/familiarization pass on that range before weapons delivery (day or night) for any of various training scenarios. Additionally, familiarization passes are required during the aircrew/aircraft operator's initial use of the range or if the aircrew/operator has not frequented the range within one year (USFWS, 2012).

On the day of a mission that employs munitions (practice or full-scale), each flight/mission lead shall confirm with Range Control the specific target, the planned ordnance on each target, and applicable restrictions (manned sites, etc.). In-flight "retargeting" exercises require approval of the Range Control Officer before expending ordnance on the new target, and the flight/mission lead shall confirm approval (USFWS, 2012).

Regulations also require that personnel conduct an explosives safety hazard 28 assessment before each range clearance. The assessment shall include, at a minimum, 29 the rationale for the range clearance, the number of personnel required, support 30 requirements, the types of military munitions anticipated to be encountered, the most 31 hazardous munition expected, and expected UXO densities. All hazard assessments 32 must be updated when new hazards (e.g., military munitions types) are identified or new 33 technologies or procedures are used (DoD, 2005). To further ensure public safety, 34 NTTR personnel perform an annual assessment to establish specific weapons 35 restrictions, procedures, armament switch settings, and so on, for aircraft that deliver 36 ordnance on the range. 37

Finally, the fire danger status is evaluated prior to training events to ensure that the types of munitions used are appropriate to minimize the danger of fires.

DRAFT | LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT NTTR LAND WITHDRAWAL

1 3.13.2 Environmental Consequences

2 3.13.2.1 Analysis Methodology

This section evaluates the potential for the proposed alternatives to increase safety risks, as well as the Air Force's capability to manage these risks. Safety includes issues related to fire risks and ground safety, as well as aircraft flight risks resulting from mishaps and bird/wildlife-aircraft strike hazards. Potential risks associated with the use and handling of munitions are also evaluated. Potential impacts related to safety were considered significant if proposed activities would endanger life or health or pose an unusual risk to military personnel or nearby residents and the general public off-site.

103.13.2.2Alternative 1 – Extend Existing Land Withdrawal and Management of11NTTR (North and South Range) – Status Quo

12 It is expected that the level of sortie operations would continue at current levels. Over 13 the last 10 years, there have been five Class A mishaps associated with manned 14 aircraft operations in the NTTR region. None of these mishaps resulted in injury to the 15 public or damage to private property. Risks associated with aircraft mishaps are 16 anticipated to remain relatively unchanged. Should new aircraft enter the military's 17 inventory, potential risks would be assessed at that time.

The majority of flight operations would be conducted over remote areas, where population densities are very low; in the unlikely event that an aircraft accident occurs, it should not create undue risk to people or property on the ground. However, if an accident were to occur, existing response, investigation, and follow-on procedures would be enforced; no new accident response procedures would be required. Potential issues associated with wildland fires from an aircraft mishap are discussed later in this section.

- A total of 151 bird-aircraft strikes have been documented for Nellis AFB over the period of 2006 to 2016. The overall risks associated with bird-aircraft strikes is expected to remain low; none of the bird-aircraft strikes occurring at the NTTR have resulted in a Class A mishap, although some resulted in damage to aircraft. To minimize the potential for any future bird/wildlife-aircraft strikes, NTTR personnel would continue to implement an aggressive BASH program.
- No significant adverse impacts to safety due to aircraft operations with Alternative 1 would be expected with continued implementation of existing mishap prevention and BASH program procedures.
- Use of live and training munitions would continue on the NTTR. All munitions would be handled by trained and qualified personnel in accordance with all explosive safety standards and detailed published technical data. It is expected that the type and amount of munitions expended would continue at current levels. If new targets were developed, or the use of existing ones changed, or if different ordnance were planned for use, prior to approval for use a comprehensive safety footprint analysis would be accomplished around the target to ensure no safety risks arise. If necessary, operational constraints

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pertaining to the use of specific delivery tactics, munitions type, or aircraft headings
 would be developed to mitigate any potentially unsafe condition.

The use of munitions poses the potential for wildland fires. Since the type and level of 3 use of the NTTR is not expected to substantially change, there is no anticipated 4 increase in fire risk. The NTTR would continue to implement the Nellis AFB Wildland 5 Fire Management Plan to address fire-related issues, and NTTR operations would 6 7 continue to rely on National Weather Service Fire Weather Watches and Fire Weather Red Flag Warnings to assess potential fire risks and the appropriate use of munitions, 8 including flares. NTTR personnel would also coordinate regarding fire-related issues 9 with BLM in the North Range and the USFWS on the South Range. 10

As previously discussed, the Air Force has no internal personnel certified to fight 11 wildland fires. Additionally, the Air Force has no aircraft capable of fire suppression in 12 their inventory of aircraft; civilian firefighting aircraft would continue to be used; 13 consequently, wildfire suppression would continue to be coordinated with other federal 14 and state agencies, including BLM, in accordance with a new MOU. The Air Force and 15 BLM would also continue to coordinate to implement appropriate joint fire management 16 17 policies that would be consistent with guiding principles, policies, and implementation actions for wildland fire management on DoD lands, as described in AFI 32-7064, 18 INRMP, Chapter 13, Wildland Fire Management (U.S. Air Force, 2014f). Note: The BLM 19 fire suppression policy does not apply on the South Range. In this area, the USFWS 20 addresses fire suppression response on a case-by-case basis. 21

Adherence to established safety protocols for any wildland fire management activity would continue. All personnel responding to a fire would be briefed regarding appropriate personal protective equipment, hazards, lookouts, escape routes, and safety zones. Adequate communication links between all parties would also be established. These areas would continue to be restricted from public access, so impacts to the public from munitions use on the range would be highly unlikely.

Ground operations on the NTTR would occur at current or similar levels and would continue to use the same processes and procedures as current operations. All actions would be accomplished by technically qualified personnel and would be conducted in accordance with applicable Air Force safety requirements, approved technical data, and AFIs. As a result, Alternative 1 would have no additional impacts outside of those identified for current ongoing activities.

Use of electronic emitters to provide training in electronic warfare and add realism to other types of training activity would continue on the NTTR. Safe separation distances from specific emitters have been established. Operation of this equipment would continue with the required safety zones. All laser use would continue to be conducted in accordance with AFI 48-109, Electromagnetic Field Radiation (EMFR) Occupational and Environmental Health Program.

Additionally, aircraft equipped for laser targeting would continue to operate and train on
 the NTTR. Laser use would be limited to targets that have been surveyed and have
 been specifically approved for such use. If new or additional targets were

recommended for laser use, the target and target area would be surveyed and assessed before being approved for laser use to ensure that no potential hazards exist that could create safety risks. If required, some operational constraints may be placed on the use of the target to mitigate any potentially hazardous condition. All laser use would continue to be conducted in accordance with AFI 48-139, Laser and Optical Radiation Protection Program.

7 These areas would continue to be restricted from public access, so impacts to the public 8 from emitter operations on the range would be highly unlikely.

9 3.13.2.3 Alternative 2 – Extend Existing Land Withdrawal and Provide Ready 10 Access in the North and South Ranges

11 It is anticipated that establishing ready access would increase test and training activities 12 an estimated 30 percent. This increase in air operations would result in an associated 13 increase in the potential for mishaps or bird strikes. As with Alternative 1, 14 implementation of procedures discussed in Section 3.13.2.2 would ensure that the 15 potential for mishaps and bird strikes would remain low; consequently, no significant 16 safety-related impacts due to aircraft operations would occur with Alternative 2.

The increase in training activities has the potential to increase munitions-related fires. 17 18 Additionally, those areas within the area proposed for wilderness and the DNWR would be more vulnerable to fire, as these areas would be more difficult for fire response 19 equipment and personnel to access. However, as with Alternative 1, adherence to 20 established safety protocols for any wildland fire management activity would continue, 21 including the use of appropriate personal protective equipment and communications 22 links between all parties; consequently, no significant safety-related impacts due to 23 munitions use would occur with Alternative 2. 24

With regard to the potential increase in impacts from ground disturbance, as with Alternative 1, all actions would be accomplished by technically qualified personnel and would be conducted in accordance with applicable Air Force safety requirements, approved technical data, and AFIs; consequently, no significant safety-related impacts due to ground disturbance would occur with Alternative 2.

The potential impacts resulting from an increase in emitter operations would be the same with Alternative 2 as the impacts with Alternative 1 since they would still occur with the existing NTTR boundary and existing procedures would ensure safety; consequently, no significant safety-related impacts due to emitter operations would occur with Alternative 2.

35 **3.13.2.4** Alternative 3 – Expand Withdrawal of Public Lands for the NTTR

- 36 Alternative 3 includes subalternatives, as described in Section 2.3.3:
- Alternative 3A Range 77 EC South Withdrawal
- Alternative 3A-1 Amended Range 77 EC South Withdrawal

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- Alternative 3B Range 64C/D and 65D Withdrawal and Administrative Incorporation
- Alternative 3C Alamo Withdrawal

4 Aircraft operations currently occur and would continue to occur with an increase of 30 percent, over Alternatives 3A, 3A-1, 3B, and 3C proposed expansion areas. The 5 increase in aircraft operations may increase the risk for bird strikes, especially during 6 periods of migration. Many bird species use mountain ranges as migration corridors, 7 and the Sheep Range attracts various bird species because of the elevation, habitat 8 diversity, and presence of water. However, potential impacts associated with bird strikes 9 would continue to remain low; consequently, it is not anticipated that significant safety-10 related impacts would occur due to aircraft operations over those discussed for 11 Alternative 2. 12

No munitions would be used on the expansion areas proposed by Alternative 3A, 3A-1, 13 or 3B; the areas would be employed as a safety buffer for test and training activities. 14 Note: a safety buffer is an area where there is a potential for an impact to occur as 15 result of a malfunctioning munition; see Section 2.2.1 for a more detailed discussion of 16 safety footprints and buffers. There is a potential that training-initiated fires on other 17 areas could spread to this area. Due to some remote locations, firefighting in the 18 proposed expansion area for Alternative 3A or 3A-1 may also prove more difficult in 19 these isolated areas. All firefighting activities would be coordinated with USFWS to 20 21 determine appropriate fire response procedures.

For Alternative 3C, IW training with blank rounds may occur within the proposed expansion area. Also discussed in Section 3.13.1.5, blanks are a type of cartridge containing gunpowder but no bullet or shot, and when fired, the wadding is propelled from the barrel of the gun. There is an unlikely potential for a fire to be ignited if smoldering wadding comes in contact with dry vegetation on the ground. To the greatest extent possible, a "leave no trace" policy to collect and remove all spent cartridges would be implemented on the NTTR.

29 For Alternatives 3A, 3A-1, and 3B, adherence to established fire safety protocols would continue to minimize the potential for fires to occur, and if a fire occurred, for it to spread 30 to these areas. Consequently, no significant safety-related impacts due to munitions 31 use would occur with these alternatives. For Alternative 3C, ground disturbance has the 32 potential to result in an expansion of invasive annual grass that could result in increased 33 wildfire risk. Reduced access for the purposes of safety and security into this area 34 could increase or delay response times, which could result in larger fires. Airspace de-35 confliction could increase where a wildfire response would include civilian firefighting 36 37 aircraft.

For Alternatives 3A, 3A-1, and 3B, ground safety impacts would not occur because no training activities would take place in the proposed expansion areas; consequently, no significant safety-related impacts due to ground disturbance would occur with these alternatives.

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For Alternative 3C, ground disturbance, including conceptual construction and troop movement, would occur within the proposed expansion area; however, potential impacts would be the same as those discussed under Alternative 1. Consequently, no significant safety-related impacts due to ground disturbance would occur with this alternative.

6 For Alternatives 3A, 3A-1, and 3B, there would be no emitter operations within the 7 proposed expansion areas; consequently, no significant safety-related impacts due to 8 emitter operations would occur with these alternatives.

9 For Alternative 3C, emitter operations could occur depending on future test and training 10 requirements within the proposed expansion area. The Air Force would coordinate with 11 the USFWS to ensure that the public is made aware of areas closed for military 12 operations. Potential impacts would be the same as those discussed under Alternative 13 1; consequently, no significant safety-related impacts due to emitter operations would 14 occur with this alternative.

15 **3.13.2.5** Alternative 4 – Establish the Period of Withdrawal

The proposed withdrawal periods associated with Alternative 4—Alternative 4A (20-year withdrawal period), Alternative 4B (50-year withdrawal period), and Alternative 4C (indefinite)—must be implemented in conjunction with one or more of the other alternatives or subalternatives. Because Alternative 4 reflects periods of time, which do not in and of themselves affect health or safety, there are no specific impacts associated with Alternative 4, except to provide a point in time at which impacts from other chosen Alternatives may end.

