NEVADA TEST AND TRAINING RANGE (NTTR)

Land Withdrawal Application Packages/
Case File and Legislative EIS

SPECIAL STATUS SPECIES OF THE NEVADA TEST AND TRAINING RANGE AND PROPOSED EXPANSION AREAS

FINAL
October 2017

SPECIAL STATUS SPECIES OF THE
OF THE NEVADA TEST AND TRAINING RANGE AND PROPOSED EXPANSION AREAS
Final Report

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ABBREVIATIONS

99 CES/CEIEA	99th Civil Engineering Squadron/Installation Management Environmental Assessments Section
ACC	Air Combat Command
AFI	Air Force Instruction
BLM	Bureau of Land Management
CAFB	Creech Air Force Base
CCVI	Climate Change Vulnerability Index
CWA	Clean Water Act
DNWR	Desert National Wildlife Range
DoD	U.S. Department of Defense
DOI	U.S. Department of the Interior
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
GIS	Geographic Information Systems
GPS	Global Positioning System
INRMP	Integrated Natural Resources Management Plan
MSL	Mean Sea Level
NAFB	Nellis Air Force Base
NDCNR	Nevada Department of Conservation and Natural Resources
NDF	Nevada Division of Forestry
NDOW	Nevada Department of Wildlife
NDWR	Nevada Division of Water Resources
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NNRP	Nellis Natural Resources Program
NNSS	Nevada National Security Site
NRCS	Natural Resources Conservation Service
NTTR	Nevada Test and Training Range (98th Range Wing)
NWAP	Nevada's Wildlife Action Plan
NWHR	Nevada Wild Horse Range
SAR	Small Arms Range
STATSGO2	U.S. General Soil Map
USACE	U.S. Army Corps of Engineers
USAF	United States Air Force
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

INTRODUCTION

The United States 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 (NTTR). In addition to extending the current withdrawal, the USAF is evaluating several potential expansion alternatives. The current withdrawal will expire in 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 the Department of Defense (DoD), has notified 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 withdrawal proposal which will be submitted through the Department of the Interior (DOI) to extend the withdrawal.

As part of the LEIS process, the USAF is preparing documentation required to support the Application Package, Case File, and legislative language to successfully accomplish the NTTR land withdrawal by November 2021. To maintain critical test and training capabilities at the NTTR, the USAF must complete all required studies in compliance with the National Environmental Policy Act (NEPA), the *Engle Act*, *Federal Land Policy and Management Act*, the MLWA, and Land Withdrawals regulations set forth in Title 43 Code of Federal Regulations (CFR) Part 2300. The results of this Special Status Species Report are needed in order to comply with NEPA and Land Withdrawals regulations and support submittal of the Application Package to the Bureau of Land Management (BLM), provision of a Case File to the DOI, and development of draft legislation for Congressional approval of the withdrawal in accordance with applicable rules and regulations.

The scope of this report is to document historic and recent surveys and observations on the study area involving special status species that may be impacted by the land withdrawal renewal. The report focusses on locations where observations were made by qualified biologists and presents presence/absence information on the species. Data collected for the report were not intended to be used for population demographics and statistical analysis.

For this report, an advisory committee comprised of representatives from the USAF, BLM, U.S. Fish and Wildlife Service (USFWS), Nevada Department of Wildlife (NDOW), and the U.S. Geological Survey (USGS) prepared a list of special status species to be addressed by this report. The special status species were placed in two groups:

- State and Federal Listed Critically Imperiled Species: This list includes all species that have some level of status designated by the State of Nevada or the U.S. Fish and Wildlife Service (USFWS). Included in this list are species that have been designated as “Critically Imperiled” (S1) as a state ranking. Habitat ranges for these species will be prepared using habitat suitability models and will be presented in a separate report.
- Special Status Species: This list includes species of interest to state and federal agencies. In most cases, these species have state rankings of S2 (Imperiled) or S3 (Vulnerable to Decline). Some species with a State of Nevada status were included in this list. Habitat range models will not be prepared for these species.

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 sources of water are scarce across most of the study area. Annual precipitation ranges from 3 to 5 inches in the basins to 16 inches in upper elevations of mountains. Vegetation composition is strongly influenced by the levels of precipitation. Most of the active springs are found in the North Range Study Area, especially in the Kawich, Belted, and Cactus mountain ranges and Stonewall Mountain. Only five springs are found in the South Range Study Area. Most water sources for wildlife in the South Range Study Area are provided by wildlife water developments, which collect water from storm events and store it in water tanks.

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

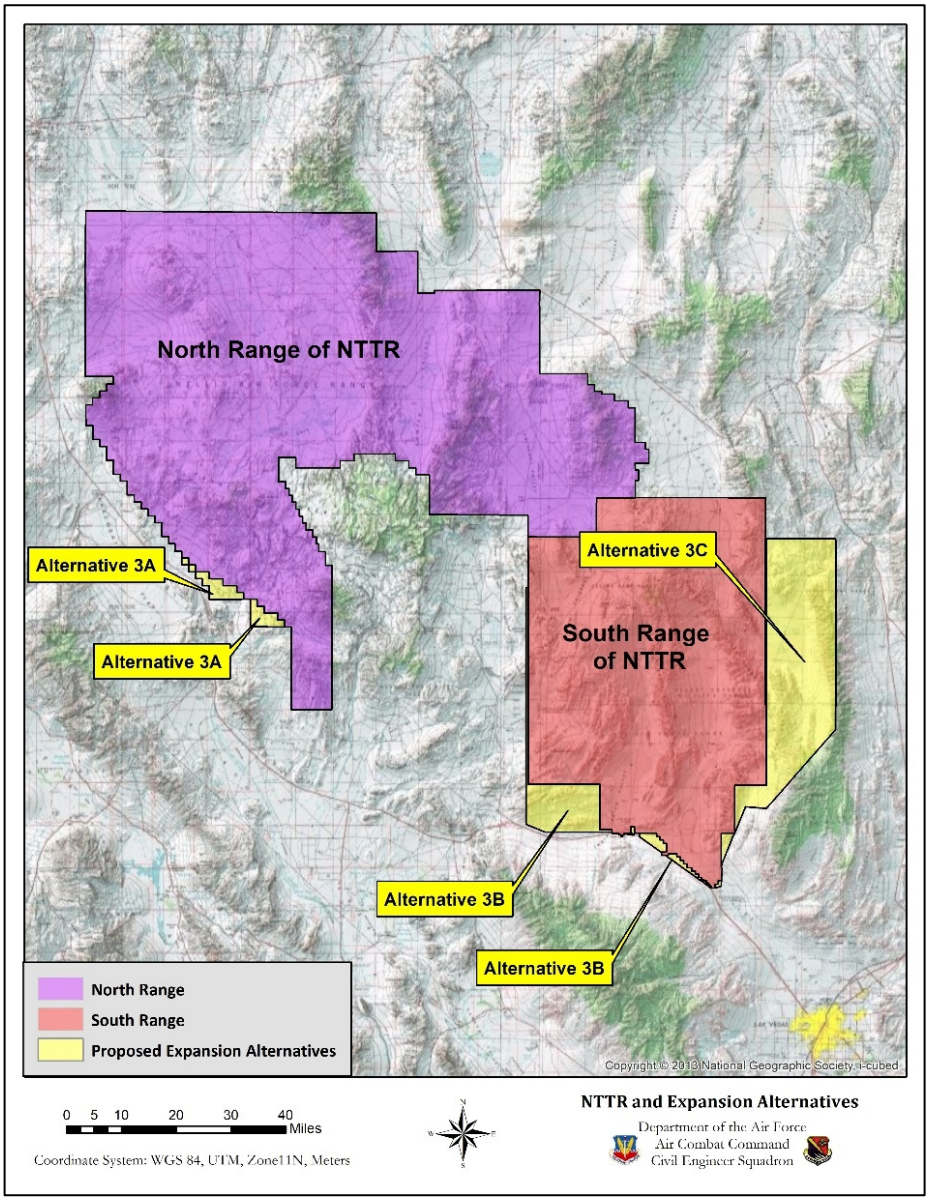


Figure 1. Location of the North and South Ranges of the NTTR as well as Alternatives 3A, 3B, and 3C

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.

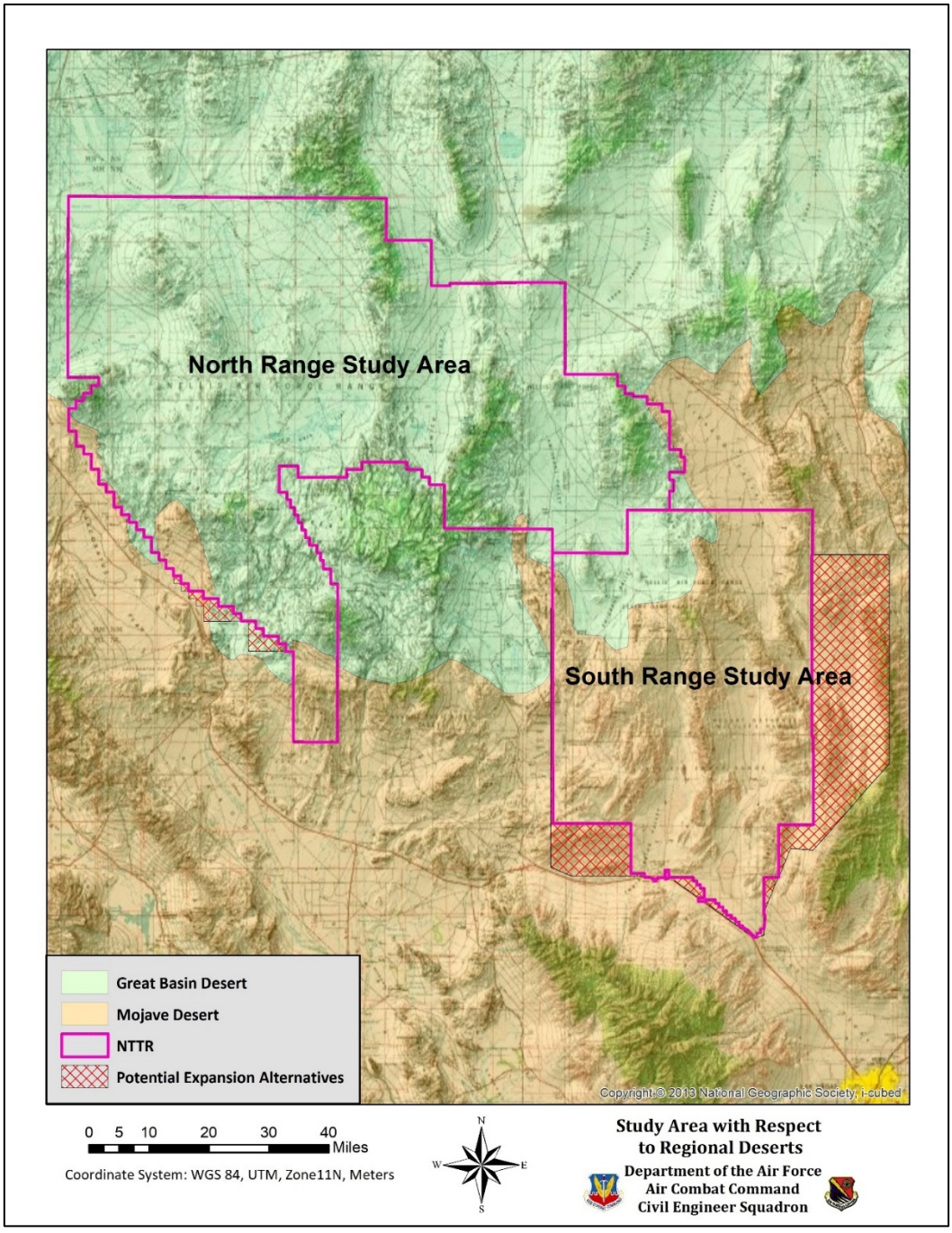


Figure 2. Location of the study area with respect to the Great Basin Desert and the Mojave Desert

