



# NEVADA TEST AND TRAINING RANGE (NTTR)

Land Withdrawal Application Packages/  
Case File and Legislative EIS



## GREATER SAGE-GROUSE AND ITS HABITAT ON THE NEVADA TEST AND TRAINING RANGE AND PROPOSED EXPANSION ALTERNATIVES



FINAL  
October 2017

**GREATER SAGE-GROUSE AND ITS HABITAT ON  
THE NEVADA TEST AND TRAINING RANGE  
PROPOSED EXPANSION  
ALTERNATIVES  
Final Report**

*Prepared for the*

**U.S. Air Force**

*Through the*

**U.S. Army Corps of Engineers**

**Contract # W9126G-14-D-0014**

**Delivery Order No. DS01**

**Leidos Subcontract No.: P010176987**

**October 2017**

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## Abbreviations

BLM	Bureau of Land Management
DNWR	Desert National Wildlife Range
DoD	U.S. Department of Defense
DOI	U.S. Department of the Interior
ESA	Endangered Species Act
NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act
NNRP	Nellis Natural Resources Program
NTTR	Nevada Test and Training Range. Also, the new name for 98th Range Wing
USAF	United States Air Force
USFWS	U.S. Fish and Wildlife Service

## Introduction

The U.S. Air Force (USAF) is in the process of extending the withdrawal of land for military operations and training on the Nevada Test and Training Range. In addition to extending the current withdrawal, the USAF is evaluating three proposed expansion areas. The current withdrawal will expire on November 6, 2021, unless Congress enacts legislation to extend it. In accordance with Section 3016 of the Military Land Withdrawal Act (MLWA), the USAF, in coordination with DoD, plans to notify Congress of a continuing military need for the NTTR withdrawal. Furthermore, the USAF plans to submit a Legislative Environmental Impact Statement (LEIS) that supports a legislative proposal through the Department of the Interior (DOI) to extend the withdrawal. The National Environmental Policy Act of 1969, United States Code [USC] Sections 18 4321-4370h (NEPA) requires agencies to include an environmental impact statement (EIS) with any proposal for legislation that may significantly affect the quality of the human environment. The land withdrawal renewal includes actions that present potential impacts to the greater sage-grouse (*Centrocercus urophasianus*) and its environment. Current BLM greater sage-grouse maps indicate that the only potential greater sage-grouse habitat is found on the North Range of the NTTR in the foothills and basins around the Kawich Mountain Range. Due to regulatory concerns and potential listing of the species, summarization of the history and current status of the species on the NTTR and potential expansion alternatives was warranted and is the content of this report.

## Description of the Study Area

The study area for this report includes the NTTR and potential expansion areas designated as Alternatives 3A, 3B, and 3C. The NTTR consists of 2,949,603 acres, in rural portions of Nye, Lincoln, and Clark Counties, Nevada (Figure 1). The potential expansion areas are shown in Figure 1 and consist of about 302,000 acres. Alternative 3A is 18,000 acres lying along the southwest boundary of the North Range of the NTTR. Alternative 3B is 57,000 acres located immediately south of the South Range of the NTTR. Alternative 3C is 227,000 acres immediately east of the South Range of the NTTR in the Desert National Wildlife Refuge (DNWR). Geology varies from limestone/dolomite in the south to volcanic fields in the north. The South Range Study Area lies in the eastern Mojave Desert and the North Range Study Area lies in the southern Great Basin (Figure 2).

Natural water sources are scarce across most of the NTTR Study Area. Annual precipitation varies from 3 to 5 inches in the basins, and up to 16 inches in the upper mountain elevations. Vegetation composition is strongly influenced by the amount of precipitation. Most seeps and springs are found in the North Range Study Area, especially in the Kawich, Belted, and Cactus ranges, and Stonewall Mountain. Only five natural springs are presently known in the South Range Study Area, but artificial water developments (guzzlers) have been constructed to provide wildlife with additional sources of water. Guzzlers collect meteoric water from storm events, store it in water tanks, and dispense water at troughs or drinkers.

The South Range Study Area is typical of the Mojave Desert. Except for the higher elevations, most of the mountains are covered by scattered populations of various desert brush and cactus species. Typical physiography of the area consists of mountain ranges which drain into bajadas (collections of alluvial fans) which eventually drain into playas. Most of these areas are considered basins which are self-contained and do not drain into any of the major rivers in the area. Playas tend to have little or no vegetation while bajadas are often dominated by creosote bush (*Larrea tridentata*) and bursage (*Ambrosia dumosa*) in the lower bajadas and blackbrush (*Coleogyne ramosissima*) and Joshua tree (*Yucca brevifolia*) in the upper bajadas. Mountain ranges support scattered populations of bitterbrush (*Purshia* spp.), matchweed



(*Gutierrezia* spp.), and shadscale (*Atriplex confertifolia*). At higher elevations, plant communities may be dominated by Utah juniper (*Juniperus osteosperma*) and pinyon pine (*Pinus monophylla*).

The North Range Study Area is typical of the southern portions of the Great Basin Desert. Again, the physiography of the area is comprised of mountains and closed basins, similar to the South Range Study Area. However, rainfall is slightly higher in the North Range Study Area resulting in denser plant communities. Similar to the South Range Study Area, the North Range Study Area playas tend to have little or no vegetation. From the boundaries of the playas to the base of mountains, plant communities are typically dominated by greasewood (*Sarcobatus* spp.), bud sagebrush (*Picrothamnus desertorum*), and shadscale (*Atriplex confertifolia*) in lower elevations and sagebrush (*Artemisia* spp.) in higher elevations. The uppermost elevations in the mountains are dominated by Utah juniper (*Juniperus osteosperma*) and pinyon pine (*Pinus monophylla*).