23 3.13.2.6 No Action Alternative

24 Wildland Fire Risk and Management/Ground Safety

Under the No Action Alternative, all military-related air-to-ground and ground-based 25 activity would cease, and potential impacts from training actions, such as munitions-26 related fires, currently creating the greatest source of fire risk would no longer occur. 27 Furthermore, since the Air Force would no longer operate or maintain anything on the 28 lands currently comprising the NTTR after the land management transfer, there would 29 be no military-related ground safety concerns. BLM would be responsible for fire 30 response on the North Range and the USFWS would be responsible for fire response 31 on the South Range. BLM would continue to provide wildland fire management support 32 to the USFWS and the South Range through mutual aid and the USFWS assistance 33 agreement. If lands are opened to the public, increased human presence may be a 34 source of increased fire risk. Fire response times would decrease because of increased 35 access, possibly decreasing fire size due to timely suppression actions. Fire reporting 36 would improve, also allowing more timely fire response and more accurate fire records. 37 Overall fire management activities would increase. 38

Since the lands currently comprising the NTTR would be administered and managed by the BLM and USFWS, those agencies would ultimately determine land uses.

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Environmental cleanup of some non-renewed lands may not be able to ensure ground safety. DOE, Air Force, USFWS and BLM review would be required to determine what areas would need to be fenced to ensure public safety. These areas are currently unknown and cannot be assessed for fire or ground safety risk. Restricted access would limit wildfire response and provide for firefighter and public safety.

6 Flight Safety Risks

Military training in the designated airspaces would continue. Although all air-to-ground training activity would cease, air-to-air training would still be possible. This may result in an overall decrease in overall flight operations; consequently the potential for mishaps or bird/wildlife-aircraft strikes would be reduced, resulting in an overall decrease in risks associated with aircraft flight training.

12 Munitions Use and Handling

There would be no impacts related to munitions use and handling as munitions training would cease. Routine cleaning of munitions from ranges would also no longer be required; however, before the non-renewed lands could revert to BLM and USFWS control, the Air Force, DOE, USFWS and BLM would be required to assess the level of UXO cleanup required and to implement appropriate remedial measures. Firefighter and public safety would benefit and increase upon the cessation of munitions training and remediation of UXO.

20 3.14 TRANSPORTATION

21 3.14.1 Affected Environment

22 3.14.1.1 Description of Resource

Transportation resources include the infrastructure required for the movement of people, materials, and goods.

25 Transportation infrastructure, within the context of the

- LEIS, includes the public roadways and access points that provide access to the NTTR,
- the road and trail network within the NTTR, and the roads and trails located within the proposed expansion areas.
- -

29**3.14.1.2**Region of Influence

The ROI for transportation includes the highways surrounding the NTTR within Clark, Lincoln, Nye, and Esmeralda Counties.

- 32 Interstate 15 (I-15) is the nearest major interstate to the NTTR. I-15 begins near the
- 33 Mexico-United States border in San Diego County and stretches north to Alberta,
- Canada, passing through the states of California, Nevada, Arizona, Utah, Idaho, and
- 35 Montana. Major U.S. routes that surround and provide access to the NTTR include U.S.
- Route 93 (Great Basin Highway), U.S. Route 95 (Veterans Memorial Highway), and

For the Native American perspective on information in this section, please see Appendix K, paragraph 3.14.1.1.1. U.S. Route 6. Nevada S.R. 375 (Extraterrestrial Highway) connects U.S. Route 6 and

- 2 U.S. Route 93 northwest of the NTTR. The location of I-15, the U.S. Routes, and S.R.
- 3 375 relative to the NTTR are shown on Figure 3-37.
 4 Figure 3-37 also shows the network of minor roads within the N
- Figure 3-37 also shows the network of minor roads within the NTTR. Additionally, the NTTR contains a patchwork of trails related to activities such as mining, agricultural 5 grazing, wildlife resource management, and historical exploration of the area. Off-road 6 access to these trails is extremely limited and restricted. The road network is more 7 extensive in the North Range than the South Range due to the presence of the 8 Tonopah Airfield, target complexes associated with the Tonopah ECR, Tolicha Peak 9 ECR, EC South Range, and facilities operated by DOE/NNSA in the North Range and 10 the land management restrictions in the South Range preventing road development or 11 improvement outside of the Air Force's target impact areas. 12
- Roads in the South Range are primarily associated with five target impact areas and their associated target complexes (i.e., 60-series ranges). The minor road network is a mix of maintained paved and nonpaved roads along with nonmaintained dirt roads (Figure 3-38).
- Primary access points to the North Range are located along U.S. Route 95 between Beatty and Goldfield, from U.S. Route 6 east of Tonopah, and off of S.R. 375 north and south of the town of Rachel. Access to the South Range is primarily associated with Creech AFB located northwest of Las Vegas along U.S. Route 95. Access to the eastern side of the South Range and within the Alamo airspace area is provided via Corn Creek Road and Alamo Road. These are also the primary access roads into the DNWR.
- There are no active railroads in the vicinity of the NTTR. The closest major commercial airport is located in Las Vegas, but smaller private-use airports and airstrips are located in close proximity to the site. It should be noted that the NTTR lies under restricted airspace.
- 28 **3.14.2 Environmental Consequences**

29 3.14.2.1 Analysis Methodology

Potential transportation impacts were assessed with respect to the potential for disruption or improvement of existing levels of service and changes in existing levels of transportation safety. Impacts may arise from changes to traffic circulation (e.g., temporary/permanent closures associated with safety footprints and other military activities), construction-related traffic and activities, or changes in traffic volumes. Adverse impacts would be significant if highways and roads with no history of capacity exceedance had to operate at or above their full design capacity as a result of an action. DECEMBER 2017





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13.14.2.2Alternative 1 – Extend Existing Land Withdrawal and Management of2NTTR (North and South Range) – Status Quo

Aircraft operations would not have any interaction with the existing transportation infrastructure, current levels of service, or traffic patterns within the NTTR or the surrounding area. Specifically, the airspace above the NTTR would remain restricted and not impact commercial or private aircraft travel routes outside of the current baseline condition.

8 Munitions use would be contained within the boundaries of NTTR, and safety weapons 9 footprints cannot extend over public transportation infrastructure. Impacts on the 10 existing roads within the NTTR would not change, and there would not be any 11 interaction with the existing transportation infrastructure, current levels of service, or 12 traffic patterns in the surrounding area.

Any future new construction planned within the NTTR is not expected to be large 13 enough to adversely impact the existing roadways within the NTTR. Transport of 14 construction materials and personnel over the surrounding highways and NTTR roads 15 would also not have adverse impacts due to the relatively good condition of the 16 roadways and existing low traffic volumes. Troop movements would likely consist of 17 small convoys (5 to 10 vehicles) used to transport troops to/from various training sites 18 and would not result in any transportation issues. Additional NEPA documentation 19 would be completed for any future projects to address site-specific impacts to the 20 21 transportation network.

Transport of new emitters or movement of existing emitters to new locations would only require occasional trips utilizing a small number of transport and support vehicles and would not adversely impact any roadways that would be used. Emitter operations would not have any interaction with the existing transportation infrastructure, current levels of service, or traffic patterns within the NTTR or the surrounding area.

27 3.14.2.3 Alternative 2 – Extend Existing Land Withdrawal and Provide Ready 28 Access in the North and South Ranges

For Alternative 2, potential transportation impacts associated with aircraft operations, munitions use, and emitter operations would be equivalent to those for Alternative 1.

Any future new construction planned within the NTTR is not expected to be large 31 enough to adversely impact existing roadways. Ready access throughout the South 32 Range could include the potential for improvements to existing roads and trails 33 34 associated with new emitter locations. Transport of construction materials and personnel over the surrounding highways and NTTR roads would also not have adverse 35 impacts due to the relatively good condition of the roadways and existing low traffic 36 volumes. Troop movements would likely consist of small convoys (5 to 10 vehicles) 37 used to transport troops to/from various training sites and would not result in any 38 transportation issues. 39

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1 3.14.2.4 Alternative 3 – Expand Withdrawal of Public Lands for the NTTR

- 2 Alternative 3 includes subalternatives, as described in Section 2.3.3:
- Alternative 3A Range 77 EC South Withdrawal
 - Alternative 3A-1 Amended Range 77 EC South Withdrawal
- Alternative 3B Range 64C/D and 65D Withdrawal and Administrative
 Incorporation
 - Alternative 3C Alamo Withdrawal

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Alternatives 3A, 3A-1, and 3B would only be used to add buffer to the safety footprint of Range 77 and operational security and safety buffers to the NTTR, respectively, and no aircraft operations, munitions use, ground disturbance, or emitter operations are associated with these alternatives. Alternatives 3A, 3A-1, and 3B would have no interaction with the existing transportation infrastructure, current levels of service, or traffic patterns within the NTTR or the surrounding area.

For Alternative 3C, aircraft operations over the Alamo withdrawal areas also would not have any interaction with the existing transportation infrastructure, current levels of service, or traffic patterns within the NTTR or the surrounding area.

For Alternative 3C, blank munitions use in currently designated target impact areas would not have any interaction with the existing transportation infrastructure, current levels of service, or traffic patterns within the NTTR. However, the addition of safety buffers within the proposed withdrawal area could require road closures within the DNWR. This would primarily impact Alamo Road and smaller roads/trails that intersect with Alamo Road in a westerly direction (Figure 3-38).

23 New construction within the Alamo withdrawal area for Alternative 3C associated with implementing additional IW capabilities is not expected to be large enough to adversely 24 25 impact the existing roads within the area. However, minor improvements could be made to existing roads and trails within the DNWR. Additionally, transport of construction 26 materials and personnel over the surrounding state/county highways would not have 27 adverse impacts due to the relatively good condition of the roadways and existing low 28 traffic volumes. Troop movements would likely consist of small convoys (5 to 29 10 vehicles) used to transport troops to/from various training sites and would not result 30 in any transportation issues. 31

Maintenance, operation, and transport of emitters to new locations for Alternative 3C 32 would only require occasional trips utilizing a small number of transport and support 33 vehicles and would not adversely impact any existing roadways that would be used. 34 However, there could be minor improvements made to existing roads and trails, along 35 with the potential for new road construction. This could occur within the existing NTTR 36 area and in the proposed withdrawal area that is part of the DNWR. Emitter operations 37 would not have any impact on current levels of service or traffic patterns within the 38 NTTR or the surrounding area. 39

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3.14.2.5 Alternative 4 – Establish the Period of Withdrawal

2 The proposed withdrawal periods associated with Alternative 4–Alternative 4A (20-year withdrawal period), Alternative 4B (50-year withdrawal period), and Alternative 4C 3 (indefinite)-must be implemented in conjunction with one or more of the other 4 alternatives or subalternatives. Alternative 4 would not result in any interaction with the 5 existing transportation infrastructure, current levels of service, or traffic patterns within 6 the NTTR or the surrounding area. Because Alternative 4 reflects periods of time, which 7 do not in and of themselves affect transportation resources, there are no specific 8 9 impacts associated with Alternative 4, except to provide a point in time at which impacts from other chosen alternatives may end. 10

11 3.14.2.6 No Action Alternative

The No Action Alternative could result in impacts to the existing transportation infrastructure, current levels of service, and traffic patterns within and surrounding the former NTTR lands. However, potential impacts would depend on the future land use planning and resource management objectives for the BLM-administered public lands and management of the DNWR by the USFWS.

17 3.15 SUMMARY OF IMPACTS

18 The following table (Table 3-49) provides a summary of the

19 potential impacts associated with each alternative, as

described in Sections 3.1 through 3.14 for each resourcearea. The potential impacts from selecting a combination

For the Native American perspective on information in this section, please see Appendix K, Table 3-49.1.

of the alternatives presented in Section 2.3 (Alternatives) are illustrated in a guick-

reference, color-coded table in Section 2.7 (Environmental Comparison of Alternatives)

24 and described in Section 3.15.1 (Summary of Impacts for Potential Alternative

25 Combinations).

Table 3-49. Su	nmary of Impacts
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Resource Area	Alternative	Summary of Impacts
Airspace	1	Under Alternative 1, congestion, range constraints, and the inability to properly test and train would continue across the NTTR.
	2	Air operations could increase; however, no changes to the boundary of existing airspace would occur. Despite a potential for increased air operations, the existing airspace would be more efficiently utilized by allowing ready access, which would reduce airspace scheduling conflicts. Therefore, no significant impacts are anticipated.
	3A 3A-1 3B 3C	No changes to the boundary of existing airspace would occur; therefore, no significant impacts are anticipated.
	4	The proposed withdrawal periods associated with Alternative 4 must be implemented in conjunction with one or more of the other alternatives or subalternatives. Because Alternative 4 reflects periods of time, which do not in and of themselves affect airspace, there are no specific impacts associated with Alternative 4, and it is not anticipated that any of the subalternatives (4A, 4B, or 4C) would impact how the airspace is used.
	No Action Alternative	The DoD would continue to utilize the airspace but would not be able to conduct live-fire testing or training activities since the underlying ground space would no longer controlled by the DoD.
Noise	1	Operational tempo is anticipated to remain similar to previous levels. Therefore, noise levels would continue as described under baseline conditions, which at this time are not considered to result in a significant adverse impact. Likewise, those SUAs in the northernmost portions of the NTTR would remain at the baseline 61-dB level, which is well below levels that result in land use compatibility concerns.
	2	Air operations, munitions use, vehicle use, and emitter operations would increase; however, increases in noise levels would be minimal (<1 dB). The number of sonic booms per day would be expected to increase by one sonic boom over the baseline levels. Therefore, no significant impacts are anticipated.
	3A	Munitions use and emitter operations would not occur within these proposed expansion areas. Ground-
	3A-1	disturbing activities and vehicle use may also increase on the NTTR, with these activities also occurring in
	38	be minimal (<1 dB). The number of sonic booms per day would be expected to increase by one sonic boom over the baseline levels. Therefore, no significant impacts are anticipated.
	3C	Blank munitions use, emitter operations, and ground disturbance associated with troop movements, vehicle use, and construction would occur within this proposed expansion area. However, increases in noise levels would be minimal (<1 dB). The number of sonic booms per day would be expected to increase by one sonic boom over the baseline levels. Therefore, no significant impacts are anticipated.