Like the South Range Study Area, playas in the North Range Study Area contain little or no vegetation. From the boundaries of the playas to the base of mountains, plant communities are typically dominated by greasewood (*Sarcobatus spp.*) and shadscale (*Atriplex spp.*) in lower elevations and sagebrush (*Artemisia spp.*) in higher elevations. The upper elevations in the mountains are dominated by Utah juniper (*Juniperus osteosperma*) and pinyon pine (*Pinus monophylla*).

METHODOLOGY

This methodology section provides information on the methods used for Nellis Natural Resources Program (NNRP) surveys conducted on the NTTR during which special status species were positively identified and located by qualified biologists. Methodology used by Adams Ecology for breeding bird surveys on the expansion alternatives is also included. Data from historical surveys conducted prior to 2004 is also used in the report, but methodology is not provided for those surveys. Note that the intention of the surveys conducted by the NNRP and Adams Ecology was for monitoring and management of wildlife and vegetation. Databases were used to document the presence/absence of special status species and not for demographic or statistical population studies.

REPTILES AND AMPHIBIANS

Reptiles and amphibians are a diverse and variable group that lives in multiple types of habitats that have specific characteristics that are required for life support of each species. To identify and locate different species within the study area, multiple survey techniques were utilized. Reptile and amphibian surveys used for data for this report were conducted by NNRP from 2005 to 2015. Surveys conducted from 2005 to 2009 included a variety of survey methodology as well as incidental observations. Methodology for formal surveys conducted by the NNRP from 2010 to 2015 is discussed in the paragraphs that follow.

Diurnal Walking Surveys

Measuring the tail of a lizard

Diurnal surveys were conducted between April and October, 2010-2015 when daytime temperatures range between 75 and 90° F (Figure 3). While walking in a survey area, biologists visually search specific types of habitat for reptiles during daylight hours. The total area surveyed was dependent on the ease of mobility of the surveyors, which was influenced by the topography and ruggedness of terrain and density of physical and vegetative cover. Surveys covered less area when the surveyed area was rugged and rocky or vegetation was dense. The survey areas were approached on foot and biologists inspected brush litter and overturned rocks and logs that potentially sheltered reptiles. When a non-venomous reptile was observed, the individual was captured and the GPS coordinates, species, sex, weight, tail length, and total body length were recorded. Data was not collected using line distance or other survey methods capable of yielding population density estimates and other demographics. The intent of the surveys was to provide presence/absence information only.

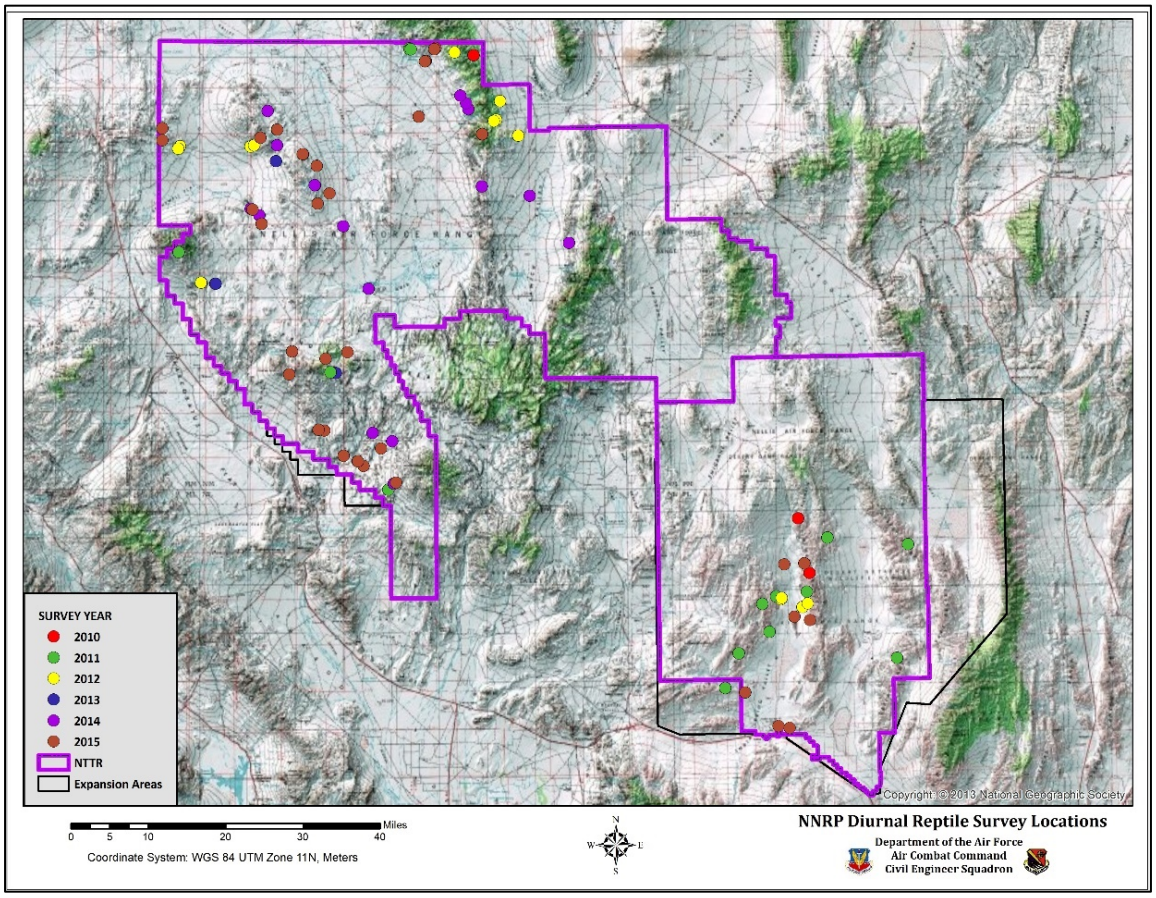


Figure 3. Locations where diurnal surveys were conducted on the NTTR from 2010-2015

Night Drives

Night drive surveys were conducted in the months of May, July, and August 2010-2015 to obtain information on nocturnal reptiles on the NTTR (Figure 4). Surveys were initiated after sunset when the reptiles were most active. Potential road sites were assessed prior to surveying to ensure they were paved and 5-20 miles long. Upon arrival at the survey road; air, soil, and pavement temperatures were obtained using a field digital thermometer. If temperatures were found to be within the allotted survey parameters, monitors proceeded to drive along the road at a maximum speed of 15 miles per hour, using high-beams or spotlights to illuminate the road. When a reptile was observed, the GPS coordinates and species of the individual were recorded. If captured, the sex of the reptile was determined and the weight, tail length, and total body length were measured.

Installing a pitfall trap on the NTTR

Pitfall Traps

Pitfall traps were utilized as a live trapping method for reptiles on the NTTR. Pitfall traps were installed in 2010 at two locations on the North Range Study Area--one along the Mud Lake boundary road and one at Mesic 3 on the west side of the Kawich Range (Figure 5). Each trap consisted of ten, 8-gallon buckets buried flush with the ground surface. The buckets were connected by 150 ft. of flashing, buried a few inches into the ground, to assist in funneling wildlife toward the bucket traps. The flashing was arranged in a Y configuration with three 50 ft. sections; one bucket was placed at the center and three buckets were located along each arm approximately 16 ft. apart. Traps were fitted with a cover for thermal and predator protection. Debris and similar material were placed at the bottom of each trap for cover and species separation. Trapping was conducted in 2010, 2011, 2013, 2014, and 2015. Additionally, each trap was fitted with a screw-top lid to prevent wildlife capture or injury during periods of non-use. Table 1 provides the total number of trapping nights for pitfall trapping for the two locations of pitfall traps. The NNRP plans to expand this type of trapping to other locations in the future.