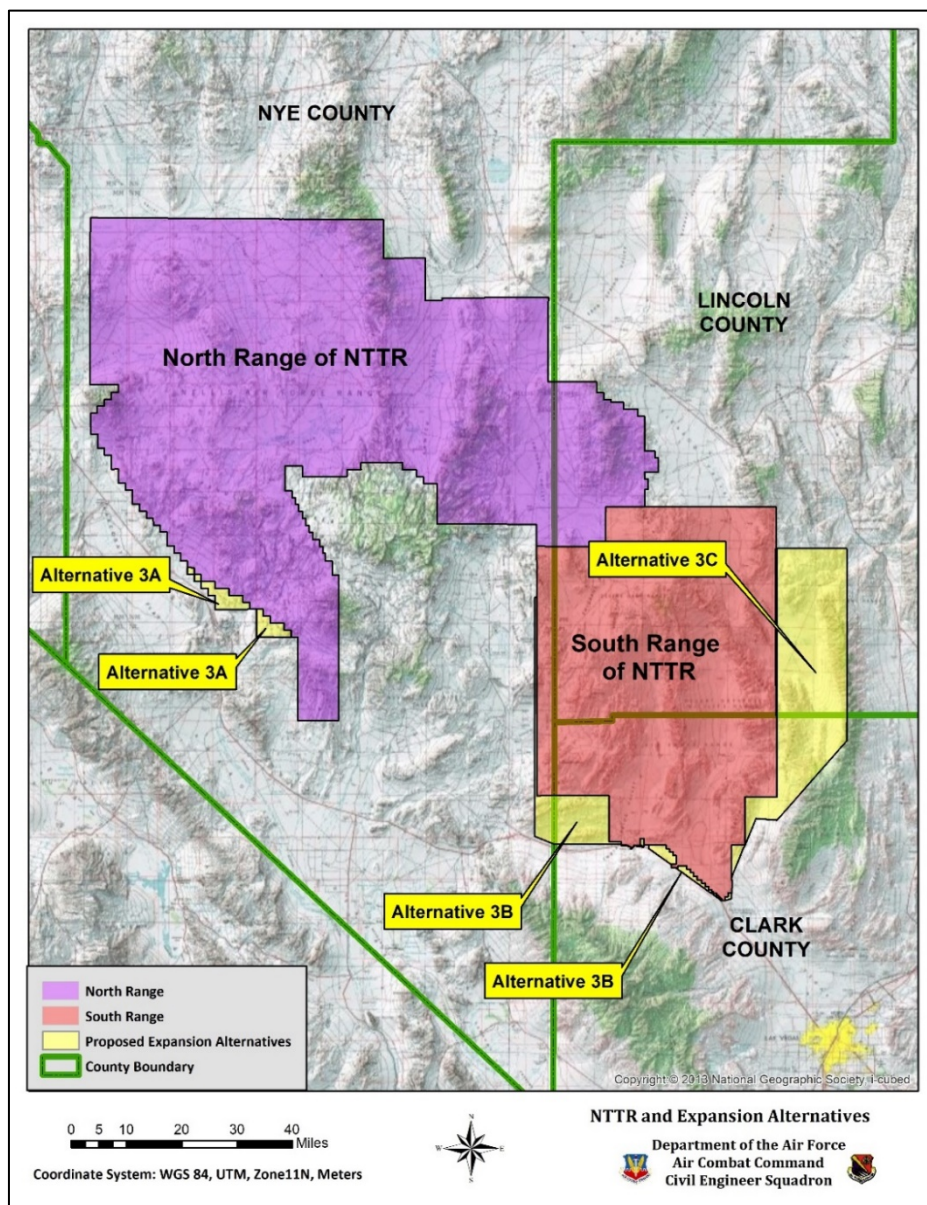


Figure 1. Location of the North and South Ranges of the NTTR as well as Alternatives 3A, 3B, and 3C.



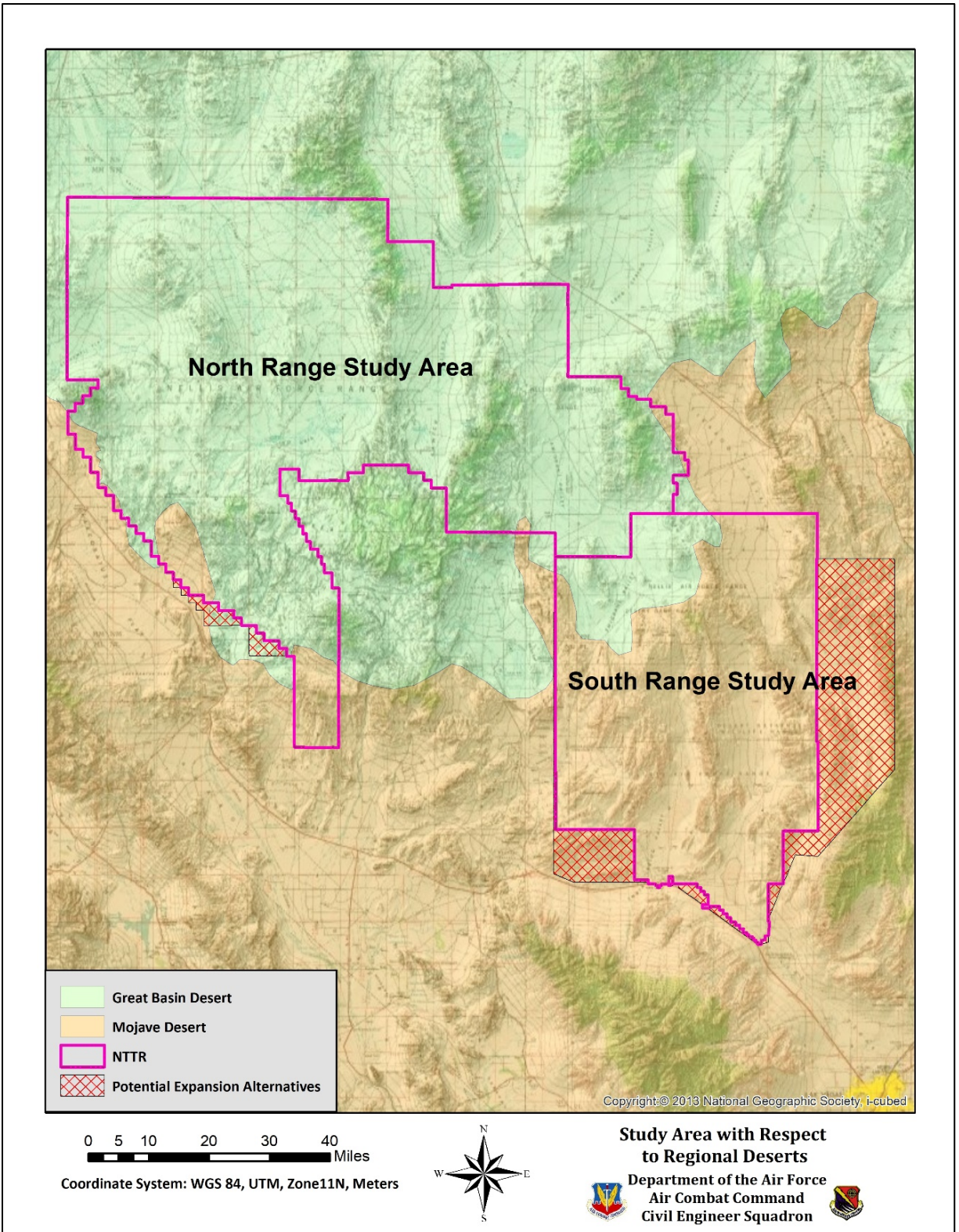


Figure 2. Location of the study area with respect to the Great Basin Desert and the Mojave Desert.

## Background Information

The greater sage-grouse is the largest grouse in North America and typically weighs 3 to 5 pounds (U.S. Fish and Wildlife Service, 2010). The males have long, pointed tail feathers and display a white breast and yellow eye patch in breeding season. Females are overall dark grey to mottled brown. During courtship rituals, males display two yellowish sacs on the neck which are inflated during courtship rituals. The males will inhale up to a gallon of air and forcefully squeeze it out, creating a large booming noise as part of their display (Cornell University, 2015). Juveniles can be distinguished from adults based on their yellowish green toes, whereas adults have dark green toes (U.S. Fish and Wildlife Service, 2010).



Male Greater Sage-grouse (Tom Koerner/USFWS)

In the past, the USFWS recognized two subspecies of the greater sage-grouse, the eastern (*C. u. urophasianus*) and the western (*C. u. phaios*). A 12-month finding for a petition to list the Columbian Basin populations of western sage-grouse was supported by this premise (66 FR 22984). However, in light of new genetic and geographical information, the USFWS has declared that a clear and consistent geographic separation between sage-grouse historically described as “eastern” and “western” does not exist (U.S. Fish and Wildlife Service, 2010). Therefore, the distinction between these two sub-species has been dropped and only the bi-state sage grouse (*Centrocercus urophasianus*) is currently recognized by the USFWS as a district sub-population of the greater sage-grouse.