Table 3-49. Summary of Impacts

Resource Area	Alternative	Summary of Impacts
	4	The proposed withdrawal periods associated with Alternative 4 must be implemented in conjunction with one or more of the other alternatives or subalternatives. Because Alternative 4 reflects periods of time, which do not in and of themselves affect noise, there are no specific noise impacts associated with any subalternatives of Alternative 4, except to provide a point in time at which impacts from other chosen alternatives may end.
	No Action Alternative	The land withdrawal for the NTTR would not be renewed. Noise associated with military activities would continue since the airspace overlying the current NTTR would be available for DoD activities. However, since the ability to conduct live-fire exercises on the ground below the airspace is not available, it is anticipated that operational tempo would decrease greatly initially, and noise would decrease overall. However, in the long term, industrial activities such as mining and cleanup activities requiring heavy machinery use could be associated with increased noise overall and in areas where the public is more significantly impacted. Public use in these areas could further contribute to increased noise through vehicle operation, firearms use, and other recreational activities that may impact other users and surrounding communities adversely. Noise impacts (i.e., increased public annoyance) may occur under the No Action Alternative, but significance cannot be determined at this time.
Air Quality	1	Operational tempo is anticipated to remain similar to previous levels. Therefore, air emissions would continue as described under baseline conditions, which at this time are not considered to result in significant adverse impact to air quality.
	2	Air operations, munitions use, vehicle use, and emitter operations would increase; however, increases in criteria pollutant and GHG levels would be minimal and those from construction activities would be temporary. Therefore, no significant impacts to regional air quality are anticipated.
	3A	Munitions use and emitter operations would not occur within these proposed expansion areas. Ground-
	3A-1	disturbing activities and vehicle use may also increase on the NTTR, with these activities also occurring in the proposed expansion areas associated with fencing installation. However, increases in criteria pollutant
	38	no significant impacts to regional air quality are anticipated.
	3C	Blank munitions use, emitter operations, and ground disturbance associated with troop movements, vehicle use and construction would occur within this proposed expansion area. However, increases in criteria pollutant and GHG levels would be minimal and those from construction activities would be temporary. Therefore, no significant impacts to regional air quality are anticipated.
	4	The proposed withdrawal periods associated with Alternative 4 must be implemented in conjunction with one or more of the other alternatives or subalternatives. Because Alternative 4 reflects periods of time, which do not in and of themselves affect air emissions, there are no specific impacts associated with Alternative 4, except to provide a point in time at which impacts from other chosen alternatives may end. Emissions are

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Table 3-49.	Summary of Impacts
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Resource Area	Alternative	Summary of Impacts
		analyzed on an annual basis, and there would be no change to criteria pollutant or GHG emissions affected by the period of withdrawal. Annual emissions would remain at or near the baseline or implemented alternative level throughout the period of withdrawal. Any substantial change in mission activity or overall operations affecting air quality would be vetted in accordance with 32 CFR 989.12, Air Force Form 813 Request for Environmental Impact Analysis processes, and analyzed through the standard NEPA process for that activity or activities.
	No Action Alternative	The land withdrawal for the NTTR would not be renewed. Criteria pollutant and GHG emissions associated with military activities would decrease greatly initially, and air quality would likely improve overall. However, in the long term, industrial activities such as mining and cleanup activities requiring heavy machinery use could be associated with increased air emissions overall. Further, public use in these areas could also contribute to increased overall air emissions through vehicle operation, firearms use, and other recreational activities. Air quality impacts may occur under the No Action Alternative, but significance cannot be determined at this time.
Land Use Recreation and Visual	1	Land use, recreation, and visual resources on the NTTR would continue as described under current baseline conditions. Land use, land status, and existing land and visual resource management plans would also remain unchanged under Alternative 1.
Resources	2	Land use would remain unchanged under Alternative 2 except for the addition of ready access in the South Range. A legislative mechanism granting ready access to the DoD would be developed to update existing land use management that currently is conducted by the USFWS on the DNWR. This would include no longer managing the areas that were proposed for wilderness as de facto wilderness in the South Range (see Wilderness section). Additionally, ready access could introduce new threat emitter locations into areas previously unavailable especially in the South Range. Hunting could be temporarily limited or prohibited within the DNWR during certain military training activities but the Air Force plans to continue to allow limited bighorn sheep hunting. The change in land management in the South Range and subsequent introduction of military training, including ground-disturbing activities from munitions use and infrastructure development, as well as construction of facilities in support of training, in an otherwise untrammeled landscape could cause significant impacts to the visual characteristics in that area. The visual resources management designations and objectives in the South Range would need to be modified in order to support the new activities. In addition, any development and infrastructure improvements could introduce permanent or persistent light- emitting sources that contribute to light pollution in the region and thus adversely impact natural night skies. Impacts to natural night skies would be worse over areas where persistent and permanent light sources are concentrated.

Resource Area	Alternative	Summary of Impacts
	3A	Additional land use impacts would result from restricted access in the Alternative 3A proposed withdrawal area. This would affect one active mining claim and eliminate existing recreational uses (i.e., biking and OHV use) within the area. Hunting is likely to continue to be allowed but it could be temporarily limited during certain military training activities. Impacts to the Bullfrog HMA are not expected but because fencing locations are not known at this time, the Air Force would need to perform site-specific NEPA analysis in those situations where fencing might overlap the HMA. There would be no changes to visual resource management designations. Changes made to prevent access, such as fencing, are consistent with existing management objectives and visual characteristics; therefore, impacts would not substantially increase over baseline conditions. The landscape changes would not introduce new light sources; therefore, impacts to natural night skies would not increase over baseline conditions.
	3A-1	As a result of the reduction in the amount of land area to be withdrawn under Alternative 3A-1, there would be a reduction in the land use and recreation impacts as discussed under Alternative 3A. One active mining claim would be affected. The affected acreage of the unallocated grazing area and Razorback grazing allotment would be reduced by a total of approximately 2,600 acres. Less acreage would also be affected in the NDOW hunting unit 253 and the Bullfrog HMA. Alternative 3A-1 would eliminate the impact to an existing 4.2-mile section of the Trails-OV Transvaal Flats Trail System (Windmill Road) and 0.24-mile of the Ridgeline Trail. It would also eliminate the impact to about 4 miles of the road/trail system that is used for OHV activities like the Beatty VFW Bullfrog Poker Run and the Best in the Desert Vegas to Reno off-road race. The potential impacts to visual resources under Alternative 3A-1 would be the same as those discussed under Alternative 3A, as the amount of linear feet required to fence the area would be similar.
	3B	Additional impacts to land use and recreational use within the Alternative 3B proposed withdrawal area would be limited due to the lack of designated roads and trails. Hunting is likely to continue to be allowed but it could be temporarily limited during certain military training activities. Since fencing locations are not known at this time, the Air Force would need to perform site-specific NEPA analysis in those situations where fencing might overlap the Wheeler Pass HMA. No changes to visual resource management designations would occur and use would be consistent with existing management objectives; however, minor changes to the landscape as a result of fencing and ground disturbance associated with these activities would create dispersed modification; therefore, minor impacts to the visual qualities and the visual resources of the area are anticipated. However, impacts would not substantially increase over baseline conditions because portions of this area are already characterized by human development. Non-permanent and dispersed light sources may be introduced as part of the infrastructure used in training activities; these light pollution sources could cause a small but temporary increase of adverse impacts to natural night skies over baseline conditions.

Resource Area Alternative **Summary of Impacts** 3C Additional land use impacts associated with this proposed expansion area could potentially be significant. Existing land use within the affected DNWR area would go from a wildlife management and recreation area to a military training area. Areas for current recreational activities (e.g., hiking, bird-watching, backpacking, and horseback riding) would become closed to the public for safety and security reasons. Hunting is likely to continue to be allowed but would be limited to times when there are no military training activities occurring. The change in land management as part of this alternative, which includes introduction of military training, including ground-disturbing activities from munitions use (such as small arms blanks or paintballs) and infrastructure development, as well as construction of facilities in support of training, in an otherwise untrammeled landscape would change the area from "undeveloped" to one with human development and interference. The visual resources management designations and objectives in the proposed expansion area would need to be modified in order to support the new activities. In addition, any development and infrastructure improvements could introduce permanent or persistent light-emitting sources that contribute to light pollution in the region and thus adversely impact natural night skies. Impacts to natural night skies would be worse over areas where persistent and permanent light sources are concentrated. The proposed withdrawal periods associated with Alternative 4 must be implemented in conjunction with one 4 or more of the other alternatives or subalternatives. Because Alternative 4 reflects periods of time, which do not in and of themselves affect land use, there are no specific impacts associated with Alternative 4, except to provide a point in time at which impacts from other chosen alternatives may end. Changes to the withdrawal period would cause no changes to either visual resource management designations nor to the visual quality of the area. Thus, there are no specific land use, recreational, or visual impacts associated with Alternative 4. No Action Military activities and land use restrictions would expire. Land uses such as mining, mineral leasing, or Alternative livestock grazing could potentially be reintroduced into previously restricted areas. The DNWR would withdraw the South Range from mining, and cleanup activities conducted by the Air Force would be localized and short term. There could also be increased recreational use of the former NTTR lands but due to past activities and use, certain areas would continue to have restricted access. The conditions on the South Range would be managed the same as those on the east side of the DNWR are currently. Current land use management objectives of BLM lands on the perimeter or the vicinity of the NTTR would continue and no changes in the land status of these adjacent lands would be expected. The expiration of military activities and subsequent mitigation of contaminated sites will be consistent with the baseline landscape characteristics of the human-modified environment; therefore, no significant impacts are anticipated. Cessation of military activities and removal of the associated infrastructure may have a positive impact on the night skies by eliminating sources of light pollution.