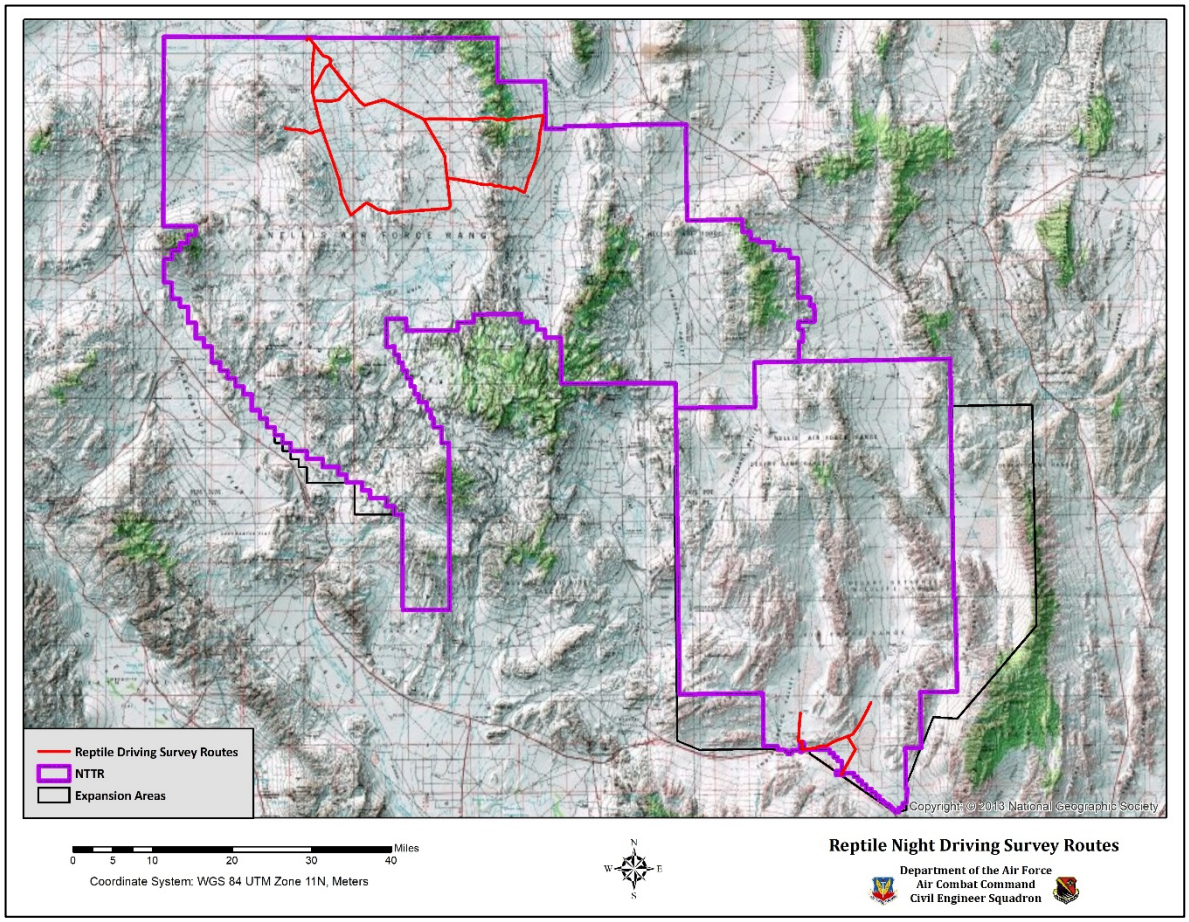


Figure 4. Routes used for reptile driving surveys on the NTTR

Funnel Traps

Funnel traps were installed to capture more evasive or reclusive species not collected using diurnal/nocturnal surveys or pitfall traps. Location of the trapping sites is provided in Figure 5. These surveys were conducted by NNHP in 2010, 2011, 2013, 2014, and 2015. The traps were constructed with wire mesh having a one-sided funnel entrance. Traps were placed under debris, near rocks and bushes, and other

features reptiles may use for cover. The traps were baited with meal worms. Data recorded for each capture included the GPS coordinates, species, sex, weight, tail length, and total body length. Live, non-venomous captures were marked using a non-toxic, felt-tipped pen for recapture identification to prevent duplication of data for the survey. Lizards were marked on the foot, snakes were marked on the neck.

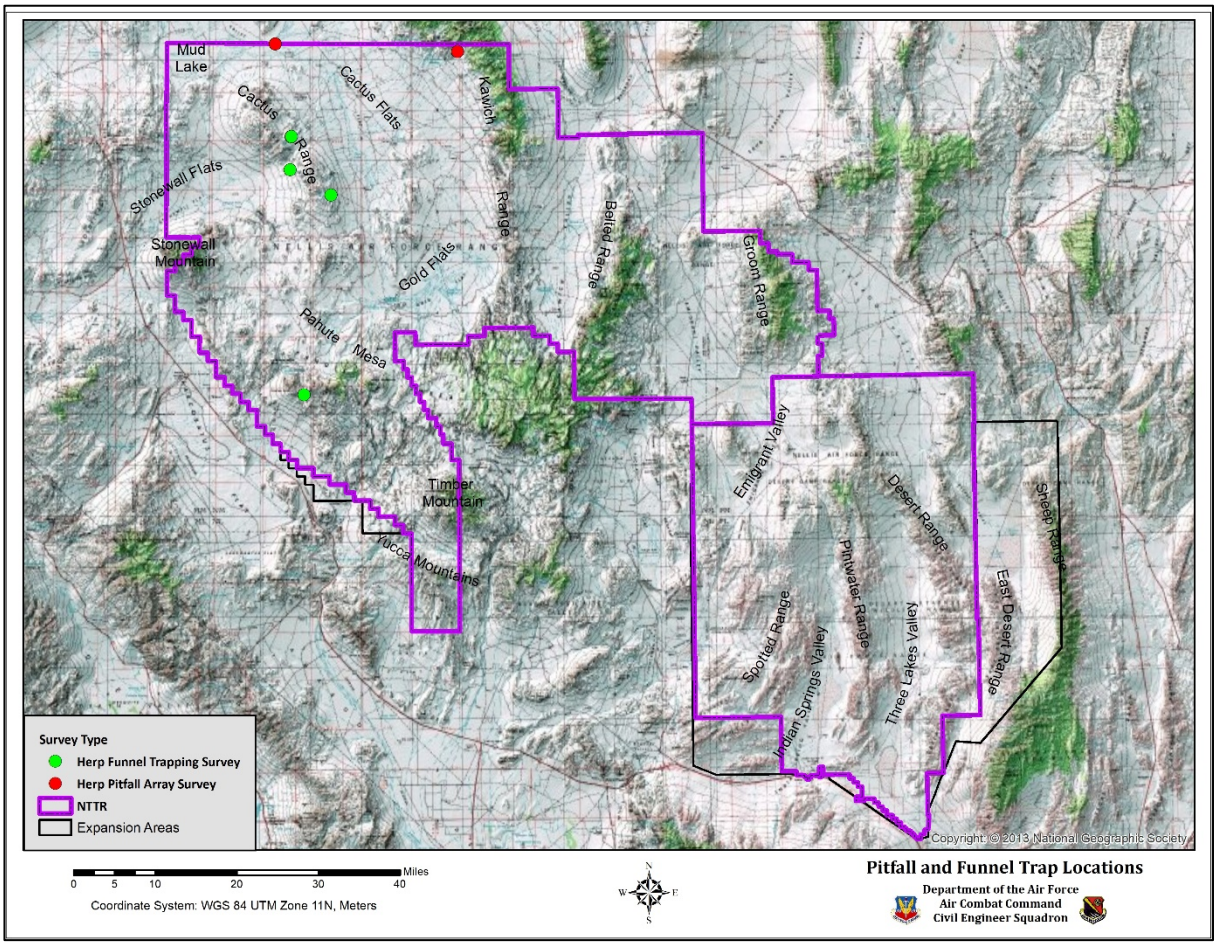


Figure 5. Locations where pitfall arrays and funnel traps for reptile surveys were located on the study area

Amphibian Surveys

Amphibian surveys were conducted at night on open, perennial water sources during breeding seasons for frogs and toads. In areas where toads were present, adults were captured and the species, sex, weight, and total body length measurements were recorded. Only one amphibian survey was conducted on the study area on Breen Creek on the west side of the Kawich Range on the North Range Study Area and concentrated on the Great Basin spadefoot. Twelve spadefoots were collected and measured.

Reptile and Amphibian Surveys Conducted on the NTTR from 2010-2015

Table 1 lists the number of reptile and amphibian survey days or nights conducted on the NTTR by NNRP from 2010-2015.

Table 1. Number of reptile and amphibian survey days or nights conducted on the NTTR from 2010 to 2015

Survey Type	2010	2011	2012	2013	2014	2015	Grand Total
Herp Diurnal Survey	4	8	10	3	19	35	79
Herp Funnel Trapping Survey	2	5	0	3	3	4	17
Herp Night Driving Survey	3	3	3	2	0	3	14
Herp Pitfall Array Survey	8	4	0	9	3	3	27
Amphibian Surveys	1	0	0	0	0	0	1
Grand Total	**18**	**20**	**13**	**17**	**25**	**45**	**139**

BATS

Mist Netting

Setting up a mist net on a playa on the North Range of the NTTR

Mist netting is the traditional bat survey method used by the NNRP at various locations on the NTTR. Bats were captured using mist nets consisting of 38 mm nylon mesh nets supported by a pole and rope system. Each net was approximately 8.5 ft. high and ranged from 20 ft. to 60 ft. in width. Mist nets were suspended over perennial and intermittent surface water features, including man-made ponds, watering troughs, springs, and areas where storm water accumulated. The mist nets were placed in position during the day, and then closed until surveys were conducted after dusk. Nets were opened at dusk and remained open for approximately three hours each night. Nets were checked frequently and captured bats were carefully removed from the nets and identified to species. Physical characteristics including weight, length of right front arm, age, and breeding status of the bats were also recorded.

Acoustic Monitoring

Anabat placement near a structure on the North Range of the NTTR

Passive acoustic monitoring for bats was accomplished by using AnaBat SD1™ units. These frequency division bat detectors produce an audio signal that is audible to humans and directly related to the frequency of the call emitted by the bat. A Zero-Crossing Analysis Interface Module (ZCAIM) then records the zero-crossings in the signal and stores it for later analysis. Analook sound analysis software was used to convert zero-crossings data into a graphic display of the echolocation call in frequency versus time display which was analyzed for patterns matching bat species. Anabats were used during some of the mist net surveys and placed at

entrances of mines and caves, water sources, and some structures where mist netting could not be conducted.

Fresh batteries were inserted into AnaBat units and their basic functions tested prior to use in the field. Compact Flash data cards were used for data storage. AnaBats were placed at survey sites in areas where a high level of bat activity was anticipated. The ultrasonic microphone was aimed skyward at approximately 45° to the ground surface. AnaBat division ratio was set to 16 for data recording. Sensitivity was adjusted so that wind and ambient noise were not recorded. Once adjusted, the recording level was checked by rubbing a thumb and forefinger together approximately 15 centimeters (cm) in front of the microphone and listening for the frequency divided signal. The recording mode was activated and the AnaBat was allowed to record throughout the night until survey teams returned in the morning. At the end of the survey session, Compact Flash data cards were downloaded to a computer.