Greater sage-grouse are usually found in small groups and no other large game bird resides in similar habitat. On the North Range Study Area, greater sage-grouse have been observed mixing with flocks of chukar (*Alectoris chukar*). In Nevada, these small groups of greater sage-grouse gather in “leks” during the breeding season when elaborate courtship rituals are performed. These birds tend to return to the same seasonal ranges each year (Fischer, et al., 1993). The females often return to the same area to nest



Female and immature greater sage-grouse (Tom Koerner/USFWS)

each year and may nest near their previous year’s nesting site (Bunnell, et al., 2000). Once selected, adults rarely switch between habitats, limiting their adaptability to change (U.S. Fish and Wildlife Service, 2010). Adult males have no role in raising the young, and only a select few males have the opportunity to mate each year (Cornell University, 2015).

Greater sage-grouse have the lowest reproduction rate of any North American game bird and as a result populations are not able to recover from low numbers as rapidly as those of other game birds (Utah



Department of Natural Resources, 2002). Greater sage-grouse experienced a gradual decline throughout the past several decades, but recently populations appear to be increasing. “Models suggest stable to slightly increasing populations overall since 1965, with some decline in peripheral areas” (Western Association of Fish & Wildlife Agencies, 2015). The study area is located in these peripheral areas.



Female greater sage-grouse (Tom Koerner/USFWS)

Greater sage-grouse historically inhabited much of the sagebrush dominated ecosystems of North America and have since declined through much of their historical range (BLM, 2004). Greater sage-grouse depend on a variety of shrub steppe habitats throughout their life cycle, and are considered obligate users of several species of sagebrush, including *Artemisia tridentata* (big sagebrush) and *A. nova* (black sagebrush) (Baker, et al., 1976). They depend on sagebrush exclusively during the winter for cover and in the warm season for breeding and nesting. Meadows, riparian areas, irrigated hay fields, and other moist areas within or adjacent to sagebrush habitat provide summer foraging areas. These

mesic sites are extremely critical for greater sage-grouse broods during dry years and remain a critical component of the habitat, even during years with above average rainfall (Northwest Nevada Sage Grouse Working Group, 2002). By its almost total dependence on sagebrush habitats, the greater sage-grouse may serve as an indicator species for the overall condition of the sagebrush ecosystem (Connelly, 1981).

Lekking is an aggregation of males that gather to engage in competitive displays to entice visiting females into reproduction. Lekking habitat typically consists of open areas surrounded by sagebrush (Gill, 1965). Examples of lek sites include landing strips, old lake beds or playas, low sagebrush flats, burned areas, and open or cleared areas on ridges, roads, or cropland (Connelly, 1981; Gates, 1985). Home ranges of greater sage-grouse appear to be tied to the location of leks with 90% of the population associated with a specific lek remaining within 3.1 miles of the lek if the population is not migratory; and 4.7 miles if the population is migratory (Coates, et al., 2013). Populations may occupy distinct summer and winter ranges that may be as much as 47 miles apart. Habitat requirements appear to vary depending on the season (lekking, brooding, rearing, fall and winter habitat) (Connelly, 2000).

Nesting habitat must provide hens with grasses and forbs high in calcium, phosphorus, and protein, all of which are necessary for egg production (Utah Department of Natural Resources, 2002). Most nests are located under sagebrush plants, but have been found under other plant species as well (Connelly, 1981). Diverse herbaceous plant composition in early spring is an important factor for nesting success (Northwest Nevada Sage Grouse Working Group, 2002).

Greater sage-grouse populations are usually established in areas with low, rolling hills adjacent to valleys, and medium density sagebrush mixed with a variety of other plants (Hays, et al., 1998). Various studies have described regional plant communities and have included cheatgrass (*Bromus tectorum*), bluebunch wheatgrass (*Pseudoroegneria spicata*), Thurber needlegrass (*Achnatherum thurberianum*), and Sandberg bluegrass (*Poa secunda*) as secondary plant species found in association with sage-grouse.

The population dynamics of the greater sage-grouse are cyclic; however, in the last 30 years, the peak population in the cycle of bird numbers has declined (BLM, 2004). This decline has been linked to low juvenile survival due to inadequate habitat. Most of the population monitoring data collected for the greater sage-grouse has been restricted to spring lek surveys. This may bias data towards showing lower declines in populations because declines appear to be greater in peripheral areas (Western Association of Fish and Wildlife Agencies, 2015).



**Male greater sage-grouse strutting at a lek (K. Theule/USFWS)**

In the Southern Great Basin Management Zone, which includes Nevada, core populations have shown an increase in levels (0.06% to 0.19% increase per year) from 1965 to 2015, while peripheral areas have declined at a rate of 1.9% per year (Western Association of Fish and Wildlife Agencies, 2015). The study area is located in a peripheral area of the Southern Great Basin Management Zone.

Adequate habitat requirements include high canopy cover of tall grasses, medium height shrubs for nesting, and availability of herbaceous riparian species for late season foraging (BLM, 2004). Habitat degradation can be attributed to suitable habitat being subjected to fires or being converted into cropland or residential development. Big sagebrush does not typically regrow from root crowns after a fire and relies on wind-dispersed seed from adjacent, unburned stands; or seeds in the soil for establishment of new stands. Depending on the species and the size of a burn, sagebrush can reestablish itself within years; but a full recovery often takes 15-20 years (BLM, 2004) under ideal climatic conditions and the absence of subsequent fires.

On the study area, potential impacts could include:

- Destruction of habitat by overgrazing by wild horse populations, especially around water sources on the North Range Study Area.
- Wildland fires caused by lightning, flares, or bombs initiating the growth of the invasive cheatgrass and suppressing sagebrush.



**Typical big sagebrush habitat on the North Range of the NTTR**

- Destruction of sagebrush stands by off-road vehicles. Military activities could result in impacts to sagebrush stands in the North Range only if individuals do not follow range protocol, which explicitly prohibits off-road vehicle use.

According to BLM habitat range maps, the only potential greater sage-grouse habitat found on the study area is on the North Range of the NTTR along the foothills and basins of the Kawich Mountain Range (Figure 3).

## Regulatory Background

The greater sage-grouse (*Centrocercus urophasianus*) is listed as a Candidate species with the USFWS. In 2000, Nevada Governor Guinn put together a Sage-Grouse Conservation Team, which created a Sage-Grouse Conservation Plan. This plan was created to assist in stabilizing greater sage-grouse populations and preventing the greater sage-grouse from being listed as “Endangered” or “Threatened” under the Endangered Species Act (ESA). In 2013, the USFWS initiated a six-year listing work plan to review more than 250 species that are identified in the 2010 Candidate Notice of Review. The intent was to improve the implementation of the ESA and make a final determination on whether the species should be added to the Endangered or Threatened Species Lists. The greater sage-grouse was one of the species reviewed in 2013.