Table 3-49. Summary of Impacts

Resource Area	Alternative	Summary of Impacts
Wilderness and Wilderness Study Areas	1	No changes to the land boundaries or baseline NTTR operations would occur. No impacts to untrammeled, natural, and undeveloped qualities are anticipated. Solitude or primitive and unconfined recreation quality of Wilderness Areas, areas proposed for wilderness, and WSAs may be adversely impacted from noise associated with aircraft operations, munitions use, and emitter operations. Impacts would not increase over baseline conditions.
	2	Ready access may be directed through a Congressionally directed change and would reduce the land area managed as de facto wilderness within the DNWR by 590,000 acres (42 percent). However, based on the amount of land remaining that possess wilderness qualities in the region, Alternative 2 would not significantly reduce the opportunity of people to experience wilderness in the region. Impacts to wilderness qualities within Wilderness Areas, remaining areas proposed for wilderness, and WSAs outside the NTTR withdrawal boundaries were considered in the analysis. Similar to Alternative 1, no impacts to untrammeled, natural, and undeveloped qualities are anticipated. Solitude or primitive and unconfined recreation of surrounding areas with wilderness characteristics may be adversely impacted from noise associated with increased aircraft operations, munitions use, and emitter operations. Increased air operations would not substantially increase noise levels; therefore, impacts are not expected to appreciably increase over baseline conditions.
	3A 3A-1	No Wilderness Areas, areas proposed for wilderness, or WSAs occur within these proposed expansion areas. Therefore, no impacts to wilderness gualities would occur under this proposed expansion.
	3B	About 33,000 acres (2 percent) of areas proposed for wilderness within the DNWR would be impacted by this proposed expansion. Impacts to solitude or primitive and unconfined recreation would result from increased levels of aircraft operations and munitions use within the current NTTR (noise associated with the munitions). Impacts would not appreciably increase over baseline conditions. Ground disturbance activities associated with perimeter fencing would impact the undeveloped quality of remaining areas proposed for wilderness outside the NTTR boundary, however, impacts would not substantially increase over baseline conditions because portions of this area have already been shown to be disturbed.
	3C	Approximately 227,000 acres (16 percent) of areas proposed for wilderness within the DNWR would be impacted by this proposed expansion. Impacts to solitude or primitive and unconfined recreation in surrounding Wilderness Areas, areas proposed for wilderness, and WSAs would result from increased levels of aircraft operations, munitions use (associated noise), and emitter operations. Noise levels would only marginally increase; therefore, impacts would not substantially increase over baseline conditions. Ground disturbance activities associated with perimeter fencing would adversely impact the undeveloped quality of remaining areas proposed for wilderness outside the NTTR boundary.
	4	Impacts to areas proposed for wilderness from the withdrawal periods proposed are dependent on the combination of alternatives selected. Selection of Alternative 1 would not result in any changes to the

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Resource Area	Alternative	Summary of Impacts
		management of areas proposed for wilderness in the South Range. In this scenario, the length of the withdrawal period may result in an improvement of wilderness characteristics in areas proposed for wilderness. Selection of Alternative 3A or 3A-1 would not affect wilderness. Selection and implementation of Alternative 2, Alternative 3B, and/or Alternative 3C would reduce the total area managed as wilderness in southern Nevada. Under those alternatives, the length of the withdrawal period is not relevant, because wilderness characteristics would no longer need to be considered. As a result, there would be no impacts to wilderness for Alternative 4A, 4B, or 4C if Alternative 2, 3A, 3B, or 3C is selected. Wilderness Areas, WSAs, and areas proposed for wilderness outside the NTTR boundaries would continue to experience impacts to solitude qualities from noise associated with military activities, but other wilderness qualities would not be impacted. Continued management practices of Wilderness Areas, WSAs, and areas proposed for wilderness of Wilderness Areas, WSAs, and areas proposed for management practices of Wilderness Areas, WSAs, and areas proposed for proposed for wilderness of Alternative 3F (Wilderness Areas, WSAs) and areas proposed for wilderness of Wilderness Areas, WSAs, and areas proposed for wilderness of Wilderness Areas, WSAs, and areas proposed for wilderness of Wilderness Areas, WSAs, and areas proposed for wilderness of Wilderness Areas, WSAs, and areas proposed for wilderness of Wilderness Areas, WSAs, and areas proposed for wilderness of Wilderness Areas, WSAs, and areas proposed for wilderness of Wilderness Areas, WSAs, and areas proposed for wilderness of Wilderness Areas, WSAs, and areas proposed for wilderness Areas, WSAs, and Areas proposed for wilderness Areas, A, 4B, and 4C.
	No Action Alternative	The absence of military operations at the NTTR would likely improve wilderness qualities within Wilderness Areas, areas proposed for wilderness, and WSAs in the southern Nevada region.
Socioeconomics	1	The total economic impact of the Nellis AFB, Creech AFB, and NTTR activities is estimated at \$5.549 billion during 2015. The Nellis AFB Economic Impact Assessment model estimates that the number of indirect and induced jobs is 5,783 for 2015 with a total indirect/induced payroll of \$242.6 million.
	2	The estimated economic increase associated with lodging and per diem for TDY personnel associated with a 30 percent increase in aircraft operations under Alternative 2 would be approximately \$67 million per year, primarily in Clark County.
	3A	The withdrawal of the additional acreage may have a potential impact on the PILT for Nye County of approximately \$6,400. The current recreational uses of the land along with any agricultural activities such as grazing that may be taking place on those lands would likely be eliminated or available to the public on a limited basis or through specific agreements (in cases such as grazing rights). Certain recreational uses, particularly near the NTTR boundary towards Beatty, including 4.88 miles of proposed bike trails and potentially portions of off-road racing routes may be impacted depending on the routes, which vary between years. Additional expenditures from the new training configurations potentially could offset some of the resulting economic losses. The BLM Razorback grazing allotment, which is impacted by Alternative 3A, consists of 266,329 acres and has an allotment of 1,926 animal unit months (AUM ⁶). Currently, there are 386 AUM suspended. Assuming uniform forage production within the allotment, an 18,000-acre reduction in the allotment due to Alternative 3A would be 6 percent or \$128,000. However, it should be noted that this

Table 3-49. Summary of Impacts

⁶ The AUM provides sufficient forage for one cow and calf for a month.

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Resource Area	Alternative	Summary of Impacts
		would be an 83 percent reduction in available grazing area to the rancher leasing the AUM and would be a significant impact. The Air Force plans to work directly with the rancher to address this impact. In addition, to minimize potential conflicts between NTTR operations and population, housing, and economic activity in the region (to include grazing and mining), the Air Force would continue coordination between the military and local and regional planning departments. The additional rights-of-way proposed under Alternative 3A that cross into Corridor 18-224 may impact its use. BLM is currently in the process of revising their resource management plan, which is proposing corridor revisions. Plans call for the corridor to be reviewed in its entirety in 2018.
	3A-1	Impacts under Alternative 3A-1 would be similar to those stated under Alternative 3A. There would be no construction disturbance (except for fencing installation) or munitions use in this area. It would only serve as a safety buffer for live weapons deployment on the interior of Range 77. As a result in the reduction of land area that would be withdrawn (2,592 acres) under Alternative 3A-1, there would be an estimated reduction of approximately \$5,500 in PILT allocation to Nye County. One of the new proposed bike trails being developed in the Beatty, Nevada, would be impacted by the proposed expansion under Alternative 3A-1. However, the Best in The Desert's Beatty-to-Dayton race route and the Section 368 Energy Corridor would no longer be impacted. Alternative 3A-1 would overlap areas of grazing allotments and reduce grazing in Nye County by about 15,000 acres. The BLM Razorback grazing allotment would also be impacted by Alternative 3A-1; however, the allotment capacity reduction and potential economic impact would be approximately the same as Alternative 3A.
	3В	The withdrawal of the additional acreage may have a potential impact on the PILT for Nye County of \$3,600. There are approximately 26,000 acres of BLM lands that are included in Alternative 3B that could be used for hiking and recreational activities. Loss of this area would have a value of approximately \$228,020.
	3C	The current recreational uses of the land would likely be eliminated or available to the public on a limited basis or through specific agreements (in cases such as grazing rights). The estimated recreational-use economic impact would be \$1,990,790 under Alternative 3C. Additional expenditures from the new training configurations potentially could offset some of the resulting economic losses.
	4	Alternative 4 establishes the period of withdrawal. This alternative will be paired with one or more of the other alternatives. Alternative 2 combined with Alternative 4 would likely include increased annual expenditures associated with the increased NTTR use and continue to provide economic stimulus throughout the region. With each time period proposed, it is assumed that economic indicators would increase at the national average of 2.2 percent annually, which has been the national average based on the last 17 years.
	No Action	The No Action Alternative would result in the removal of Air Force and DOE/NNSA activities from the NTTR.

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Resource Area	Alternative	Summary of Impacts
	Alternative	The initial impact would be a \$500.8 million reduction in economic impact, including a \$138 million reduction in payroll, a \$340 million reduction in expenditures, and a \$21 million reduction due to the loss of jobs. The removal of all facilities and buildings from the NTTR and Creech AFB is estimated to cost \$213 million. Secondly, the cost for full decontamination of the NTTR is estimated at about \$2.5 billion. These actions would delay opening some of the NTTR land to public use by up to 18 years, particularly land where decontamination is necessary. The replacement costs of facilities on the NTTR are estimated at \$122 million and \$1.1 billion at Creech AFB. A new range location may also require moving the aggressor squadrons and facilities from Nellis AFB to the new location. The acres in Nye County eligible for PILT payments would add, at 2016 rates, an estimated \$682,000 to the Nye County PILT payments. Clark and Lincoln County payments are estimated with population limitations and would not necessarily experience such direct impacts on the magnitude of their PILT payments.
Environmental Justice	1	Aircraft, operations, munitions use, ground disturbance, and emitter operations would continue as described under baseline conditions. No disproportionately high and adverse impacts to environmental justice communities and no disproportionately high and adverse environmental health and safety impacts to children are anticipated under this alternative.
	2	Under this alternative, the six census tracts and the associated environmental justice and youth/elderly populations residing under the Caliente and Coyote SUAs that are currently exposed to 65–69 dB DNL associated with subsonic aircraft noise would continue to be exposed to this range of noise. Munitions use would continue as under existing conditions and noise levels of 62 CDNL outside of the NTTR boundary would not extend into populated areas. No adverse significant noise or safety impacts associated with ground disturbance, munition use, and emitter operations have been identified that would impact the public. Therefore, no disproportionately high and adverse impacts to environmental justice communities or disproportionately high and adverse environmental health and safety impacts to children would be anticipated from aircraft operations resulting in subsonic noise over and above current baseline conditions under this alternative.
	3A 3A-1 3B	For Alternatives 3A, 3A-1, and 3B, the potential impacts to environmental justice and youth and elderly populations resulting from supersonic and subsonic aircraft noise, as well as munitions use, would be similar to those described for Alternative 2. No ground disturbance activities that would impact the public or emitter operations would occur within Alternative 3A, 3A-1, or 3B's proposed expansion areas. Therefore, no disproportionately high and adverse impacts to environmental justice communities or disproportionately high and adverse environmental health and safety impacts to children from ground disturbance or emitter operations would be anticipated with these proposed expansion areas.
	3C	For Alternative 3C, no adverse noise or safety impacts associated with ground disturbance have been

Resource Area	Alternative	Summary of Impacts
		identified that would impact the public (see Section 3.2, Noise, and Section 3.13, Health and Safety), and there would be no ground disturbance performed on or in close proximity to cultural or historical sites or other noise-sensitive areas. Additionally, no adverse noise or safety impacts associated with potential emitter operations have been identified that would impact the public (see Section 3.2 and Section 3.13). Therefore, no disproportionately high and adverse impacts to environmental justice communities or disproportionately high and adverse environmental health and safety impacts to children from ground disturbance or emitter operations would be anticipated with Alternative 3C.
	4	The proposed withdrawal periods associated with Alternative 4 must be implemented in conjunction with one or more of the other alternatives or subalternatives. Because Alternative 4 reflects periods of time, which do not in and of themselves affect environmental justice communities, there are no specific impacts associated with Alternative 4, except to provide a point in time at which impacts from other chosen alternatives may end.
	No Action Alternative	Activities associated with the NTTR are an important economic contributor, and under the No Action Alternative there would be a loss of employment, income, and expenditures throughout the three counties. Adverse socioeconomic impacts would affect the general public and would not only impact minority, low- income, youth, and elderly populations. Therefore, no disproportionate impacts to environmental justice populations are anticipated under this alternative.
Biological Resources	1	There would be no changes to air operations or existing airspace, and no changes in land area or baseline NTTR uses are anticipated. Wildlife may be adversely impacted from noise associated with aircraft operations, munitions, and emitter operations, but impacts would not increase over baseline conditions. Therefore, impacts to biological resources would remain less than significant. Impacts associated with the continued withdrawal of the NTTR could be beneficial to biological resources as the lands would continue to be excluded from intense land uses that could lead to development and cause habitat destruction and degradation. Environmental review (NEPA analysis) and planning would be required prior to any future construction or ground clearing, which would avoid or reduce impacts to biological resources to neutral or less than significant.
	2	Air operations could increase; however, impacts to biological resources (e.g., wildlife) from noise and aircraft strikes are not expected to appreciably increase over baseline conditions. Increased potential for direct impacts to biological resources could occur from an associated increase in use of existing target areas; construction and maintenance of new facilities, targets, or roads; placement of threat emitters; and increased ground training (including access by vehicles and personnel). Increased potential for indirect impacts could occur from soil contamination and subsequent cleanup of target impact areas; accidents such as fuel spills or fire; or non-native species invasion in areas previously inaccessible for military training.