Call sequences to be analyzed were cleaned by hand to remove fragmented calls, echoes, signal drop, and environmental noise. Call sequences with less than six calls were considered fragmented and removed from analysis. AnaLook was allowed to calculate call parameters using default settings. AnaLook measured 10 call parameters, including call duration, maximum, minimum, and mean frequency of the call, duration to the knee, frequency of the knee, duration of the body, frequency of the body, initial slope, and slope of the body. The knee is the point at which the slope changes from the initial downsweep to a flatter, more horizontal sweep. Calls were then compared to the known structural characteristics of call sequences for identification. If calls were analyzed using structural characteristics and results indicated more than one species, visual comparison to known calls was used to determine the bat species.

Removing a bat from a mist net

Bat Surveys Conducted on the NTTR

In 1997, an initial bat study was conducted for NNRP to identify species of bats on the NTTR (Nellis Air Force Base, 1997). Of twenty species that were identified to potentially occur on the NTTR, only six were captured during the field survey. Species captured during the survey included the long-legged myotis (*Myotis volans*), fringed myotis (*M. thysanodes*), California myotis (*M. californicus*), canyon bat (*Parastrellus hesperus*), Townsend's big-eared bat (*Corynorhinus townsendii*), and pallid bat (*Antrozous pallidus*). Of the observed bat species, the pallid bat and fringed myotis are state-listed as "Protected Mammals," and the Townsend's big-eared bat is state-listed as "Sensitive Mammals" (Nevada Administrative Code, 2009). No federally listed species were observed during the 1997 survey.

During the period from 2008-2015, thirty-eight acoustic monitoring survey sessions and nineteen mist net surveys were conducted at different locations on the NTTR by the NNRP (Figure 6).

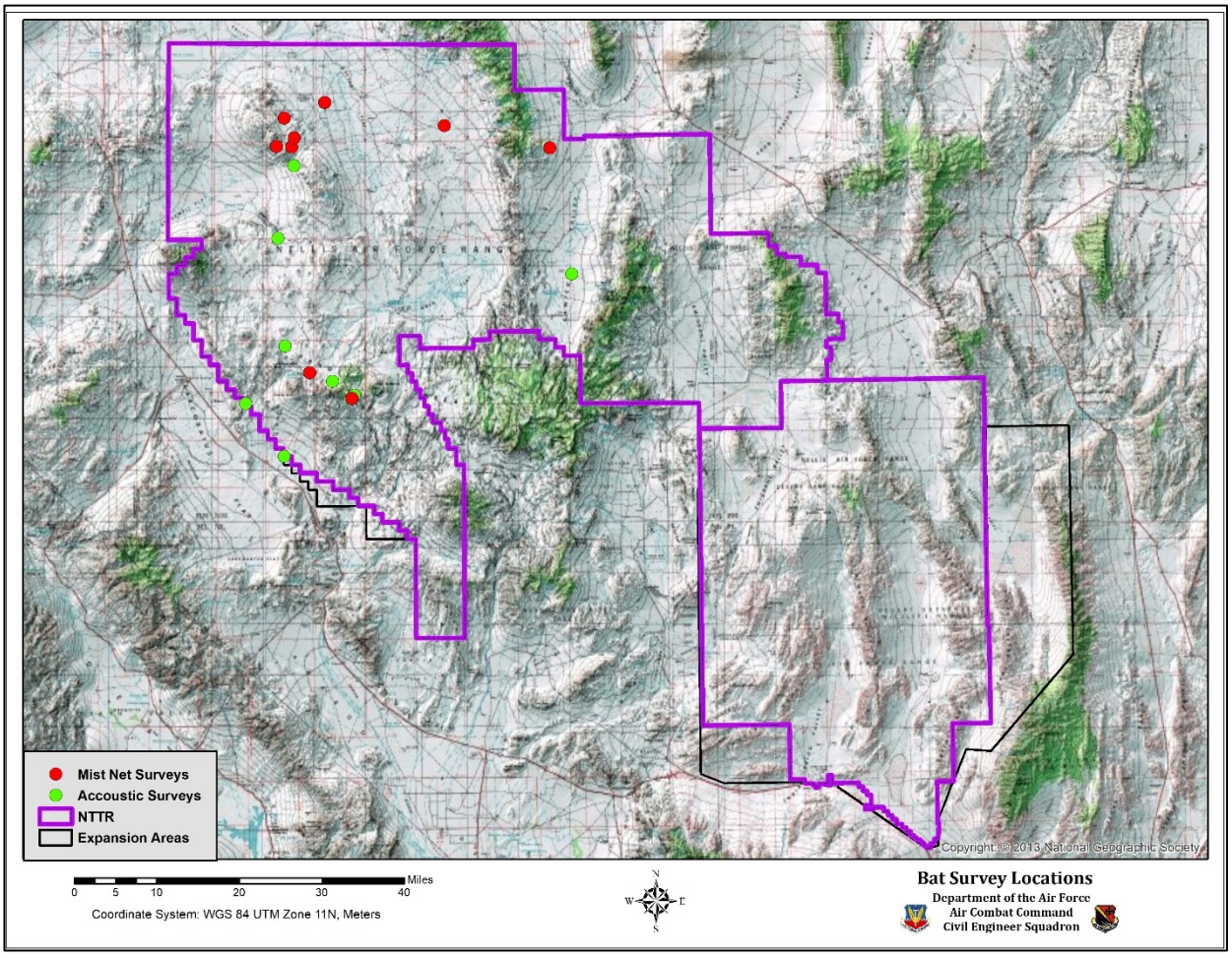


Figure 6. Locations where bat surveys were conducted by NNRP on the NTTR from 2008 to 2015

SMALL MAMMALS

Small Mammal Live Trapping Surveys

Since 2005, small mammal live trapping surveys have been conducted annually on the NTTR to gather data on species diversity, distribution, population size estimates, and habitat. The trapping sites were chosen based on key habitat characteristics, vegetation types, and areas which might be developed or disturbed in the future for the military missions. Folding Sherman traps (3"x 3.75" x 12") were baited with a peanut butter/oatmeal mix for surveys. At each site, forty-five traps were typically arranged in three linear rows of fifteen traps spaced approximately fifteen feet from each other and positioned to encompass a representative portion of a potentially disturbed area or key habitat. Traps were

Measuring the body length of a kangaroo mouse

checked and re-baited as required each morning, usually for three consecutive days. The data recorded for each mammal captured included species, sex, age class, body weight, and reproductive condition. Ear, hind foot, tail, and total body length measurements were also obtained. Live captures were marked by removing a small portion of body hair from the animal's hind quarters to identify all recaptures and prevent duplicate sampling. All trapping locations were mapped in the field using a Garmin GPS. Figure 7 shows the locations where small mammal trapping surveys were conducted from 2003-2015 on the NTTR. All surveys were conducted by the NNRP with the exception of surveys conducted in 2003, which were conducted by John C. Hafner.

Small Mammal Surveys conducted from 2005 to 2015 on the NTTR

Small mammal surveys were initiated by the NNRP in 2005 and have continued annually through 2015. Including the survey conducted by Hafner in 2003, eighty 2-3 day surveys from 2003-2015 have been conducted on the NTTR. The number of sites surveyed each year is provided in Table 2.

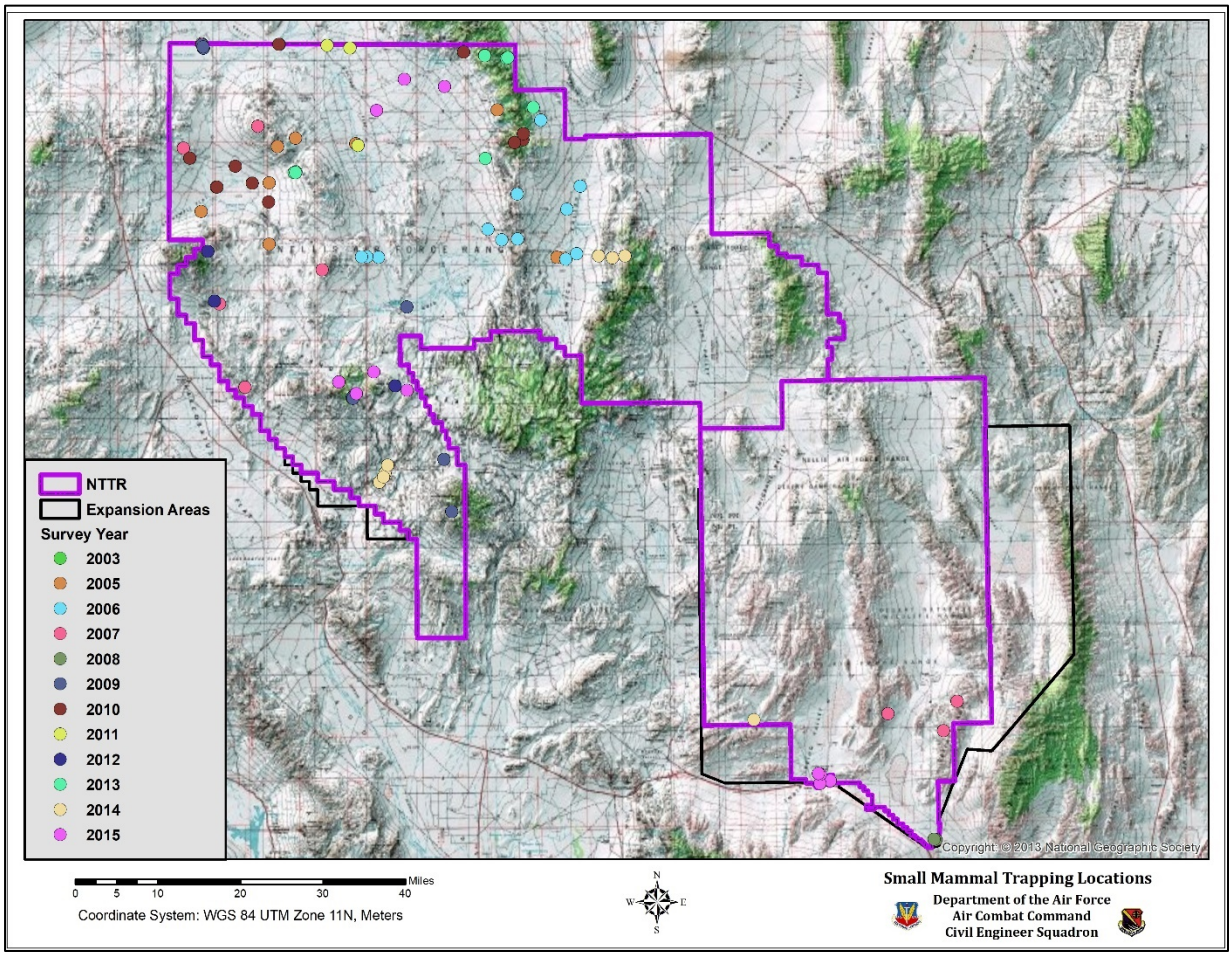


Figure 7. Locations where small mammal trapping surveys were conducted from 2003-2015 on the NTTR

Table 2. Number of small mammal survey sites reported by year

Year	Number of Surveys
2003	1
2005	6
2006	12
2007	9
2008	2
2009	9
2010	11
2011	3
2012	3
2013	6
2014	7
2015	11
Total	**80**

MIGRATORY BIRDS

Five types of migratory bird surveys have been conducted by NNRP on the NTTR from 2007 to 2015:

- Seasonal raptor surveys
- Helicopter surveys for nesting raptors
- Breeding bird surveys
- Stationary point counts
- Christmas bird counts.