In April 2015, the USFWS withdrew its proposal to list the bi-state population as “Threatened” in California and Nevada. This decision was made after several agencies from across the west from state and local levels came together to reach a conservation partnership and developed the Bi-State Action Plan. It was determined that the implementation of this Action Plan provided sufficient protection for the bi-state population of the greater sage-grouse that it no longer required ESA protection (U.S. Fish and Wildlife Service, 2015). Since then, the partnership’s advisory committee has finalized plans on nearly 80 science-driven conservation projects specifically designed to reduce identified threats and protect the greater sage-grouse sagebrush-steppe habitat. Each of the projects is tied to a specific population management unit within the region led and funded by a specific agency or partnership; and ranked by the immediacy of the threat to the species (Bureau of Land Management, 2016).

For the State of Nevada, the BLM produced a 2016 update on the Sage-Grouse Program, displaying a map of greater sage-grouse population habitat areas that can be used to guide management efforts within the state (Figures 3 and 4). In March 2016, the BLM released a Greater Sage-Grouse Land Use Plan Implementation Guide establishing range wide requirements to monitor and report on changes in the extent and condition of sagebrush-steppe habitat critical to sage-grouse survival. The implementation guide is intended to foster a shared understanding and common approach to implementing the plans, especially with respect to the monitoring and reporting commitments in the plans (Bureau of Land Management, 2016).

Classified as an upland game bird by the State of Nevada (NAC 503.045), the greater sage-grouse is protected under the regulatory framework of Chapters 501 through 506 of the Nevada Revised Statutes. In 2014, the Sagebrush Ecosystem Council finalized the Nevada Greater Sage-Grouse Conservation Plan, which created a Conservation Credit System providing financial incentives for private landowners to conserve sage-grouse habitat for compensatory mitigation (U.S. Fish and Wildlife Service, 2015). Additionally, in June 2015, regulations were signed by the governor for the formation of Rural Fire Protection Associations (RFPAs) within the State of Nevada (NRS 472 per AB 163, sec. 3.5(1) of the 78<sup>th</sup> Session of the Nevada legislature) to support fire suppression efforts in greater sage-grouse and other habitat (U.S. Fish and Wildlife Service, 2015). Most recently, a new federal lawsuit was filed on March 9, 2016 by a coalition of

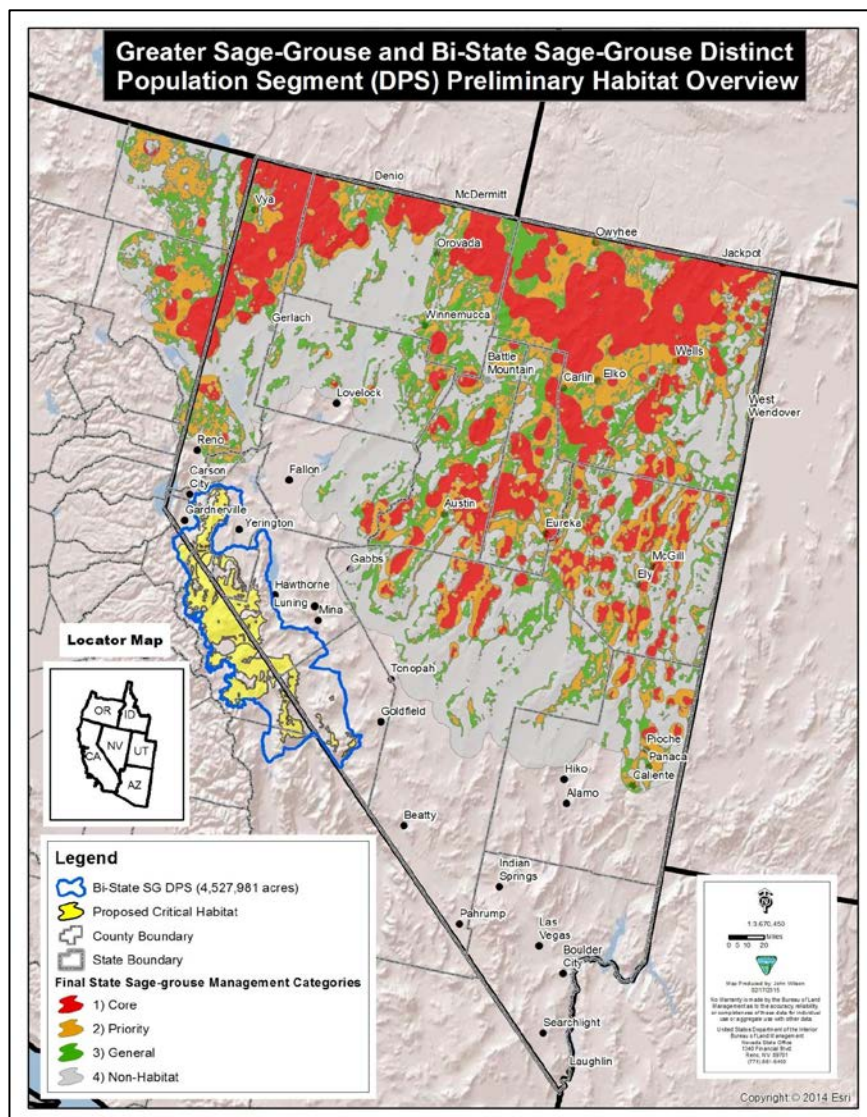


conservation groups from the region that challenges the 2015 decision to not list the species as Endangered or Threatened under the ESA (Molvar, 2016).

Figure 3 shows the current Greater Sage-Grouse Management Categories in the state of Nevada as delineated by the Bureau of Land Management. The USFWS established Priority Areas for Conservation for the greater sage-grouse. Figure 4 focuses on any areas proposed for sage-grouse management that are in the vicinity of the study area. Most of the North Range Study Area appears to be in “Non-Habitat”, but the northeastern corner contains General Habitat and some Priority Habitat. Figure 5 indicates that the northeastern portion of the North Range Study Area lies in the Southern Great Basin Population Management Zone.

At this time, the greater sage-grouse has been designated by various wildlife conservation agencies as the following:

- **United States Forest Service(USFS):** Region 4 Sensitive Species
- **Bureau of Land Management (BLM):** Nevada Special Status, designated sensitive by state office
- **Nevada Department of Wildlife (NDOW):** Nevada Protected Species
- **NNHP Global Rank:** G3—Vulnerable, at moderate risk of extirpation in the jurisdiction due to restricted range, relatively few populations or occurrences, recent and widespread declines, threats or other factors. G4--long-term concern, though now apparently secure, usually rare in parts of its range, or with very restricted range
- **NNHP State Rank:** S3--vulnerable to decline because rare and local throughout its range, or with very restricted range.



**Figure 3. Map of the greater sage-grouse habitat area in the state of Nevada, Bureau of Land Management Nevada Program update, 2016 Tri-RAC Meeting (Bureau of Land Management, 2016).**



This report reviews the status of the greater sage-grouse on the study area. Additionally, the report will provide a map of the potential habitat for the species on the study area.