Resource Area	Alternative	Summary of Impacts		
		However, impacts would likely be site-specific, represent a small portion of the area within the NTTR, and be reduced through proper planning, monitoring, and maintenance. Impacts associated with potential increases in military training within the areas that were proposed for wilderness in the NTTR South Range currently managed as wilderness could be avoided or minimized through proper planning, monitoring, and maintenance, as under current Air Force management practices. Additionally, environmental review and planning would be required prior to any future construction or ground clearing, which would avoid or reduce impacts to biological resources to neutral or less than significant.		
	3A	Impacts to biological resources (e.g., wildlife) from noise and aircraft strikes would be less than significant. No military ground operations are proposed in this area, as the area would be used as a safety buffer. The additional land would be managed the same as the existing NTTR withdrawn lands under current Air Force management practices. Environmental review and planning would be required prior to any future construction or ground clearing, which would avoid or reduce impacts to biological resources to neutral or less than significant. Perimeter fencing along the 25-mile boundary has the potential to impact biological resources, by removing native vegetation or special status plant species, fragmenting wildlife habitat, creating barriers for wildlife movement, causing injury to large mammals that run into or get caught in the fence, increasing threats due to predation from supplemental perches via fencing, damming or altering streams, or creating corridors for weed dispersion. The level of impacts to biological resources affected and implementation of associated mitigation measures. A fence maintenance and monitoring plan that includes appropriate fence design for wildlife in the area and no fencing in mountainous areas would further avoid or reduce impacts.		
	3A-1	Potential impacts would be similar to Alternative 3A. Impacts associated with the withdrawal of 15,314 acres (2,592 acres less than Alternative 3A) in the proposed EC South withdrawal area could be beneficial (an additional 15,314 acres of land would be excluded from other uses) or adverse (should construction or clearing of lands be proposed at a future date), but are likely to be low intensity and thus neutral or less than significant. Perimeter fencing along the boundary has the potential to impact biological resources, with the level of impacts (i.e., impacts remain adverse and significant or reduced to less than significant) dependent on the biological resources directly or indirectly affected by the installation, monitoring, and maintenance of the fencing and whether mitigation measures can reduce those impacts.		
	3B	Impacts to biological resources (e.g., wildlife) from noise and aircraft strikes would be less than significant. The additional land would be managed under the same management practices that the Air Force employs on the existing NTTR. Environmental review and planning would be required prior to any future construction or ground clearing, which would avoid or reduce impacts to biological resources to neutral or less than significant. There would be no munitions use in this area, as it would serve as a safety buffer for live		

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Resource Area	Alternative	Summary of Impacts
		weapons deployment on the interior of the South Range and may include potential impacts due to mishaps from live weapon deployment. An emitter may be placed here, which would impact biological resources from installation of a 0.5-acre pad, road construction, and disturbance. Perimeter fencing along the 30-mile boundary has the potential to impact biological resources, similar to those described under Alternative 3A. Fencing impacts could be avoided or minimized depending on the biological resources affected and implementation of associated mitigation measures as described under Alternative 3A.
	3C	Impacts to biological resources (e.g., wildlife) from noise and aircraft strikes would be less than significant. The additional land would be managed the same as the existing NTTR withdrawn lands under current Air Force management practices. Environmental review and planning would be required prior to any construction or ground clearing, should this be proposed at a future date, which would avoid or reduce impacts to biological resources to neutral or less than significant. Military ground operations are proposed in this area and include development of insertion points, emitter sites, and two runways, which have the potential to impact biological resources. Installation of 0.5-acre pads, generators running, road construction and maintenance of 15 half-acre pads would fracture contiguous habitat. However, impacts would likely be site-specific, represent a small portion of the area within the Alternative 3C area, and avoided or reduced through proper planning, monitoring, and maintenance. No adverse impacts are anticipated from emitter use. Perimeter fencing along the 60-mile boundary has the potential to impact biological resources, similar to those described under Alternative 3A. The level of impact to biological resources from fencing may be adverse but avoided or minimized depending on the biological resources affected and implementation of associated mitigation measures. The additional approximately 227,000 acres of land is proposed for wilderness and national wildlife refuge and is managed as wilderness, which is already excluded from more intense land uses, therefore the exclusion would not provide an additional beneficial impact to biological resources.
	4	The proposed withdrawal periods associated with Alternative 4 must be implemented in conjunction with one or more of the other alternatives or subalternatives. Because Alternative 4 reflects periods of time, which do not in and of themselves affect biological resources, there are no specific impacts associated with Alternative 4, except to provide a point in time at which impacts from other chosen alternatives may end.
	No Action Alternative	Under the No Action Alternative, land use restrictions placed on the military withdrawn lands within the NTTR would expire. Access to the DNWR would be under the jurisdiction of the USFWS and would be managed to preserve desert bighorn sheep and other wildlife uses. Access to all other lands would be under the jurisdiction of the BLM and may eventually be opened for appropriative land uses (such as mining, geothermal leasing, or livestock grazing) after new management planning under FLPMA and NEPA regulations could be completed.

Alternative	Summary of Impacts
1	Under the status quo alternative, only the current NTTR boundary would be withdrawn. No direct physical impacts to resources are anticipated as a result of aircraft operations. However, indirect visual or auditory impacts can potentially occur from aircraft or other vehicular operations. With the implementation of avoidance areas around specific traditional cultural properties and sacred sites and scheduling of mission activities around tribal events, no adverse effects to cultural resources would be anticipated from aircraft operations.
	Cultural resources have the potential to be physically impacted by munitions use or other ground-disturbing activities resulting from the military mission. Current mission activities occur only in previously approved areas and any new or proposed activities would be subjected to the Air Force's EIAP process and Section 106 of the NHPA prior to implementation.
	Given proposed mitigations, the Section 106 of the NHPA process, the requirements mandated by the Nellis AFB ICRMP, and existing management requirements, no adverse effects to cultural resources within the context of the NHPA would be anticipated from aircraft operations, munitions use, or other ground-disturbing activities.
	If an inadvertent discovery of cultural resources or human remains occurs during any ground-disturbing activity, procedures set forth in the Nellis AFB ICRMP and AFI 32-7065 would be implemented.
2	Although aircraft operations would increase under Alternative 2, auditory and visual effects from aircraft operations are similar to those described under Alternative 1, and no physical impacts to cultural resources are anticipated as a result of aircraft operations. With the implementation of avoidance areas around specific traditional cultural properties and sacred sites and scheduling of mission activities around tribal events, no adverse effects to cultural resources would be anticipated from aircraft operations. Ready access for the South Range would result in increased potential for impacts to cultural sensitive resources as the Air Force expands military activities in these areas. However, the actual impacts to cultural resources from ground disturbance, emitter operations, and munitions use would be the same as discussed under Alternative 1, and culturally sensitive areas would be avoided to the extent practicable. Any new or proposed activities would be subjected to the Air Force's EIAP process and Section 106 of the NHPA prior to implementation. Given proposed mitigations, the Section 106 of the NHPA process, the requirements mandated by the Nellis AFB ICRMP, and existing management requirements, no adverse effects to cultural resources or human remains occurs during any ground-disturbing activities.
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Resource Area	Alternative	Summary of Impacts
	3A 3A-1 3B	Impacts associated with aircraft use over these areas would be the same as those described for Alternative 1. No munitions use or emitter operations would occur in these proposed withdrawal areas. However, ground disturbance would occur from installation of fencing. These withdrawal areas would fall under the management requirements of the Nellis AFB ICRMP and additional compliance with NEPA and the NHPA would be required if areas of potential disturbance are anticipated within unsurveyed or sensitive areas. Given proposed mitigations, the Section 106 of the NHPA process, the requirements mandated by the Nellis AFB ICRMP, and existing management requirements, no adverse effects to cultural resources within the context of the NHPA would be anticipated from aircraft operations, munitions use, or other ground-disturbing activities. If an inadvertent discovery of cultural resources or human remains occurs during any ground-disturbing
		activity, procedures set forth in the Nellis AFB ICRMP and AFI 32-7065 would be implemented. An ancillary benefit to withdrawal of these areas is that public access would be restricted, thereby increasing the opportunity for beneficial impacts to cultural resources associated with greater protection and management. Removing unfettered access would decrease the likelihood of direct impacts to cultural resources in the Alternative 3B area from foot traffic, vehicular traffic, and vandalism or looting.
	3C	Impacts associated with aircraft use over this area would be the same as those described for Alternative 1. No ground-disturbing munitions use would occur within this withdrawal area (blanks may be used). However, ground disturbance associated with troop movements, emitter placement, runway construction, and fencing installation would occur. This area would fall under the management requirements of the Nellis AFB ICRMP, and culturally sensitive areas would be avoided to the extent practicable. Additional compliance with NEPA and the NHPA would be required if areas of potential disturbance are anticipated within unsurveyed or sensitive areas.
		Given proposed mitigations, the Section 106 of the NHPA process, the requirements mandated by Nellis AFB ICRMP, and existing management requirements, no adverse effects to cultural resources within the context of the NHPA would be anticipated from aircraft operations, munitions use, or other ground-disturbing activities.
		If an inadvertent discovery of cultural resources or human remains occurs during any ground-disturbing activity, procedures set forth in the Nellis AFB ICRMP and AFI 32-7065 would be implemented. As with the other alternative areas, an ancillary benefit to withdrawal of these areas is that public access would be restricted, thereby increasing the opportunity for beneficial impacts to cultural resources associated with greater protection and management. Restricting unfettered access would decrease the likelihood of direct impacts to cultural resources in the Alamo areas from foot traffic, vehicular traffic, and vandalism or looting.

Table 3-49.	Summary	of Impacts
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Resource Area	Alternative	Summary of Impacts
	4	For Alternative 4, the period of withdrawal would be established and combined with other alternatives, conjunctively determining the temporal and spatial limits of the withdrawal. The longer the term of the withdrawal and the greater the geographic extent of the withdrawal, the greater the opportunity for beneficial impacts to cultural resources due to a lack of access by the general public. This lack of access would decrease the likelihood of direct impacts to cultural resources within the NTTR and/or the proposed expansion areas from foot or vehicular traffic and vandalism or looting.
	No Action Alternative	In the event that the land withdrawal for the NTTR is not extended, much of the approximately 3 million acres currently closed to the public would potentially be open to use under BLM and USFWS administration. The potential for the public to interact with known cultural resources or traditional properties or cultural landscapes would increase. Currently protected tribal resources could potentially be unprotected and open to potential damage from looting or vandalism. Appropriate environmental documentation and safeguards would be the responsibility of the permitting federal agency, which in this case would be the BLM and USFWS.
Earth Resources	1	Earth resources have the potential to be physically impacted by munitions use or other ground-disturbing activities resulting from the military mission. Because missions would occur in areas previously approved for specific activities, aircraft operations, and munitions use, ground-disturbing activities would have no significant impact on soils, paleontological, or geologic resources within the existing withdrawn lands under Alternative 1. Future actions, such as construction, would be subjected to additional consideration under NEPA and other applicable regulations and may require permits and BMPs that could include stormwater diversion, erosion control, or any number of best practices. An extension of the withdrawal of current NTTR lands, however, could restrict economic opportunity associated with extraction of some mineral resources. Potentially valuable deposits of mineral resources are present throughout the NTTR. Safety footprints required to support the various military missions would necessarily restrict public and industrial access to the NTTR. In terms of mineral exploration, the withdrawal extension of the NTTR would prevent the discovery and exploitation of economically viable resources. Because this alternative would preserve the current boundaries of the NTTR and not greatly increase the intensity of activities, no significant impacts are anticipated with respect to earth resources within the NTTR.
	2	Aircraft operations, munitions use, emitter operations and ground-disturbing activities would consist of similar types of activities and associated impacts as under Alternative 1, but ready access under Alternative 2 would allow these activities to be conducted in areas proposed for wilderness that are currently managed as wilderness. Therefore, impacts to earth resources would be similar if not the same as discussed under Alternative 1, although occurring in some areas previously undisturbed within the South Range. Activities would avoid to the extent practicable erosion-prone areas (e.g., steep slopes, seep/spring banks, etc.) and future actions, such as construction, would be subjected to additional consideration under NEPA

Resource Area	Alternative	Summary of Impacts
		and other applicable regulations and may require permits and BMPs that could include stormwater diversion, erosion control, or any number of best practices. As with current restrictions placed on mineral exploration within the DNWR, a change in jurisdiction would result in a continuation of this situation and would reflect a neutral impact to mineral exploration.
	3A	Ground-disturbing activities within these proposed expansion areas would be limited to fencing installation
	3A-1	and would have no significant impact on soils, paleontological, or geologic resources. Any projects in the future may be subjected to additional consideration under NEPA and other applicable regulations.
		Expansion within this area would prevent the discovery and exploitation of economically viable resources. At present there is one active mining claim within the proposed Range 77 expansion area. If the Air Force withdraws this parcel, a subsequent potential restriction of access to this active claim could potentially represent an impact to earth resources. The significance of these impacts are difficult to quantify until the final disposition of these claims are resolved between the claimants and the Air Force. The potential for impacts would also be altered depending on the term of withdrawal to be implemented under Alternative 4. An ancillary benefit of withdrawal of this area would be access control that would provide the opportunity to restrict access to sensitive paleontological, or geologic resource areas and increase the opportunity for beneficial impacts to earth resources owing to this lessened potential for impacts.
	3B	Ground-disturbing activities within this proposed expansion area would be limited to fencing installation and would have no significant impact on soils, paleontological or geologic resources. Any projects in the future may be subjected to additional consideration under NEPA and other applicable regulations. The potential for impacts would also be altered depending on the term of withdrawal to be implemented under Alternative 4. An ancillary benefit of withdrawal of this area would be access control that would provide the opportunity to restrict access to sensitive paleontological or geologic resource areas and increase the opportunity for beneficial impacts to earth resources owing to this lessened potential for impacts.
	3C	Ground-disturbing activities within this proposed expansion area would include troop movements, emitter placement, runway construction, and fencing installation. These activities would avoid erosion-prone areas and would be subject to further NEPA and NPDES requirements depending on the action and scope of activity. As a result, implementation of mitigations and BMPs resulting from further site-specific environmental evaluations and regulatory requirements would minimize impacts to soils, paleontological, or geologic resources to less than significant. Any projects in the future outside the scope of those analyzed in this LEIS may also be subjected to additional consideration under NEPA and other applicable regulations. With the proposed expansion in this area, restricted access to mineral exploration could impact earth resources, depending on the actual interest by industry or the public in these resources. Currently, NTTR and USFWS DNWR lands are withdrawn from mineral exploration. The potential for impacts would also be altered depending on the term of withdrawal to be implemented under Alternative 4.