Ferruginous hawk flying over the North Range of the NTTR

Seasonal Raptor Driving Surveys.

Seasonal raptor surveys were conducted by the NNRP from 2007 to 2015 by driving 20-mile permanent transects, usually located along a powerline (Figure 7). A total of ten permanent driving transects have been established, with seven on the North Range Study Area, and three on the South Range Study Area. Location of the surveys was determined by the presence of a passable road preferably adjacent to a powerline. These surveys were conducted bi-annually, during the winter and summer seasons. Data collected included species, habitat, distance from road, and height from the ground. In addition to raptor species, information on ravens and loggerhead shrikes was also recorded due to their predatory behaviors.

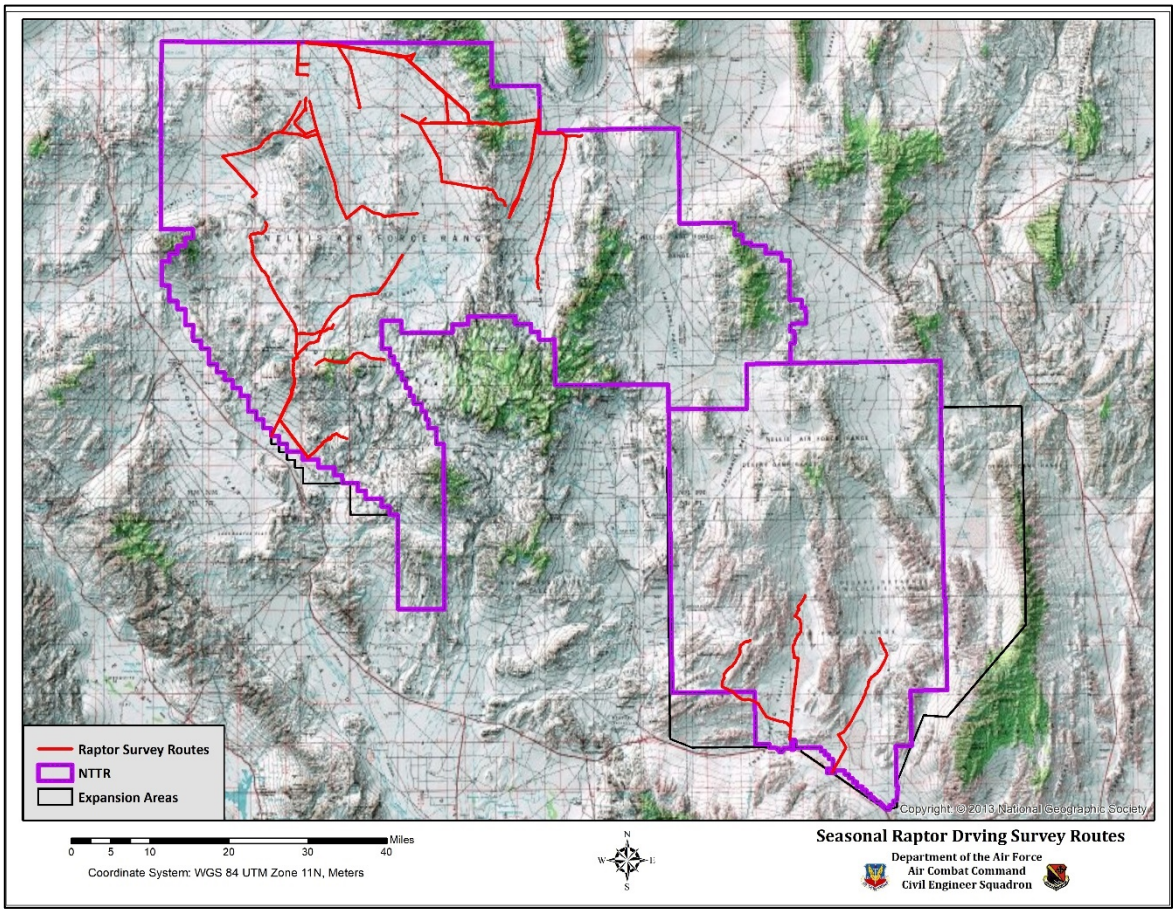


Figure 8. Routes used for seasonal raptor driving surveys conducted by the NNRP from 2007 to 2015 on the NTTR

Nesting Raptor Surveys

The NNRP conducted nesting raptor surveys in 2007, 2009-2011, and 2013-2015 (Figure 9). Nesting raptor surveys consisted of flying helicopter transects over Joshua tree or cliff and canyon habitat and recording raptors observed nesting. The surveys were flown at approximately 60 mph to maximize the number of trees or cliff faces surveyed. Transects were spaced approximately 0.10-0.25 miles apart, depending on Joshua tree density or topography. For cliff raptors, transects were flown in close proximity to cliff faces potentially supporting eyries or stick nests at approximately 200 ft. intervals in height along the cliff face. All nests were located with the use of a GPS and information on nest characteristics was recorded. Data that were recorded included cliff height, cliff length, cliff aspect, cliff elevation, nest elevation, nest material, nest height from the cliff base, nest dimensions, nest type, nest

Peregrine falcon

aspect, and nest condition. If the nest was active, the number of eggs or young, age of young, and number of adults present were also recorded.

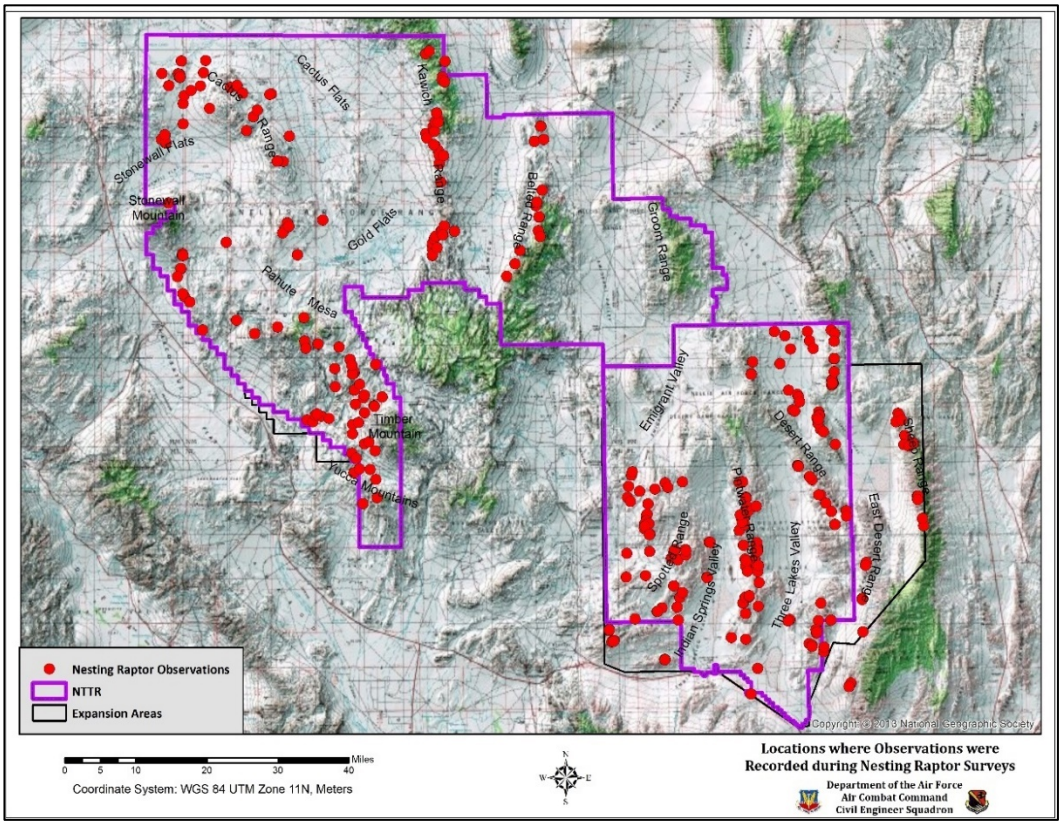


Figure 9. Locations where nesting raptors were observed during nesting raptor surveys conducted by NNRP or Adams Ecology on the study area from 2007-2016

Breeding Bird Surveys.

Breeding bird surveys were conducted by NNRP in accordance with protocol developed by the Great Basin Bird Observatory (GBBO) (Great Basin Bird Observatory, 2005). These surveys are point-count transects placed in uniform habitat (Figure 10). Each transect is approximately 1.5-2.0 miles long, and includes ten survey points spaced 800-1,000 ft. apart along the line. At each point count location, the observer records all species of birds seen and heard during a span of 10 minutes. Surveys were always scheduled during the breeding season. Surveys were initiated around sunrise and completed by 10 am. Information recorded included the number and species of birds observed, distance of each bird from the observer, and each bird's breeding status, if known. For this report, only locations of observations of special status species is being documented. Surveys were not conducted to determine bird population densities, only to provide presence/absence information.

In 2016, this type of survey was completed on the expansion areas. Starting points, or anchoring points, were established by a committee comprised of representatives from the USFWS, BLM, NDOW, USAF, and contractors to provide a representative sample of the major key habitats in the expansion areas. Anchor points were placed near roads to allow for good accessibility and to avoid use of helicopters. Transects usually ran perpendicular to the road. At each point count location on a transect, the observers recorded all species of birds seen and heard during a span of 10 minutes according to the protocol (Great Basin Bird Observatory, 2005). Survey teams were comprised of one observer (biologist) and one assistant observer to record observations.

Stationary Point Counts.