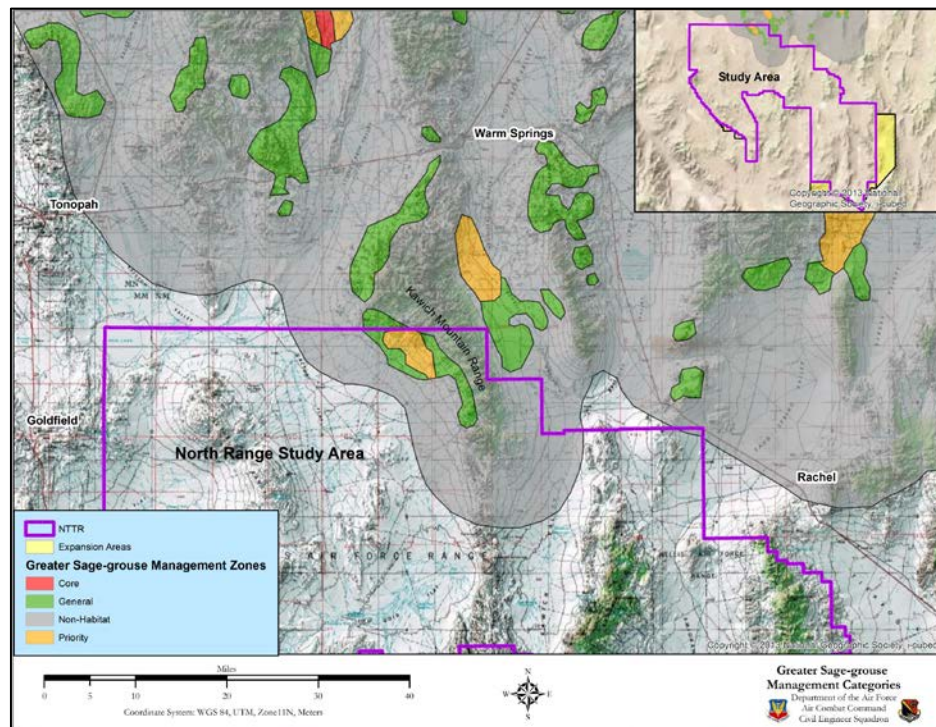


Figure 4. Management Category map showing more detail on categories found within the study area.

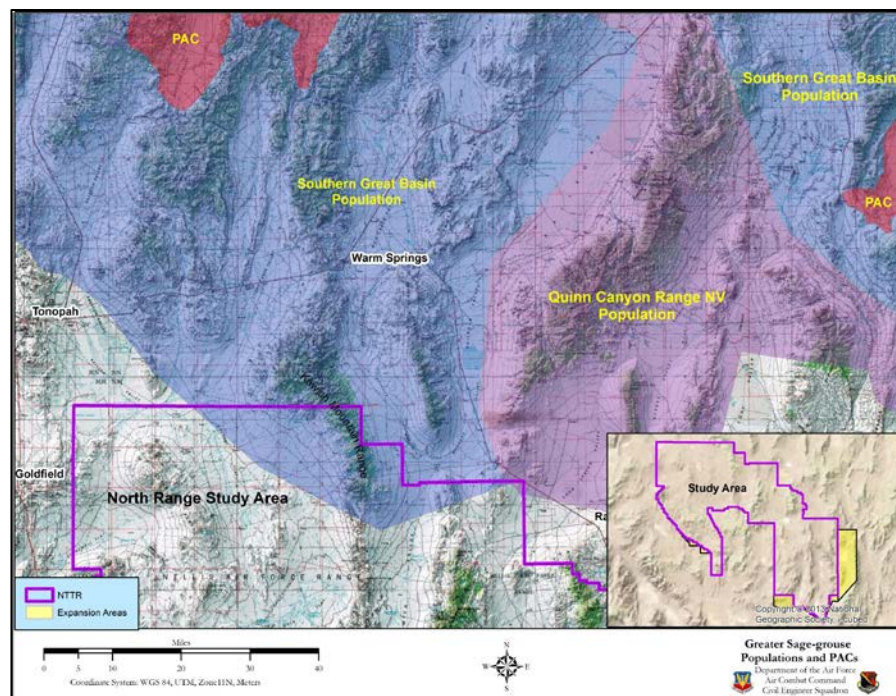


Figure 5. Sage-grouse populations and Priority Areas of Conservation (PAC).

## Methodology

### HELICOPTER SURVEYS

The BLM developed a potential habitat map for greater sage-grouse in 2004 (Figure 6). BLM's 2004 map and the 2006 Nevada Wildlife Action Plan sagebrush map were combined for determining areas to be surveyed in 2015. The only area potentially supporting greater sage-grouse was located on the foothills and upper basins of the Kawich Mountain Range in the North Range Study Area. These areas of potential habitat were selected for performing aerial surveys using a helicopter.

The Nellis Natural Resources Program (NNRP) has conducted two formal helicopter surveys of greater sage-grouse on the North Range Study Area. The first survey was conducted in cooperation with NDOW along the slopes of the Kawich Range in EC East and EC West in April 2005. The helicopter was flown at approximately 300 to 500 feet above the ground surface in parallel transects oriented in a north-south direction along the sagebrush habitat found on the foothills of the Kawich Range. In some areas, transects followed contours along canyons where sagebrush habitat intermingled with pinyon juniper habitat at