Resource Area	Alternative	Summary of Impacts
	4	For Alternative 4, the period of withdrawal would be established and combined with other alternatives, conjunctively determining the temporal and spatial limits of the withdrawal. The potential for mineral or other geologic resource exploration in many areas of the Proposed Action would be affected by the geographic extent and time period of the withdrawal. The longer the term of the withdrawal and the greater the geographic extent of the withdrawal, the greater the opportunity for future negative impacts due to potential lack of access to industry and the public. Conversely, earth resources such as paleontological and soil resources would benefit from a probable reduction in impacts from mineral exploration and a restriction of public access. Additionally, how the land use is managed after withdrawal (restricted, multiple use, etc.) would greatly impact future mineral and resource exploration. Currently, NTTR and USFWS DNWR lands are withdrawn from mineral exploration. Alternative 4A would have a minor potential to affect earth resources and offer the most flexibility for future economic development, as it represents the shortest withdrawal period proposed (20 years). Alternative 4B (50 years) would also have a moderate potential to affect earth resources and would offer less flexibility than Alternative 4A. The indefinite withdrawal period proposed for Alternative 4C would offer less flexibility than Alternative 4A or Alternative 4B for future economic development, as it represents the longest withdrawal period. Protections to soils and paleontological resources offered by Air Force land access controls would be beneficial to a greater degree with Alternative 4B than with Alternative 4A, and to the
	No Action Alternative	If the land withdrawal for the NTTR is not extended, the area currently closed to the public would potentially be open to use under BLM administration. Access to mineral resources under the No Action Alternative could be less restrictive under BLM management than under Air Force administration, resulting in beneficial impacts to local mining interests. Conversely, potential mining in the non-renewed lands could result in removal or significant alteration of geologic features or existing topsoil. The removal or shifting of topsoil could potentially result in increased soil erosion. Depending on the location, type, and intensity of future BLM-permitted developments and uses, unique geologic features or hazards to paleontological resources could be impacted.
Water Resources	1	There would be no changes to the baseline quantity or locations of munitions use or ground-disturbing activities, and therefore no change in the potential for water resources to be affected by erosion or deposition of metals and explosive materials. There would be no requests for additional surface or groundwater appropriations. Impacts would not increase over baseline conditions.
	2	There would be an increase in the quantity and locations of munitions use and ground-disturbing activities on the South Range. These activities would increase the potential for erosion and deposition of metals and

Resource Area	Alternative	Summary of Impacts
		explosive materials. However, all new activities would be subject to NEPA review and would involve applicable avoidance/minimization measures. Potential increases in water use could likely be fulfilled through current or existing water rights. Access protocols for water quality and wildlife management would be developed. With implementation of these measures, no significant impacts are anticipated.
	3A	A spring and small floodplain area, as well as two wells and one groundwater right, occur in this proposed expansion area. However, there would be no ordnance use or ground activities in the area, and perimeter fencing would result in only minimal ground disturbance. Access restrictions could affect water quality sampling in the upper Amargosa River watershed; access protocols for these activities would be developed. There would be no requests for additional surface or groundwater appropriations. No significant impacts are anticipated.
	3A-1	A spring and small floodplain area, as well as a groundwater right, occur in this area. Water wells do not occur within the Alternative 3A-1 boundary. This alternative occurs within the same hydrographic basin as Alternative 3A and this area would serve as a safety buffer only. There would be no ordnance use or ground disturbance that could result in surface water or groundwater contamination, or erosion-related impacts.
	3B	Small floodplain areas, several wells, and one groundwater right occur in this proposed expansion area. There would be no ordnance use in the area. Perimeter fencing (including crossing of intermittent surface water) would be constructed according to applicable design standards. Access protocols for water sampling would be developed. There would be no requests for additional surface or groundwater appropriations. No significant impacts are anticipated.
	3C	A total of 12 springs, wildlife water developments, and surface water features (including guzzlers, enhanced springs, and stormwater catchments), as well as potential floodplains and wetlands occur in this proposed expansion area. Two additional springs occur very close to the eastern border. Increased munitions use and ground-disturbing activities would increase the potential for erosion and deposition of metals and explosive materials. However, all new activities would be subject to NEPA review and would involve applicable avoidance/minimization measures. Fuel spills could occur during FAARP activities, and fuel could potentially migrate to groundwater or surface waters. However, spill response would be part of training preparation, and the potential for contamination would be reduced by the location (dry lake bed) and soil conditions of training areas. Perimeter fencing (including crossing of intermittent surface water) would be constructed according to applicable design standards. Access protocols for water sampling would be developed. Any new water requirements would be evaluated by the Nevada Department of Water Resources. With these actions, no significant impacts are anticipated.
	4	The proposed withdrawal periods associated with Alternative 4 must be implemented in conjunction with one or more of the other alternatives or subalternatives. Because Alternative 4 reflects periods of time, which do not in and of themselves affect water resources, there are no specific impacts associated with Alternative 4,

Table 3-49.	Summary	/ of	Impacts
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Resource Area	Alternative	Summary of Impacts
		except to provide a point in time at which impacts from other chosen Alternatives may end. For example, generally, increased duration of the withdrawal period would correspond to increased deposition of ordnance and target constituents, as well as erosion potential. Restricted access to water resources for water quality and wildlife management actions would also be extended, although it is expected that access protocols would be developed.
	No Action Alternative	Under the No Action Alternative, much of the water-related potential for impacts (erosion and deposition of metals, explosive materials, and depleted uranium) due to military testing and training would cease. Other appropriate land uses could be reintroduced and would likely require evaluation regarding impacts to water resources. If the land were returned to the BLM, water rights would remain the property of the Air Force unless the BLM requested that the water rights be vacated or transferred to the BLM. With implementation of appropriate mitigation measures associated with reintroduced land use, no significant impacts to water resources are anticipated.
Hazardous Materials and Solid Waste	1	No changes in the quantity of hazardous materials used or hazardous materials generated and no off-site impacts related to regional disposal capacity would occur. All hazardous materials or wastes would be managed according to established procedures, and no significant impacts are anticipated.
	2	Increased training operations would not result in a significant change in the quantity of hazardous materials used, the quantity of hazardous or non-hazardous waste generated, or in off-site impacts related to regional disposal capacity. Therefore, no significant impacts are anticipated.
	3A 3A-1 3B	Fencing that will meet BLM standards is proposed and may require maintenance. However, there would be no other activities within these proposed expansion areas that would involve hazardous materials or generate hazardous wastes. All hazardous materials or wastes would be managed according to established procedures, and no significant impacts are anticipated.
	3C	In this proposed expansion area, hazardous materials would be used and wastes would be generated from runway construction, installation and operation of emitters, and possibly from fencing installation and maintenance. However, all hazardous materials or wastes would be managed according to established procedures, and no significant impacts are anticipated.
	4	The proposed withdrawal periods associated with Alternative 4 must be implemented in conjunction with one or more of the other alternatives or subalternatives. Because Alternative 4 reflects periods of time, which do not in and of themselves affect hazardous or solid wastes, there are no specific impacts associated with Alternative 4, except to provide a point in time at which impacts from other chosen alternatives may end.
	No Action Alternative	Hazardous materials would not be used and hazardous wastes would not be generated from maintenance processes, as these would cease. Hazardous materials would be removed from the range and disposed of or reissued elsewhere. Hazardous materials utilized in other land uses on what had been the NTTR would receive separate environmental review and would be administered by BLM. Therefore, no significant impacts are anticipated.
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Table 3-49. Summary of Impacts

Resource Area	Alternative	Summary of Impacts
Health and Safety	1	There would be no changes in the operational tempo. All actions would continue to be performed by technically qualified personnel in accordance with applicable safety requirements; consequently, there would be no significant impacts related to aircraft mishaps, munitions use, or emitter operations over the baseline condition.
	2	There may be slight increases in risk potentials relative to any increase in operational tempo. However, all actions would be performed by technically qualified personnel in accordance with applicable safety requirements; consequently, there would be no significant impacts related to aircraft mishaps, munitions use, or emitter operations.
	3A 3A-1 3B 3C	Air operations could increase with the availability of these proposed expansion areas; consequently, the potential for aircraft mishaps and from mishap-related fires would incrementally increase when compared to Alternative 1. Safety impacts resulting from training-initiated fires would not occur, as no air-to-ground or ground-based munitions training would occur in Alternatives 3A, 3A-1, or 3B. All actions would be performed by technically qualified personnel in accordance with applicable safety requirements; consequently, no significant impacts would occur. For Alternative 3C, ground disturbance has the potential to result in an expansion of invasive annual grass that could result in increased wildfire risk. Reduced access for the purposes of safety and security into this area could increase or delay response times, which could result in larger fires. Airspace de-confliction could increase where a wildfire response would include civilian firefighting aircraft.
	4	The proposed extension periods associated with Alternative 4 must be implemented in conjunction with one or more of the other alternatives or subalternatives. Because Alternative 4 reflects periods of time, which do not in and of themselves affect health or safety, there are no specific impacts associated with Alternative 4, except to provide a point in time at which impacts from other chosen Alternatives may end.
	No Action Alternative	Potential impacts related to air-to-ground and ground-based activities would not occur, as these operations would cease; however, air-to-air training would still be possible. This may result in an decrease in overall flight operations; consequently, the potential for mishaps or bird/wildlife aircraft strikes would be reduced, resulting in an overall decrease in risks associated with aircraft flight training. Fire response times would decrease because of increased access, possibly decreasing fire size due to timely suppression actions. Fire reporting would improve, also allowing more timely fire response and more accurate fire records. Overall fire management activities would increase.
Transportation	1	Impacts on existing NTTR roads would not be expected to change, and there would be no interaction with existing transportation infrastructure, current levels of service, or traffic patterns in the surrounding area beyond existing baseline conditions.
	2	Ready access could include improvements to existing roads and trails along with possible road/trail relocations especially within the South Range. Troop movements on NTTR roads and surrounding highways

Resource Area	Alternative	Summary of Impacts
		would not result in any adverse transportation issues.
	3A 3A-1 3B	The proposed expansion areas would have no interaction with the existing transportation infrastructure, current levels of service, or traffic patterns within the NTTR or the surrounding area beyond existing baseline conditions
	3C	In addition to baseline transportation conditions there is the potential for new road construction within the proposed Alamo withdrawal areas. Addition of safety buffers could also require DNWR road closures (primarily Alamo Road and smaller intersecting roads and trails).
	4	The proposed withdrawal periods associated with Alternative 4 must be implemented in conjunction with one or more of the other alternatives or subalternatives. Alternative 4 would not result in any interaction with the existing transportation infrastructure, current levels of service, or traffic patterns within the NTTR or the surrounding area. Because Alternative 4 reflects periods of time, which do not in and of themselves affect transportation resources, there are no specific impacts associated with Alternative 4, except to provide a point in time at which impacts from other chosen alternatives may end.
	No Action Alternative	Impacts to the existing transportation infrastructure, current levels of service, and traffic patterns within and surrounding former NTTR lands would depend on future land use planning and resource management objectives of the land management agencies.