Stationary bird counts were fixed-location surveys lasting one hour, with 1-3 biologists recording all bird species seen or heard during that hour. Surveys primarily occurred in the spring and summer during breeding seasons, and to a lesser extent, during fall migration. These counts were typically conducted at either natural or developed perennial water sources. Isolated pockets of water in the desert environment attract many species of birds that would otherwise not occur in the area, and therefore give a more complete view of the species utilizing the surrounding habitat. Information recorded included the observation time, number and species of birds observed, distance of each bird from the observer, and each bird's breeding status if known.

Christmas Bird Count Surveys.

Christmas bird count surveys were initiated in 2014, and were modeled after Audubon's annual event. Surveys were conducted in mid-December in 2014 and 2015 and restricted to a single day (per Audubon). Multiple groups travelled to separate areas and remained at the location until all birds present in the area had been recorded. Thus, surveys typically lasted from 15 minutes to two hours. Each group was assigned a designated survey route and counted all birds observed on that route.

Migratory Bird Surveys Conducted on the NTTR from 2007 to 2015

As of 2015, 411 stationary point count surveys, 11 raptor driving surveys, 4 raptor nesting surveys, 106 winter raptor surveys, and 44 Christmas bird count surveys have been completed on the NTTR. A total of 56 breeding bird surveys have been completed on the NTTR. In 2016, 56 breeding bird surveys were completed on the expansion alternatives of the study area (Figure 10).

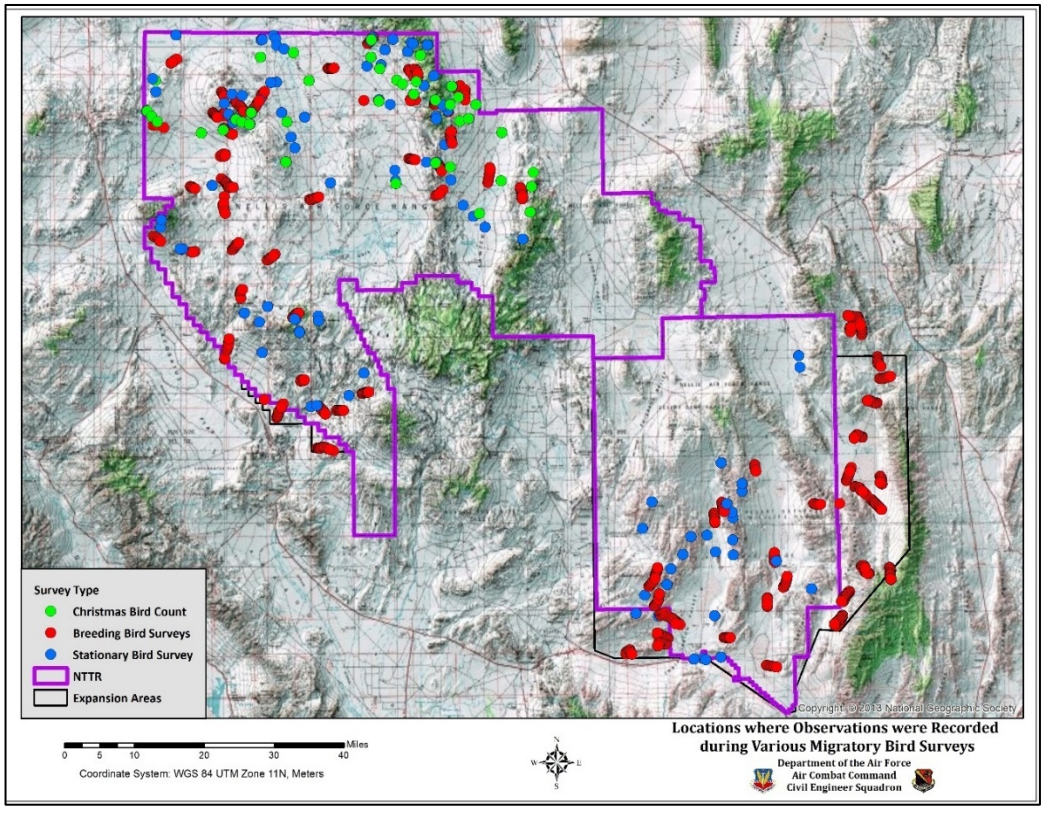


Figure 10. Locations of observation points where NNRP or Adams Ecology conducted various migratory bird surveys on the study area from 2007-2016

NEVADA STATE AND FEDERAL LISTED OR CRITICALLY IMPERILED SPECIES

For the purposes of this report, two lists of animal and plant species were developed. The list of special status species was initially developed using a database search of the study area for documented observations of special status species (plants, animals, insects, gastropods, and bryophytes) prepared by the Nevada Natural Heritage Program (NNHP) (Nevada Natural Heritage Program, 2016A). The list of species was subjected to a thorough review by cooperating agencies including NDOW, USFWS, U.S. Geological Survey (USGS), and the BLM. During the review process, species were selected for two different lists based on the consensus of the agencies. The placement of a selected species on Table 3 or Table 4 was determined by the agencies and was usually based on the regulatory status of the species and potential for the species to be found on the study area. The USFWS assisted in finalizing the list and determining the final members of each table. The first list included those species that have been granted some level of status on state or federal endangered and threatened species lists or were of special interest to cooperating agencies (Table 3). The second list included all plant and animal species that were usually categorized with a state status of S2 to S4, but of special interest to cooperating agencies (Table 10). Figure 11 shows the area used to select documented species observations from the NNHP database. The search area for the NNHP database was arbitrarily drawn to include all of the study area with an approximate 1,000 to 1,500 ft. buffer from the boundaries.

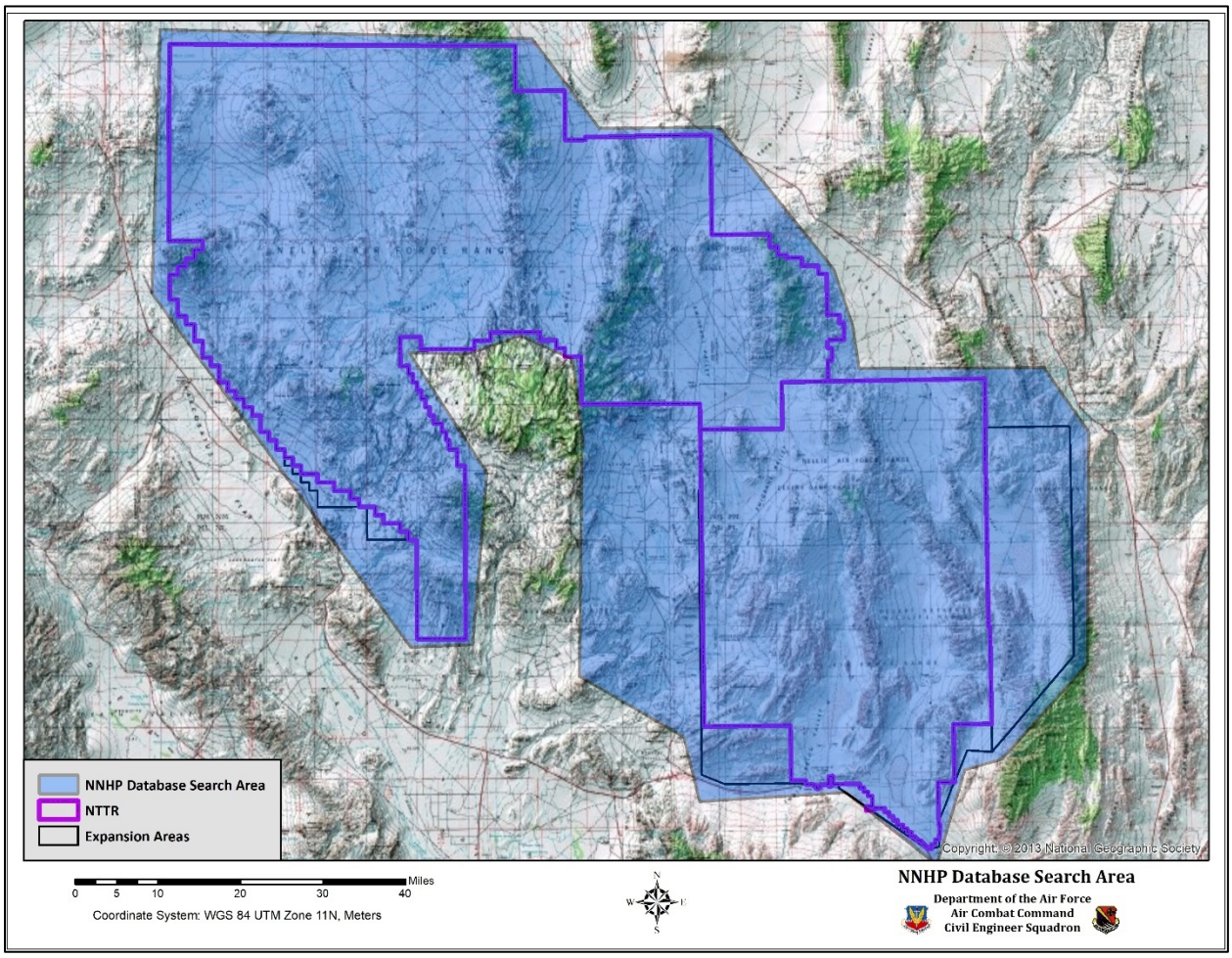


Figure 11. Area used for determining documented observations of special status species in the NNHP Database

The special status species listed in Table 3 will be discussed in detail in this report and will be subjected to habitat suitability modeling in a separate report. In the paragraphs that follow, each of the species listed in Table 3 will be described in detail. Maps showing the locations of observations are provided if recent (in the last 10 years) or historical observations have been made in or around the study area. If the map shows observation points outside of the study area, they are historic observations that were documented in the NNHP database or other databases and were included to provide information on species observations within the vicinity of the study area. If a map is not included with a species, no observations have been documented in or around the study area. Sage-grouse and desert tortoise are not included in this report because they are discussed in detail in separate reports for those species.