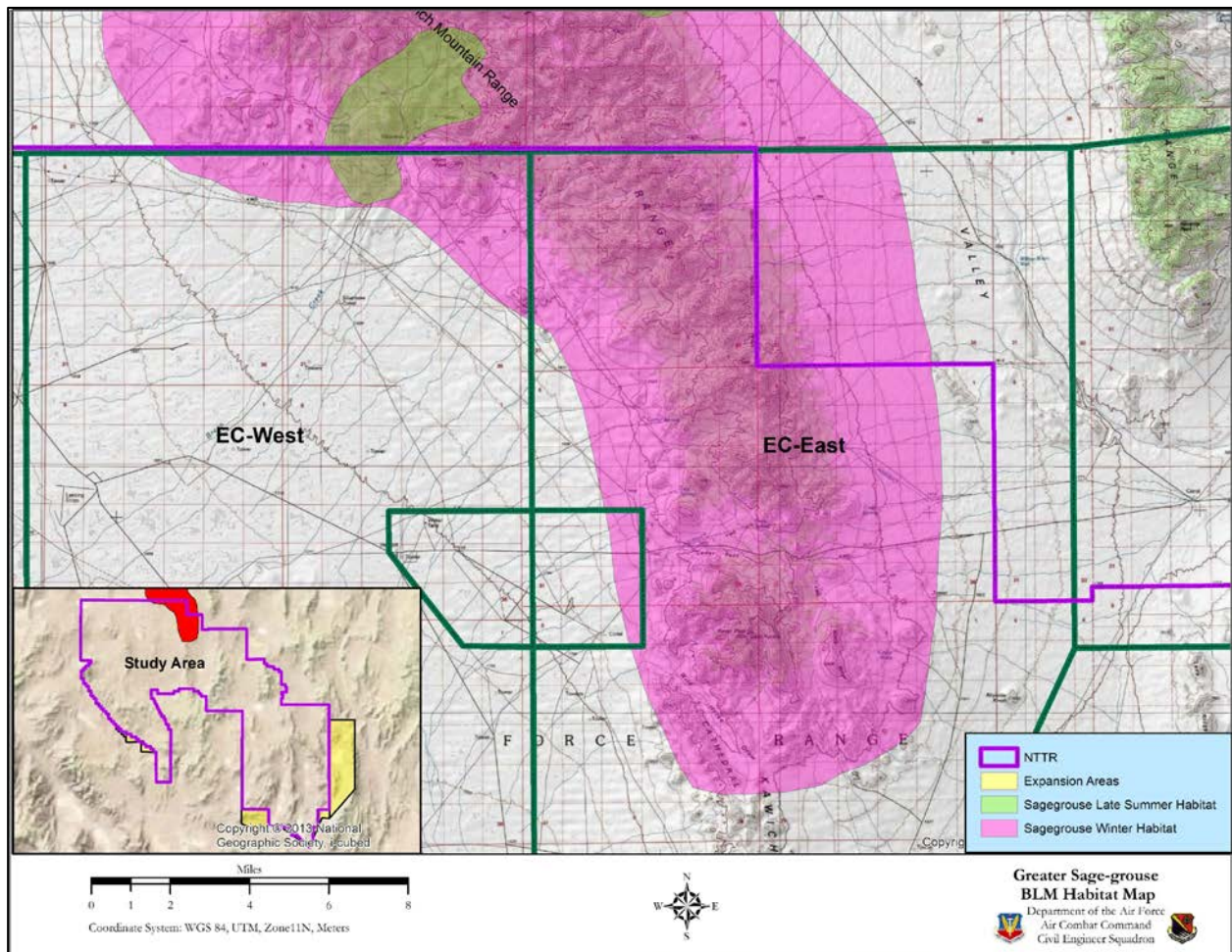
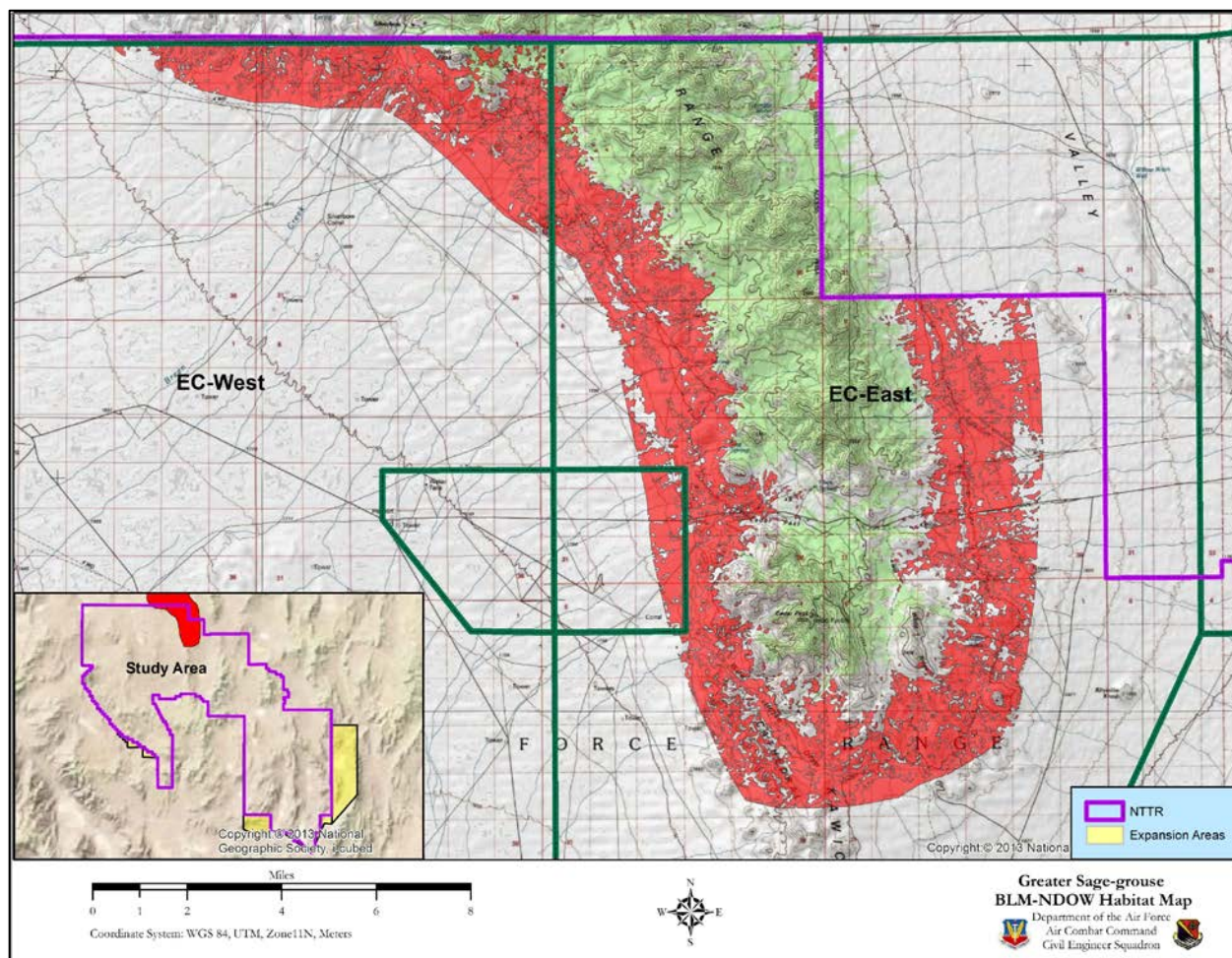


Figure 6. BLM greater sage-grouse habitat map.



higher elevations. Observers in the helicopter noted the quality of sage-grouse habitat and the location of any sage-grouse or leks observed. No sage-grouse or leks were observed during the surveys.



**Figure 7. Combination of BLM's 2004 greater sage-grouse habitat map and the sagebrush habitat map within the 2006 Nevada Wildlife Action Plan.**

In 2015, a second helicopter survey for greater sage-grouse was conducted. Survey methods followed the lek search procedures described in the Nevada Department of Wildlife South Central Nevada Sage-Grouse Conservation Plan prepared in May 2004 by the South Central Planning Team (The South Central Nevada Planning Team, 2004). The surveys were timed to coincide with greater sage-grouse peak lekking activities. This is the period when the birds are most easily observed as they display on leks to attract females during the mating season. Aerial lek searches were performed using an Airbus AS-350 helicopter. The helicopter was flown low (below 50 feet AGL) and slow (less than 50 MPH) in an attempt to flush the sage-grouse from cover. No leks had been identified in the Kawich Mountain Range prior to the survey and no new leks were detected during the survey.

All of the second survey efforts were concentrated in the Kawich Mountains and conducted on April 4 & 5, 2015, and April 12, 2015. Surveys were performed for approximately three hours after sunrise and flown to observe all potential habitat along the foothills of the entire Kawich Range. A third survey was conducted on the weekend of August 1 & 2, 2015, and was designed as a brood survey performed by helicopter and supplemented with ground surveys, which were implemented if good greater sage-grouse

habitat was observed. During the ground surveys, the areas were carefully inspected for the presence of fecal matter and feathers to determine sage-grouse presence.

## GROUND SURVEYS

In 2014 and 2015, a team of biologists conducted ground truth surveys for mapping vegetation on Range EC East on the North Range Study Area. During the 2015 vegetation surveys (Feb. 25; May 23; June 30-July 4; Sept. 16 and 18; and Oct. 10), habitat was evaluated for greater sage-grouse. Additionally, vegetation had previously been mapped for ECW and that data was reviewed for greater sage-grouse habitat quality based on plant community composition and physical attributes of the community recorded in the database. From these ground observations and vegetation data, the points indicating areas dominated by sagebrush species, including little sagebrush (*Artemisia arbuscula*), Bigelow sage (*A. bigelovii*), white sagebrush (*A. ludoviciana*), black sagebrush (*A. nova*) and big sagebrush (*A. tridentata*) were selected and subjected to further analysis to determine their potential for sage-grouse habitat. Three vegetative parameters were reviewed to rate the point as poor, fair, or good greater sage-grouse habitat (Table 1).