Table 3-49. Summary of Impacts

< = less than; AFB = Air Force Base; AFI = Air Force Instruction; Alt; Alternative; AUM = animal unit months; BLM = Bureau of Land Management; BMP = best management practice; CFR = Code of Federal Regulations; CDNL = C-weighted day-night sound level; dB = decibel; DNL = day-night average sound (or noise) level; DNWR = Desert National Wildlife Range; DoD = U.S. Department of Defense; DOE/NNSA = U.S. Department of Energy/National Nuclear Security Administration; EC = xxx; EIAP = Environmental Impact Analysis Process; FAARP = Forward Area Arming and Refueling Points; FLPMA = *Federal Land Policy Management Act*; GHG = Greenhouse Gases; HMA = Herd Management Area; IADS = Integrated Air Defense System; ICRMP = Integrated Cultural Resource Management Plan; INRMP = Integrated Natural Resources Management Plan; LEIS = Legislative Environmental Impact Statement; MOA = Memorandum of Agreement; NEPA = *National Environmental Policy Act*; NDOW = Nevada Department of Wildlife; NHPA = *National Historic Preservation Act* (of 1966); NPDES = National Pollutant Discharge Elimination System; NTTR = Nevada Test and Training Range; OHV = off-highway vehicle; OV = Oasis Valley; PILT = Payment in Lieu of Taxes; SUA = Special Use Airspace; TDY = Temporary Duty; USFWS = U.S. Fish and Wildlife Service; VFW = Veterans of Foreign War; WSA = Wilderness Study Area

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3.15.1 Summary of Impacts for Potential Alternative Combinations

As discussed in Chapter 2, a Congressional decision regarding the land withdrawal may include various combinations, or portions, of the alternatives presented in this LEIS. The following discussion attempts to summarize the impacts that may occur as a result of various combinations of alternatives.

6 Methodology

Essentially, aside from selection of the No Action Alternative, any withdrawal decision
must include either Alternative 1 (status quo) or Alternative 2 (extend existing
withdrawal with ready access) or portions thereof. Alternative 3 or any of the Alternative
3 subalternatives cannot be selected exclusive of either Alternative 1 or Alternative 2; in
other words, any Alternative 3 selection must accompany either Alternative 1 or
Alternative 2, or a portion thereof.

Alternative 4, which is related to the timeframe of the withdrawal decision, must also accompany any withdrawal decision (i.e., Alternatives 1, 2, or 3). However, Alternative 4 would not necessarily result in any direct or indirect impacts outside of those already described for Alternatives 1, 2, or 3 because there is no "action" associated with the timeframe decision. However, the time period for the withdrawal would dictate the length of time over which identified alternative-specific impacts may occur.

Given that Congress could decide to implement any combination of proposed 19 alternatives, or even modify proposed alternatives and implement portions of different 20 alternatives or alternatives not presented in this document, it would be problematic to 21 attempt to identify every possible combination of potential outcomes. As a result, and 22 given the above factors, the impacts associated with potential alternative combinations 23 focuses on the alternative-specific impact analysis previously presented in Chapter 3 24 and summarized in Table 3-49 and identifies where combinations of alternatives would 25 result in impacts substantively different from those described for individual alternatives. 26

As an example, for air quality analysis: while each individual "action" alternative would not result in significant adverse air quality impacts, a combination of any "action" alternatives would result in air quality emissions greater than those identified for the individual alternatives. However, the combined impact would not result in any significant adverse impacts, regardless of combination. Therefore, any combination of alternatives would not result in air quality impacts substantively different than those identified for individual alternatives.

Alternatively, for land use, while Alternative 2 by itself would have no adverse impact to 34 recreation because land use impacts would be limited to the existing NTTR land 35 boundary (which currently has limited access), the combination of Alternative 2 plus 36 Alternative 3C would result in significant impacts to recreation because Alternative 3C 37 involves limiting access to large portions of the DNWR that are currently accessible to 38 the public. However, a combination of Alternative 2 and Alternative 3B would essentially 39 have no adverse impact to recreation because the Alternative 3B area is not used for 40 public recreation/access. 41

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1 The following discussion provides summaries for each resource area and the potential

2 impacts associated with varying combinations of alternatives based on the above

3 methodology.

4 Airspace

5 Depending on alternatives selected, air operations could increase; however, no 6 changes to the boundary of existing airspace would occur under any alternatives. 7 Despite a potential for increased air operations under alternatives allowing for ready 8 access, the existing airspace would be more efficiently utilized, which would reduce 9 airspace scheduling conflicts. There are no substantive differences in airspace impacts 10 between alternative combinations and adverse impacts to airspace are not anticipated 11 regardless of alternative combination.

12 **Noise**

The only substantive differences between alternatives with regards to noise are 13 potential increases in operational intensity under Alternative 2 and potential increased 14 exposure to noise in the Alternative 3C area. For alternative combinations involving 15 Alternative 1, there would be no expected increase in noise because military operations 16 would remain as status quo. For alternative combinations involving Alternative 2, air 17 operations, munitions use, vehicle use, and emitter operations may increase on the 18 19 NTTR, with blank munitions use, emitter operations, and ground disturbance associated with troop movements, vehicle use and construction occurring in previously unutilized 20 areas of the South Range. These activities would also occur under Alternative 3C in the 21 Alamos area. However, under any alternative combination, incremental increases in 22 noise levels would be minimal (less than 1 dB) and the number of sonic booms per day 23 would be expected to increase by one sonic boom over the baseline levels. As a result, 24 no significant noise impacts are anticipated under any alternative combination. 25

26 Air Quality

Depending on alternatives selected air operations, munitions use, vehicle use and 27 emitter operations may increase within the NTTR, fencing could occur at all proposed 28 expansion areas, and blank munitions use, emitter operations, and ground disturbance 29 associated with troop movements, vehicle use and construction may occur within the 30 Alternative 3C expansion area. As a result, emissions may increase associated with 31 activities both on the NTTR and relative to alternative locations, with greater emissions 32 associated with respective alternative combinations (e.g., a combination of Alternatives 33 3A + 3B would result in less emissions than 3A + 3C because 3A + 3B requires less 34 fencing and 3C is larger and also involves other ground-disturbing activities that would 35 not occur with 3B); however, increases in criteria pollutant and GHG levels would be 36 minimal and those from construction activities would be temporary. Therefore, there are 37 no substantive differences in air quality impacts between alternative combinations and 38 no significant impacts to regional air quality are anticipated regardless of alternative 39 combination. 40

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1 Land Use, Recreation, and Visual Resources

2 The substantive differences between alternatives are as follows:

3 *Alternative 1*: No change to baseline condition—the NTTR would continue to have 4 limited access on a case-by-case basis.

Alternative 2: Portions of the South Range previously restricted to military activity would 5 become accessible for operational use. Subsequent introduction of military training and 6 infrastructure development in an otherwise untrammeled landscape could cause 7 significant impacts to the visual characteristics in that area. Any development and 8 infrastructure improvements could introduce permanent or persistent light-emitting 9 10 sources that contribute to light pollution in the region, and, therefore, adversely impact natural night skies. Impacts to natural night skies would be worse over areas where 11 persistent and permanent light sources are concentrated 12

Alternative 3A: Public access to this area, currently unrestricted, would become limited on a case-by-case basis as is the current practice for the NTTR. This would affect one active mining claim, the unallocated grazing area, and Razorback grazing allotment, the NDOW hunting unit 253, and, depending on fencing locations, the Bullfrog HMA; it would also eliminate existing recreational uses (i.e., biking and OHV use) within the area. No impact to visual resources are expected under this alternative.

Alternative 3A-1: This area is a smaller portion of the Alternative 3A area, which would also affect one active mining claim and result in reduced affected acreage of the unallocated grazing area and Razorback grazing allotment, NDOW hunting unit 253, and the Bullfrog HMA than under Alternative 3A. There would be no impact to existing recreational uses (i.e., biking and OHV use) within the area. No impact to visual resources are expected under this alternative.

Alternative 3B: This area is currently inaccessible to the public, which would not change under Alternative 3B; however, the area may be made available on a limited, case-bycase basis as is current practice on the NTTR. No impact to visual resources are expected under this alternative.

Alternative 3C: This area is currently part of the DNWR and open for public recreation; 29 public access to portions of this area would be limited in a similar fashion to current 30 practices on the NTTR. Similar to impacts in the South Range under Alternative 2, 31 introduction of military training and infrastructure in an otherwise untrammeled 32 landscape would change the area from "undeveloped" to one with human development 33 and interference. Visual resources management designations and objectives in this 34 area would need to be modified in order to support the new activities. In addition, any 35 development and infrastructure improvements could introduce permanent or persistent 36 light-emitting sources that contribute to light pollution in the region, and, therefore, 37 adversely impact natural night skies. Impacts to natural night skies would be worse over 38 areas where persistent and permanent light sources are concentrated. 39

From a public access/recreation perspective, alternative combinations involving
 Alternative 3C would have the greatest potential for significant impacts; Alternative 3A
 would have an additive adverse effect on public access/recreation but less so than

- 1 Alternative 3C, and Alternatives 3A-1 and 3B would have the least additive impact.
- 2 Alternative 2 would not have any incremental effect on public access/recreation 3 because access is already limited on the NTTR.
- 4 For visual impacts, a combination of Alternatives 2 and 3C would have the greatest
- 5 potential for impacts, a combination of Alternatives 2 and 50 would have the greatest
- 6 over large distances. Alternatives 3A/3A-1 and 3B would have minimal incremental
- 7 impact on visual resources when considered in combination with other alternatives.

8 Wilderness

9 The substantive differences between alternatives with regards to wilderness area 10 impacts are associated with the amount of land area affected by a potential change in 11 land management:

- 12 Alternative 1: No change to wilderness or areas proposed for wilderness.
- Alternative 2: Land area managed as wilderness would potentially be reduced by approximately 590,000 acres, which represents approximately 42 percent of the land area associated with the areas proposed for wilderness on the DNWR. However, this
- area would be completely within the NTTR boundary.
- 17 *Alternative 3A/3A-1*: No change to wilderness.
- Alternative 3B: Approximately 33,000 acres, or 2 percent, of the land area managed as de facto wilderness within the DNWR would be affected.
- *Alternative 3C*: This would affect approximately 227,000 acres of land outside the current NTTR boundary, or 16 percent, of the land area within DNWR currently managed as de facto wilderness.
- The scope of impact to wilderness is largely dependent on potential alternative combinations, with specific impacts dictated by the location of the area in question as per the above list of alternatives.
- Alternative combinations involving Alternative 1 would not result in any impacts to areas 26 proposed for wilderness, even were there to be expansion combined with Alternative 1, 27 because the land management of these areas would not change. For example, if a 28 combination of Alternative 1 and Alternative 3C was chosen, although 227,000 acres 29 proposed for wilderness would now become part of the NTTR, the land would continue 30 to be managed as de facto wilderness and, thus, there would be no effect to wilderness 31 characteristics. However, access limitations would be expanded into portions of the 32 Alamo areas (which is covered under Land Use, Section 3.4), thus affecting the ability 33 of persons to experience wilderness. 34
- In cases where ready access is granted for areas currently managed as de facto wilderness (i.e., alternative combinations involving Alternative 2), minor impacts mainly associated with effects to untrammeled, natural, and undeveloped qualities are anticipated resulting from increased use of the areas. Impacts to solitude or primitive and unconfined recreation of the South Range would not be expected because this area

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is not accessible for recreation; however, impacts to solitude or primitive and unconfined
 recreation would occur for the Alamo areas.

The largest potential for impacts occurs with a combination involving Alternatives 2, 3B, and 3C, which could result in approximately 61 percent of areas proposed for wilderness affected if ready access was granted to the South Range and expansion areas. Solitude or primitive and unconfined recreation of surrounding areas with wilderness characteristics may be adversely impacted from increased aircraft operations, munitions use, and emitter operations. Noise levels would not substantially increase over baseline conditions.

- 10 Combinations involving Alternative 3B, regardless of other alternatives selected, would 11 not result in a substantive incremental impact to areas proposed for wilderness because 12 that land area represents only 2 percent of the total.
- 13 Regardless of alternative combination, based on the remaining amount of land area in
- 14 the region that contain wilderness qualities, the removal of requirements to manage the
- alternative areas as wilderness would not significantly reduce wilderness qualities, or
- ¹⁶ opportunities to experience wilderness, in the region.

17 Socioeconomics

18 Substantive differences between alternatives are essentially associated with the 19 particular impact to the counties associated with potential withdrawal areas.