Table 3. Wildlife species that have been designated some level of status on state and federal lists or have a state ranking of S1, critically imperiled species

SCIENTIFIC NAME	COMMON NAME	STATE RANK-ING	GLOBAL RANK-ING	USWFS	NEVADA STATUS	BLM STATUS	USFS STATUS	NDOW WILDLIFE ACTION PLAN
AMPHIBIANS								
Anaxyrus nelsoni	Amargosa toad	S2	G2	None	PA	S	None	SOCP
Lithobates pipiens	Northern leopard frog	S2S3	G5	None	PA	S	None	SOCP
REPTILES								
Gopherus agassizii	Mojave Desert Tortoise*	S2S3	G3	LT	TR	S	T	SOCP
Heloderma suspectum cinctum	Banded Gila monster	S2	G4T4	None	PR	S	None	SOCP
BIRDS								
Accipiter gentilis	Northern goshawk	S2	G5	None	SB	S	S	SOCP
Centrocercus urophasianus	Sage-grouse*	S3	G3G4	C	PB	S	S	SOCP
Lanius ludovicianus	Loggerhead shrike	S4	G4	None	SB	S	None	SOCP
Spizella breweri	Brewer's sparrow	S4B	G5	None	SB	S	None	SOCP
Toxostoma bendirei	Bendire's thrasher	S1	G4G5	None	None	S	None	SOCP
MAMMALS								
Antrozous pallidus	Pallid bat	S3	G5	None	PM	S	R5S	None
Chaetodipus penicillatus	Desert pocket mouse	S1S2	G5	None	None	None	None	SOCP
Corynorhinus townsendii	Townsend's big-eared bat	S2	G3G4	None	SM	S	R4S, R5S	SOCP
Microdipodops megacephalus albiventer	Desert Valley kangaroo mouse	S2	G4T2	None	PM	S	None	SOCP
Microdipodops pallidus	Pallid kangaroo mouse	S2	G3	None	PM	S	None	SOCP
Microtus montanus fucosus	Pahranagat Valley montane vole	S1S2	G5T2	None	SM	None	None	None
Myotis thysanodes	Fringed myotis	S2	G4	None	PM	S	R5S	SOCP
Tadarida brasiliensis	Mexican free-tailed bat	S3S4B	G5	None	PM	S	None	SOCP
GASTROPODS								
Pyrgulopsis fausta	Corn Creek pyrg	S1	G1	None	None	None	None	SOCP
BRYOPHYTES								
Entosthodon planoconvexus	Planoconvex cordmoss	S1	G1	None	None	None	None	None
INSECTS								
Neivamyrmex nyensis	Endemic ant	S1	G1	None	None	None	None	None
Pseudocotalpa giulianii	Giuliani's dune scarab	S1	G1	None	None	S	None	None
Aegialia magnifica	Large Aegialian scarab	S1	G1	None	None	S	None	None

SCIENTIFIC NAME	COMMON NAME	STATE RANK-ING	GLOBAL RANK-ING	USWFS	NEVADA STATUS	BLM STATUS	USFS STATUS	NDOW WILDLIFE ACTION PLAN
Miloderes sp.	Big Dune Miloderes weevil	S1	G1	None	None	S	None	None

***:** *Sage-grouse and desert tortoise are not addressed in this report because they have been addressed in their own separate reports for the NNRP program.*

***None:** The agency has not established a status for the species and, therefore, the species is not afforded protection under the regulations of that agency.*

USFWS Status:

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

C - Candidate for listing as Threatened or Endangered

BLM Status:

S - Nevada Special Status Species, USFWS listed, proposed, candidate species or otherwise protected by Nevada state law

USFS Status:

S - Sensitive Species

R5S - Region 5 Sensitive

State of Nevada Status:

PA - Protected Amphibian (NAC 503.075.2)

PR - Protected Reptile (NAC 503.080.1)

TR - Threatened Reptile (NAC 503.080.2)

PB - Protected Birds (NAC 503.050.1)

SB - Sensitive Birds (NAC 503.050.3)

PM - Protected Mammal (NAC 503.030.1)

SM - Sensitive Mammal (NAC 503.030.3)

Global Rank or State Rank:

G - Global rank indicator, based on worldwide distribution at the species level

T - Global trinomial rank indicator, based on worldwide distribution at the intraspecific level

S - State rank indicator, based on distribution within Nevada at the lowest taxonomic level

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, abundant populations or occurrences, with little to no concern from declines or threats.

B - Breeding - Conservation status refers to the breeding population of the element in the nation or state/province.

NDOW Wildlife Action Plan:

SOCP – Species of Conservation Priority

AMARGOSA TOAD

Regulatory Status:

- United States Fish and Wildlife Service: None
- U.S. Forest Service: None
- Bureau of Land Management: S
- State of Nevada: Protected Amphibian
- Nevada Department of Wildlife: SOCP
- Nevada Natural Heritage Program Global Rank: G2
- Nevada Natural Heritage Program State Rank: S2

Amargosa toad
(Photo by Glenn Clemmer, NNHP)

BACKGROUND INFORMATION

The Amargosa toad (*Anaxyrus nelsoni*) is a member of the family Bufonidae which includes true toads found in North America. Amargosa toads initiate breeding in mid-February and females typically lay up to 6,000 eggs. The

tadpoles require relatively open, persistent water allowing sufficient time to metamorph into terrestrial, young toads. The breeding season usually ends in July (U.S. Fish and Wildlife Service, 2016). Adult toads tend to congregate at breeding sites during the breeding season making the breeding season an excellent time for surveys (Nevada Natural Heritage Program, 2016). The eggs develop into tadpoles within a week, and tadpoles into toadlets in about 4 weeks. Toads reach sexual maturity in two to three years with the average adults living nine to twelve years (U.S. Fish and Wildlife Service, 2016). The adult toad's diet is dominated by invertebrates including spiders, insects, and scorpions. During the day, Amargosa toads find cover and shelter in burrows, debris piles, or dense vegetation (U.S. Fish and Wildlife Service, 2016).

Initial efforts were made to have the Amargosa toad listed for federal protection because it was believed that the population was rapidly dropping due to habitat loss, urbanization of the region, off-road vehicles, over-grazing and competition with non-native animal species (bullfrog and crayfish) (U.S. Fish and Wildlife Service, 2016). Other factors that appeared to be adversely affecting toad populations were feral burro grazing, flood control, and commercial development (Jones, 2003). Encroachment of non-native saltcedar also was found to be degrading toad habitat (Burroughs, 1999). In 1995, after reviewing the 12-month findings for the listing of the Amargosa toad, the USFWS determined that the supporting data did not warrant listing of the species (U.S. Fish and Wildlife Service, 1996). In 2000, a cooperative conservation agreement was established by several agencies to protect the Amargosa toad (Nevada Division of Wildlife, 2000). The agreement stated that initial surveys for all sites indicate an adult population of over 4,700 toads (Stein, Hobbs, & Wasley, 2000). Annual surveys, population monitoring, and habitat restoration efforts as a result of the conservation agreement have had a positive impact on the protection and management of this toad. Current surveys indicate that the populations are increasing.

Amargosa toads prefer perennial water sources such as desert springs and streams. These areas are usually dominated by cottonwood, cattails, and sedges. At night, the toads may be found around street lights to feed on insects (Burroughs, 1999). The toad has been identified in springs along the Amargosa River, in tributary springs of the Amargosa River in Oasis Valley, and isolated springs north of Beatty (U.S. Fish and Wildlife Service, 2010).

RECENT AND HISTORICAL OBSERVATIONS

All of the observations of the Amargosa Toad have been made in the Amargosa River Valley and Oasis Valley north of Beatty. The earliest recorded observation was made in 1891 and included two observations in two locations. The next documented observation was made in May 1996. In 1998, NDOW and USFWS tagged 6 toads. The next year, NDOW and USFWS tagged 17 toads (11 males and 6 females). In 2000, one toad was tagged by BLM. Three female toads were tagged by NDOW in 2003. In 2008, the population at one location was estimated to be 139 toads which was listed as being 72% below the 10-year average of 499 toads.

NDOW conducts annual surveys to monitor the status of the species in the Amargosa River Valley. Data from these surveys was not available for use in this report, but NDOW indicated that the data is showing a steady improvement in the toad population. The species has not been observed within the boundaries of the study area, although Alternative 3A is in close proximity to areas where the species has been observed. It is doubtful that the toad has established populations in Alternative 3A because the area does not support suitable habitat or perennial springs. Figure 12 shows the locations of observations of the Amargosa Toad with respect to the study area.

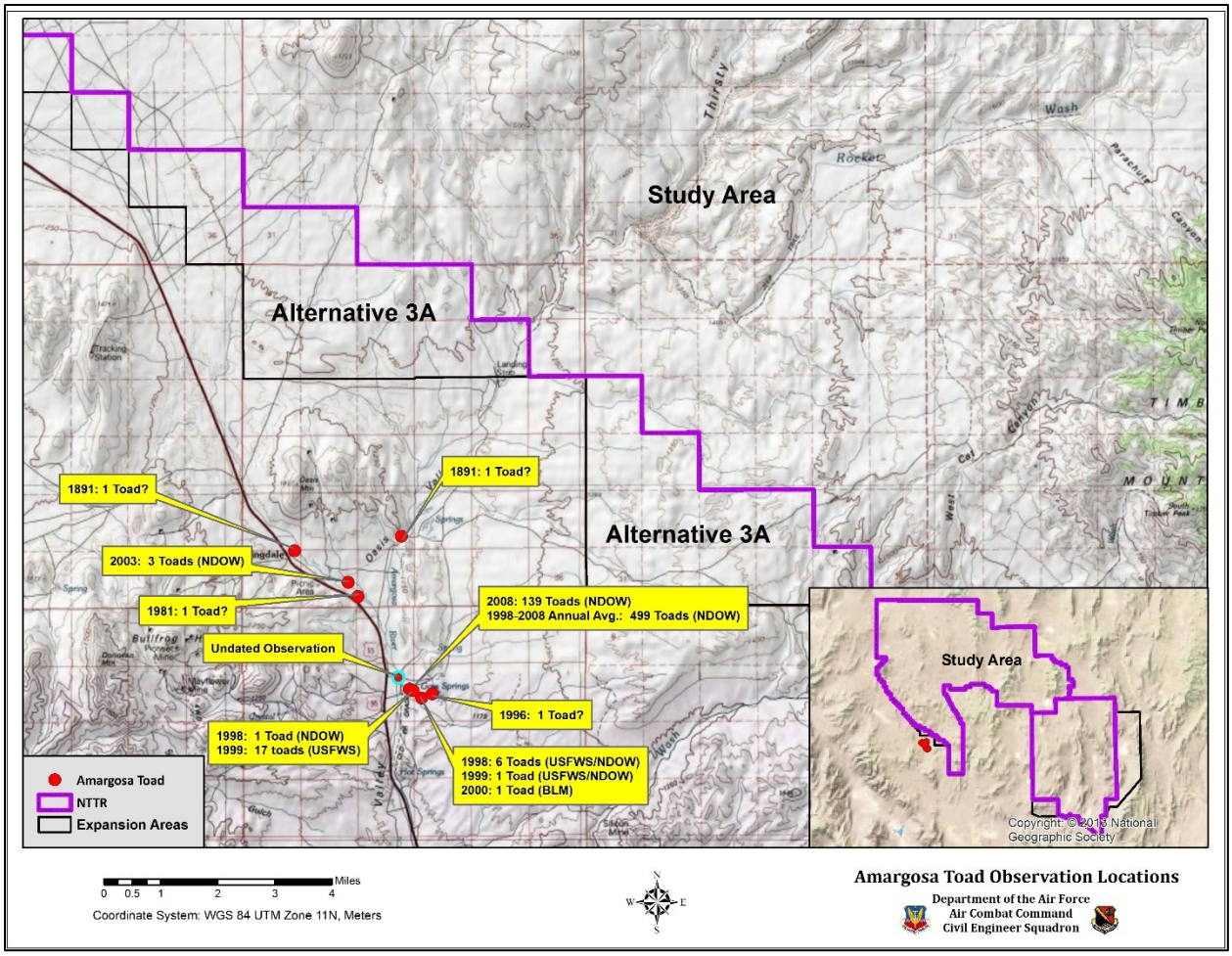


Figure 12. Locations where the Amargosa toad has been observed in and around the study area