**Table 1. Parameters used to rate greater sage-grouse habitat.**

<b>Vegetative Attribute</b>	<b>Poor Habitat</b>	<b>Fair Habitat</b>	<b>Good Habitat</b>
Sagebrush Canopy Cover (%)	0-9	10-19	>20
Sagebrush Height (ft.)	<1	1-1.5	>1.5
Grass Canopy Cover (%)	0-5	5-15	>15

The rating scale was based on the Sage-Grouse Habitat Requirements Fact Sheet created by the University of Nevada, Reno (McAdoo, 2001). Optimal early brood-rearing habitat is generally comprised of sagebrush stands that are 16 to 32 inches tall, with a canopy cover of 10% to 25%. The herbaceous understories have approximately 15% grass cover and 10% herbaceous broadleaf plant cover. Sage-grouse hens prefer sagebrush to be one to three feet high. They excavate a hollow under one of the taller sagebrush plants within a stand for nesting (Sage Grouse Initiative, 2016). Grass species observed during the surveys were members of several genera including needlegrass (*Achnatherum*), sandwort (*Arenaria*), grama grass (*Bouteloua*), brome (*Bromus*), woollygrass (*Dasyochloa*), wildrye (*Elymus*), needle and thread grass (*Hesperostipa*), galleta grass (*Pleuraphis*), and bluegrass (*Poa*). The median of the three parameters was calculated to determine the potential sage grouse habitat rating for each survey point. Each survey point was tied to a class of vegetation, which was mapped and classified using satellite imagery. In most cases, a minimum of four survey points was associated with each class of vegetation. The ratings were then assigned to each vegetation class. The polygons representing each class were combined into new classes of sage-grouse habitat rating to create an overall map of the habitat in ECE and ECW.

No surveys were conducted in any other parts of the study area because sagebrush habitat was not present and the areas were not within the accepted potential range of greater sage-grouse, according to the habitat range maps (Figures 6 and 7).



## Discussion of Results

### HELICOPTER SURVEYS

In 2004, NNRP conducted a helicopter survey of the plant communities on the east and west sides of the Kawich Range and portions of the Belted Range to determine if greater sage-grouse, lekking grounds, or big sagebrush plant communities were present. This survey did not locate lekking grounds or live birds, but confirmed that habitat conducive to the species was present. The highest quality and most consistent habitat areas were found to be located on the west side of the Kawich Range.

During the 2011 field season, greater sage-grouse were identified in the Breen Creek area by NNRP during other wildlife surveys using helicopters. The sage grouse observed in 2011 were seen in July and September. On July 3 and 4, one adult and three juveniles were observed. During the second trip in September, two adults and four juveniles were identified (Figure 8). All observations were made during helicopter surveys for seeps and springs and other wildlife.

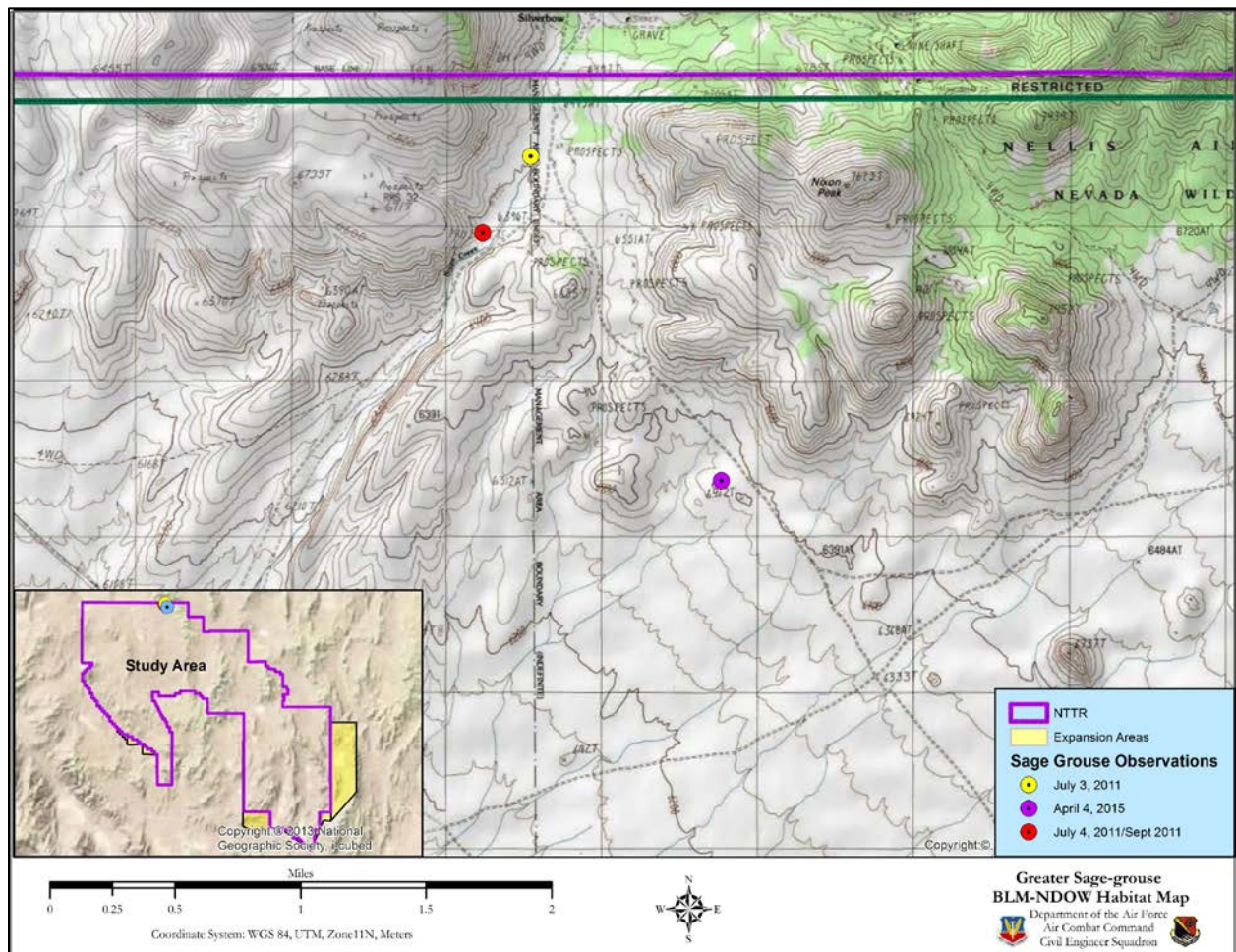


Figure 8. Locations where greater sage-grouse have been observed on the NTTR.

Potential sage-grouse habitat includes the transition zone between pinyon-juniper plant community and a true sagebrush plant community and the sagebrush plant community to the valley floor at the boundary where sagebrush is replaced by other species, such as shadscale saltbush, budsage, spiny hopsage (*Grayia spinosa*), and greasewood. No potential habitat was observed in the pinyon-juniper stands or on the

upper elevations of the Kawich Range during the three aerial surveys. Approximately 99% of the potential sage-grouse habitat in the Kawich Range is dominated by dwarf scrub species including spiny hopsage, budsage, and black sage (*Artemisia nova*), as well as short big sage (*Artemisia arbuscula*). The only suitable sage-grouse habitat identified during the surveys was found in Breen Creek on the west central side of the Kawich Range. Breen Creek is dominated by 2 to 4 ft. tall big sagebrush (*Artemisia tridentata*).