- *Alternative 1*: No further impact on the region than the baseline economic impact because payrolls and expenditures would be expected to continue at typical levels, though they may change as new technologies, aircraft, and military strategies are introduced over time.
- Alternative 2: Estimated economic increase associated with lodging and per diem for TDY personnel associated with a 30 percent increase in test and training activities under Alternative 2 would be \$67 million per year.
- Alternative 3A: Based on acreage, potential impact on the PILT for Nye County would 27 be approximately \$6,400 per year; there would be an 83 percent reduction in available 28 grazing area to the rancher currently leasing the Razorback AUM allotment and would 29 be a significant impact to that individual. Thus, the Air Force plans to work directly with 30 rancher to address this impact. The additional rights-of-way proposed under Alternative 31 3A that cross into Corridor 18-224 (also known as Crater Flat to Las Vegas) may impact 32 its use. BLM is currently in the process of revising their Southern Nevada resource 33 management plan, which is proposing corridor revisions. Plans call for the corridor to 34 be reviewed in its entirety in 2018. 35
- Segments of OHV race routes such as the Best in The Desert's Beatty-to-Dayton route are close to the NTTR boundary and may be impacted by the additional land withdrawal for Alternative 3A. The 2016 route would not have been impacted by any of the proposed Alternative 3 actions. With the exception of 2016, Best in the Desert's Vegas to Reno off-road race has used the route that would be impacted by proposed expansion area 3A since 2009. In any event, the race routes may vary between years,

- or the Air Force might be able to adjust mission-related activities to accommodate these
 races.
- *Alternative 3A-1*: Based on acreage, there would be an estimated reduction of \$5,500 per year in PILT allocation to Nye County; impacts to grazing would be similar to those described for Alternative 3A. Impacts to Corridor 18-224 would be eliminated in the southern area of Alternative 3A-1; however, the northern area would still be impacted as described for Alternative 3A.
- 8 *Alternative 3B*: Based on acreage, there would be a potential estimated reduction in 9 PILT allocation for Nye County by approximately \$3,600 per year.
- *Alternative 3C*: The estimated recreational-use economic impact would potentially be a loss of \$1,990,790.
- 12 Alternative combinations involving expansion would have an additive adverse impact,
- mainly associated with economic losses either from PILT allocations for Nye County or recreation-based expenditures throughout the region; the degree of impact would be
- dependent on the alternative combination selected. Alternative 2 would have an additive
- 16 effect in terms of potential beneficial economic impact, primarily in Clark County, from
- increased expenditures on behalf of the military; such beneficial impacts may to some
- 18 degree offset potential negative impacts from other selected alternatives.

19 Environmental Justice

There are no substantive differences between alternatives or alternative combinations 20 with regards to environmental justice. The six census tracts and the associated 21 environmental justice and youth/elderly populations residing under the Caliente and 22 Coyote SUAs that are currently exposed to 65 to 69 dB DNL associated with subsonic 23 aircraft noise would continue to be exposed to this range of noise under all alternative 24 combinations. Noise levels of 62 CDNL outside of the NTTR boundary would not extend 25 into populated areas and no adverse significant noise or safety impacts associated with 26 ground disturbance, munition use, and emitter operations have been identified that 27 would impact the public. Therefore, no disproportionately high and adverse impacts to 28 environmental justice communities or disproportionately high and adverse 29 environmental health and safety impacts to children would be anticipated from any 30 alternative combination. 31

32 Biological Resources

Depending on alternatives selected air operations, munitions use, vehicle use and 33 emitter operations may increase within the NTTR, fencing could occur at all proposed 34 expansion areas, and blank munitions use, emitter operations, and ground disturbance 35 associated with troop movements, vehicle use and construction may occur within the 36 South Range and Alternative 3C expansion area. Alternative 3A, 3A-1, and 3B areas 37 would mainly be utilized as buffer areas and fencing along the boundaries has the 38 potential to impact biological resources by removing native vegetation or special status 39 plant species, fragmenting wildlife habitat, creating barriers for wildlife movement, 40 causing injury to large mammals that run into or get caught in the fence, damming or 41

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altering streams, or creating corridors for weed dispersion. However, impacts could be 1 avoided or minimized through implementation of proposed mitigations and management 2 actions described in Section 2.8. Alternative 3A would result in approximately 25 miles 3 of fencing, 25 miles for Alternative 3A-1, and 30 miles for Alternative 3B. Alternative 3C 4 would also involve approximately 60 miles of fencing, potentially resulting in similar 5 impacts as described above. Consequently, any alternative combination involving these 6 alternatives could result in between 25 and 115 miles of fencing. 7 Alternative combinations associated with Alternative 2 and Alternative 3C could result in 8 increased potential for direct impacts to biological resources from an associated 9 increase in use of existing target areas; construction and maintenance of new facilities, 10 targets, or roads; placement of threat emitters; and increased ground training (including 11 access by vehicles and personnel). Increased potential for indirect impacts could occur 12 from soil contamination and subsequent cleanup of target impact areas; accidents such 13

as fuel spills or fire; or non-native species invasion in areas previously inaccessible for
 military training. However, impacts would likely be site-specific, represent a small
 portion of the overall action area, and be reduced through proper planning, monitoring
 and maintenance.

18 Impacts associated with the continued withdrawal of the NTTR and potential expansion 19 could also result in beneficial impacts to biological resources as these resources would 20 be managed for conservation purposes and impacts from public access would be 21 limited.

As a result, impacts associated with alternative combinations involving only 22 Alternatives 1, 3A, 3A-1, and 3B would have minimal impact over current/baseline 23 conditions, while alternative combinations involving Alternative 2 and 3C would have a 24 greater potential for adverse impact over a larger area due to the potential increase in 25 operational intensity and introduction of military operations into new areas. In any case, 26 potential impacts identified can be avoided or minimized to less than significant with 27 implementation of suggested mitigations and management actions identified in 28 Section 2.8. 29

30 Cultural Resources

Under any alternative combination no direct physical impacts to resources are 31 anticipated as a result of aircraft operations. However, indirect visual or auditory 32 impacts can potentially occur from aircraft or other vehicular operations, with a potential 33 increase in operational intensity associated with alternative combinations that include 34 Alternative 2. However, with the implementation of avoidance areas around specific 35 traditional cultural properties and sacred sites and scheduling of mission activities 36 around tribal events, no adverse effects to cultural resources would be anticipated from 37 aircraft operations under any alternative combination. 38

Cultural resources have the potential to be physically impacted by live munitions use (associated with Alternatives 1 and 2) or other ground-disturbing activities (under all

alternatives) resulting from the military mission. Potential direct physical impacts to

1 cultural resources under Alternatives 3A, 3A-1, and 3B would mainly be associated with 2 installation of fencing since these areas would be used as buffer.

Alternative combinations involving Alternative 2 and Alternative 3C would result in increased potential for impacts to culturally sensitive resources as the Air Force expands military activities in the South Range and Alamo areas. However, the context of impacts to cultural resources from ground disturbance, emitter operations and munitions use would essentially be the same as that for Alternative 1, only over a larger area with the potential to impact more resources.

9 A benefit associated with alternative combinations involving Alternative 3 and its subalternatives is a reduction in potential impacts to cultural resources associated with limited public access and increased resource protection and management. Limited public access would decrease the likelihood of direct impact to cultural resources within the expansion areas from foot traffic, vehicular traffic, and vandalism or looting.

Regardless of alternative combination, any culturally sensitive areas would be avoided to the extent practicable, and given proposed mitigations, Section 106 of the NHPA process, the requirements mandated by the Nellis AFB ICRMP, and existing management requirements, no adverse effects to cultural resources within the context of the NHPA would be anticipated under any alternative combination.

19 *Earth Resources*

Under all alternative combinations earth resources have the potential to be physically 20 impacted by munitions use or other ground-disturbing activities resulting from the 21 military mission. For Alternative 1, the context and intensity of impacts would be the 22 same as the baseline condition because missions would occur in areas previously 23 approved for specific activities; aircraft operations, munitions use, and ground-disturbing 24 activities would have no significant impact on soils, paleontological or geologic 25 resources. However, the context and intensity of impacts to earth resources for other 26 alternatives is alternative-specific, with substantive differences being the types of 27 activities proposed in each potential expansion area. For alternative combinations 28 involving Alternatives 3A, 3A-1, and 3B, any additional impacts to earth resources would 29 be limited to ground disturbance associated with fencing; however, there would be no 30 substantive difference in the context or intensity of impacts across these alternatives 31 aside from the miles of fencing installed per alternative. 32

Additional impacts associated with alternative combinations involving Alternative 2 may result from increased intensity of military operations, as well as the introduction of ground-disturbing activities in areas previously undisturbed; however, the context of these impacts would be the same as activities currently occurring on the NTTR. In a similar fashion, additional impacts associated with alternative combinations involving Alternative 3C would involve ground disturbance in areas previously undisturbed.

With regards to mineral exploitation, an extension and or expansion of the withdrawal of NTTR lands could restrict economic opportunity associated with extraction of some mineral resources. Potentially valuable deposits of mineral resources are present throughout the NTTR. Safety footprints required to support the various military missions

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would necessarily restrict public and industrial access to the NTTR. In terms of mineral 1 exploration, the continuation extension of NTTR would prevent the discovery and use 2 exploitation of economically viable resources. At present there is one active mining 3 claim within the Alternative 3A and 3A-1 expansion areas. If the Air Force withdraws 4 either parcel, a subsequent potential restriction of access to these active claims could 5 potentially represent an impact to earth resources. The significance of these impacts is 6 difficult to quantify until the final disposition of these claims is resolved between the 7 claimants and the Air Force. The potential for impacts would also be altered depending 8 on the term of withdrawal to be implemented under Alternative 4. 9

Overall, the substantive difference between potential alternative combinations is essentially the amount of area that may be potentially disturbed, with combinations involving Alternatives 2 and 3C resulting in disturbance over a larger area than other alternative combinations. However, the types of disturbance would be fundamentally the same. Combinations involving Alternative 3A would result in additional potential impacts to an active mining claim.

Regardless of alternative combination, activities would avoid erosion-prone areas and 16 would be subject to further NEPA and NPDES requirements depending on the action 17 and scope of activity. As a result, implementation of proposed mitigations and BMPs 18 resulting from further site-specific environmental evaluations and 19 regulatory requirements would minimize impacts to soils, paleontological or geologic resources to 20 less than significant. Any projects in the future outside the scope of those analyzed in 21 this LEIS may also be subjected to additional consideration under NEPA and other 22 applicable regulations. 23

24 Water Resources

Aside from the specific resources (e.g., springs, wetlands, etc.) described for each area 25 in Table 3-49 and Section 3.11 (Water Resources) the substantive difference between 26 potential alternative combinations is essentially the amount of area that may be 27 potentially disturbed due to ground disturbance and training activities, with combinations 28 involving Alternatives 2 and 3C resulting in disturbance over a larger area than other 29 alternative combinations, thus resulting in potential impacts to a greater number of 30 resources. However, the types of disturbance would be fundamentally the same and 31 have similar impacts; e.g., fencing installation would have the same type of impact to 32 wetlands regardless of which alternative combination is selected; however, the amount 33 of wetlands potentially impacted may be different per alternative combination, 34 depending on resources present and planning and avoidance measures employed. 35 Overall, ground disturbance in or near surface water features, wetlands, and other water 36 37 resources would be avoided to the extent practicable regardless of alternative.

Combinations involving Alternative 2 would also have the additive effect of an increase in operations over baseline conditions (thus resulting in an increased potential for erosion and water resource impacts). Combinations with Alternative 2 would also result in an incremental increase in water consumption associated with the increase in operations; however, this increase could likely be fulfilled through current or existing water rights. Overall, impacts to water resources that may result in substantive issues for human health or wildlife populations are not anticipated under any alternative combination; however, the potential for adverse impacts increases incrementally as additional alternatives are selected, with the greatest potential for adverse impacts associated with combinations involving Alternatives 2 and 3C.

6 Hazardous Materials and Solid Waste

Based on the analysis for each alternative, the only substantive differences between 7 alternative impacts are (1) the potential for increased hazardous waste generation and 8 spills from an increase in operational intensity associated with Alternative 2, and (2) the 9 10 potential for use of hazardous materials and spills in areas previously unexposed to this potential (i.e., the proposed expansion areas and portions of the South Range). 11 However, regardless of alternative combination all hazardous materials or wastes would 12 be managed according to established procedures, and no significant impacts would be 13 anticipated under any alternative combination. 14

15 Health and Safety

The substantive differences in health and safety impacts between alternatives are the 16 potential for increased air operations under Alternative 2 and Alternative 3 over the 17 baseline condition (Alternative 1), and increased ground training activities and emitter 18 19 use in the South Range (Alternative 2) and Alternative 3C area. As a result, alternative combinations involving Alternatives 2 and 3 have the potential for increased aircraft 20 mishaps, with alternative combinations involving Alternatives 2 and 3C having the 21 added potential for training-related fires and exposure to electromagnetic radiation when 22 compared to other alternative combinations. However, regardless of alternative 23 combination, all actions would be performed by technically qualified personnel in 24 accordance with applicable safety requirements and based on analysis in Section 3.13 25 (Health and Safety) the potential for hazardous electromagnetic radiation exposure is 26 less than significant; consequently, no significant impacts would be expected under any 27 alternative combination. 28

29 Transportation

The only substantive differences between alternatives are that under Alternative 2 there 30 could be improvements to existing roads and trails along with possible road/trail 31 relocations within the South Range, and under Alternative 3C there could be road 32 improvements/maintenance activities within the withdrawn portion and portions of 33 Alamo Road would be closed to the public. Aside from Alternative 3C, no impacts to 34 locally accessible roads or transportation routes would occur. Consequently, additive 35 impacts to local roadways would only occur through a combination of alternatives 36 involving Alternative 3C. 37

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