During the 2015 surveys, only two greater sage-grouse were identified and were seen approximately 0.25 miles south of Breen Creek (Figure 8). The birds were flushed by the helicopter from the top of a sandy hill and the birds were not positively identified. Ground surveys were conducted to confirm the presence of these two birds, but they were not found and the sighting was therefore considered only highly probable.

The August survey found no sage-grouse or broods. Brood habitat was identified at the head of Breen Creek and Hawes Creek and consisted of wet meadows containing grasshoppers and forbs. Ground surveys of the meadows did not detect any feathers or droppings.

The surveys concluded that habitat appeared to be restricted to a small area in and around Breen Creek. The majority of the Kawich Range supports fair to poor habitat, at best. One small population of greater sage-grouse was identified during the 2015 survey and past surveys in 2011. In all cases, the species was found in the good habitat identified in and around Breen Creek.

## GROUND TRUTH SURVEYS

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Vegetation and habitat surveys conducted in 2014 and 2015 found that the entire Kawich Range, with the exception of Breen Creek, contains only marginal sage-grouse habitat, little to no brood rearing habitat, and no leks. Biologists noted that the lack of a persistent population of sage-grouse was probably due to the fact that only a small area would be considered good habitat, and the springs in the habitat were dry and/or heavily used by wild horses, which resulted in damage to cover. Most of the habitat on the study area is very poor and provides little cover for sage-grouse. Sage-grouse populations are probably sporadic and visit the Breen Creek area during wetter seasons when the creek springs are flowing and forage species are present. The populations may also be residing in adjacent, preferred areas and migrate into the Breen Creek area when conditions in their preferred habitat are not ideal. Surveys for sage-grouse have not been documented for areas to the north of Breen Creek outside of the NTTR as of 2016.

The random occurrence of populations on the study area and the lack of evidence of leks and brooding areas in the good habitat further support the concept that this is not permanent habitat. Based on the current survey results, this sage-grouse population appears to be in the Breen Creek area sporadically in favorable years. Additional seasonal surveys should be conducted in the future to adequately characterize the habitat.

Ground truth surveys concur with the helicopter surveys in that the only good habitat observed within those ranges was found in and around Breen Creek. All other habitat was considered to be fair to poor with no known populations present.

## FINAL HABITAT MAP

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Based on the data from the ground truth surveys and helicopter surveys, greater sage-grouse habitat was mapped (Figure 9). Nearly all of EC East was determined to be fair to poor habitat using the criteria listed in Table 1. However, the biologists believed that the only good habitat is located in the northeast corner of EC-West. This was confirmed by the helicopter surveys and actual sightings of sage-grouse.



The final map prepared by the project indicates that the only suitable greater sage-grouse habitat identified during this study is located on the upper reaches of Breen Creek within the NTTR (Figure 9). The habitat map agrees with the priority habitat mapped by the 2016 Tri-RAC Meeting (Bureau of Land Management, 2016). Greater sage-grouse are not assumed to be in the remainder of the study area, including all expansion alternatives (3A-C), based on current distribution maps. The greater sage-grouse population observed in the Breen Creek area appears to be present sporadically.

In conclusion, it is recommended that the USAF minimize or avoid any impacts to the greater sage-grouse habitat delineated in Figure 9. Additionally, the combined greater sage-grouse habitat mapped by BLM and the sagebrush habitat mapped by the Nevada Wildlife Action Plan (Figure 7) should be surveyed for greater sage-grouse prior to any soil disturbing activities to ensure continued conservation of the species.

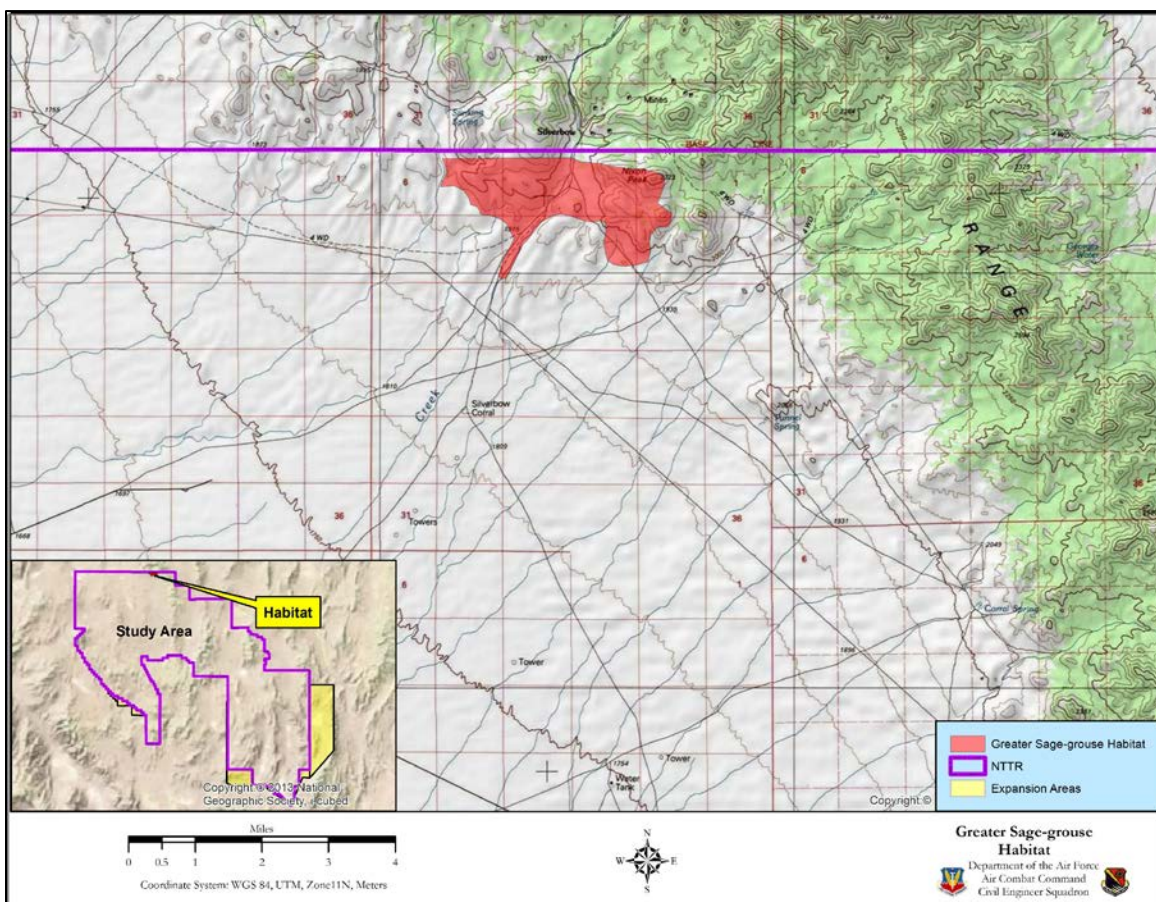


Figure 9. Greater sage-grouse habitat on and around the Kawich Range in the NTTR.

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