NORTHERN LEOPARD FROG

Regulatory Status:

- United States Fish and Wildlife Service: None
- U.S. Forest Service: None
- Bureau of Land Management: S
- State of Nevada: Protected Amphibian
- Nevada Department of Wildlife: SOCP
- Nevada Natural Heritage Program Global Rank: G5
- Nevada Natural Heritage Program State Rank: S2S3

Northern leopard frog (Photo by C. Andrew)

BACKGROUND INFORMATION

The Northern Leopard Frog (*Lithobates pipiens*) is 2-4 inches in length, with the female being larger than the male. The frog is green or greenish brown in color and covered with large, dark brown or green spots with light colored edges. The frog's abdomen is white to greenish-white and it has a white stripe running down its lip. Two dorsolateral folds of skin run from the back of its eyes to the posterior end of the frog. The male has a pair of vocal sacs used for calling during the breeding season (New Hampshire Public Television,

2016). At the on-set of the breeding season, mature adults travel to water features where the males call to attract females and establish territories. Eggs are laid by the females and the male fertilizes them externally. The eggs hatch into tadpoles which remain in the water to eventually grow into young frogs, emerge onto land and often migrate to other water sources (CaliforniaHerps.com, 2016).

The decline in northern leopard frog populations in the western U.S. and Canada appears to be a result of habitat loss, chemical contamination of water, disease, and introduction of non-native species (U.S. Fish and Wildlife Service, 2016A; Rogers & Peacock, 2012). The northern leopard frog prefers permanent water sources with slow moving water and dense vegetation. During the summer, they may be found in vegetated areas between water sources (New Hampshire Public Television, 2016). Suitable habitat in Nevada includes springs and perennial streams that are separated by less than 0.5 mi. of upland or dry habitat. The frog usually stays underwater or underground in moist soil during the winter (NatureServe Explorer, 2016). For the frogs to survive the winter, water must be well-oxygenated and not subject to freezing (Nevada Natural Heritage Program, 2016).

The diet of leopard frog tadpoles is mostly comprised of algae, diatoms, and small animal matter filtered from the water or scraped from surfaces. Once they metamorphose into an adult frog, their diet changes to terrestrial invertebrates; including spiders, insects, slugs, snails, and earthworms (Harding, 1997).

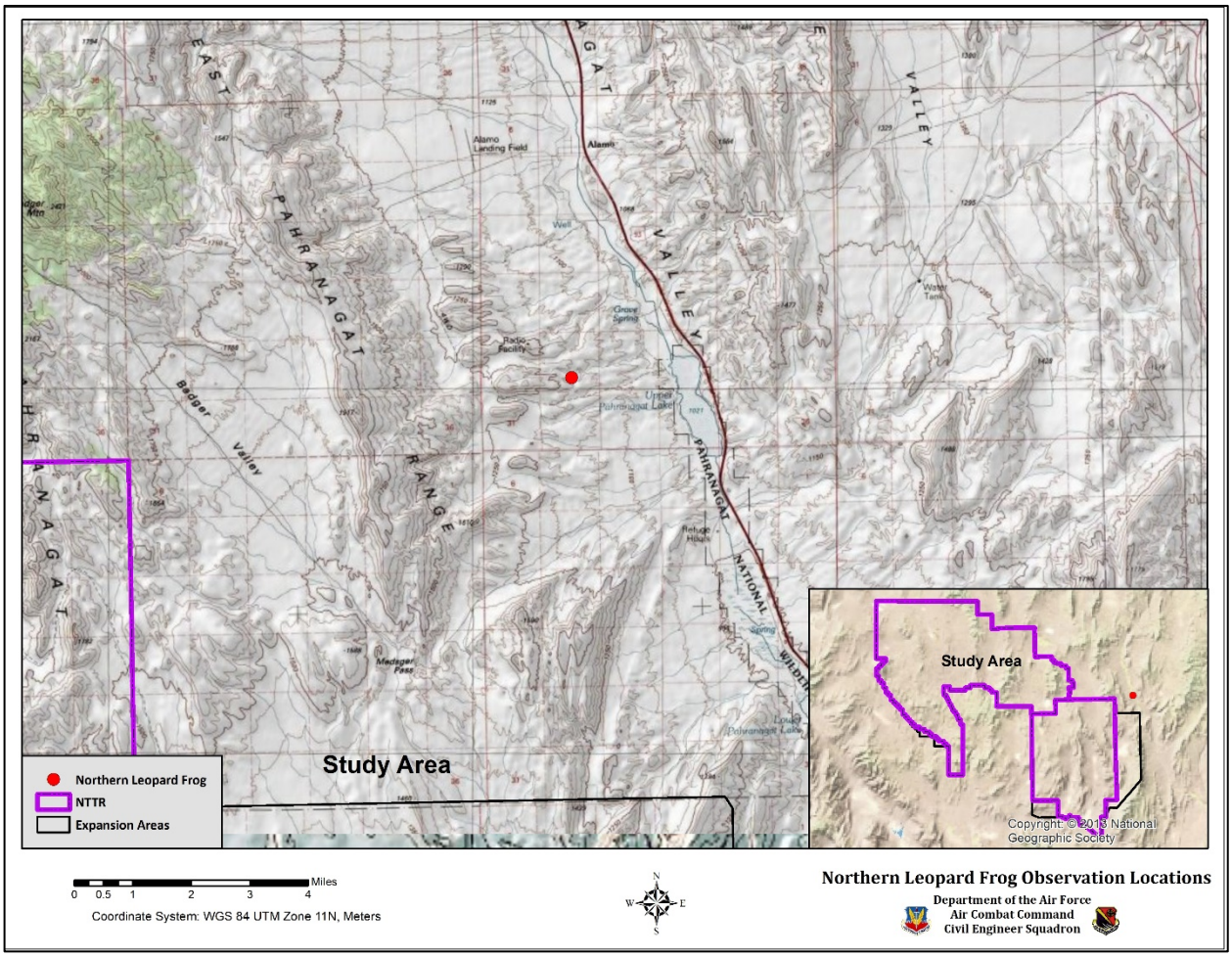


Figure 13. Locations where the northern leopard frog has been observed in and around the study area

RECENT AND HISTORICAL OBSERVATIONS

The only documented observations of the northern leopard frog were made in 1936 in the Pahranagat Valley about 4 miles south of Alamo, Nevada (Figure 13). Three specimens were collected at the site, one by J.M. Linsdale (University of California) and two by T.L. Rogers. The location of the observation was estimated using "vague" directions to the site (Nevada Natural Heritage Program, 2016A). NDOW has reported that a significant number of leopard frogs were observed at L-Spring at the Pahranagat Wildlife Refuge in 2016 and some were also observed on the south end of the refuge near Maynard Lake in 2010.

BANDED GILA MONSTER

Regulatory Status:

- United States Fish and Wildlife Service: None
- U.S. Forest Service: None
- Bureau of Land Management: S
- State of Nevada: Protected Reptile
- Nevada Department of Wildlife: SOCP
- Nevada Natural Heritage Program Global Rank: G4T4
- Nevada Natural Heritage Program State Rank: S2

Banded Gila monster

BACKGROUND INFORMATION

The banded Gila monster (*Heloderma suspectum cinctum*) is found primarily in the Eastern Mojave Desert of southern California and southern Nevada and the northern Sonoran Desert in Arizona. The species is rare, but has been observed in Clark County, Nevada. In this region, the banded Gila monster is found primarily in the Mojave Desert scrub, blackbrush, and desert riparian habitats. Gila monsters are classified as Sensitive by the BLM and are listed as a Protected Reptile under NAC 503.080.1 (Wildlife Action Plan Team, 2012). It is considered a species of conservation priority because of large-scale habitat degradation and poaching (Wildlife Action Plan Team, 2012).

The banded Gila monster is the only venomous lizard endemic to North America (NDOW, 2007). It is one of the larger lizards in the United States with a total length of 14-20 in., including the tail. The average adult Gila monster weighs about one lb. with total weight commonly fluctuating over the life of the lizard. This fluctuation appears to be seasonal, with the lowest weight occurring in the spring when the animals emerge from hibernation (Daniel Beck, 2010).

The lizard is covered with pale pink and black beads arranged in a somewhat banded design. The beadlike scales give the lizard an appearance of having studded skin (Daniel Beck, 2010). *Heloderma* means "studded skin", from the ancient Greek words *Helos*, "the head of a nail or stud", and *derma*, "skin". *Suspectum* comes from the describer, paleontologist Edward Drinker Cope, who suspected that the lizard might be venomous due to the grooves in the teeth (King, Pianka, & King, 2004). The head is relatively large with a black snout and black eyes characterized by round pupils. The lizard has a forked tongue used for the sense of smell, similar to snakes. The ear opening on the head is a narrowly oblique or ovoid slit. The limbs of the lizard are stout with heavy claws (Ernst, 1992). The tail is short and blunt and used to store fat and water (Daniel Beck, 2010). The lizard posesses a neurotoxin that is produced in glands within the jaw. The toxin flows along the grooves in the teeth when the lizard bites. Gila monsters avoid biting whenever possible, but if provoked, they rapidly bite and hold their predator while grinding their jaws to deliver the poison (King, Pianka, & King, 2004). The neurotoxin is rarely fatal to humans.

The Gila monster is found within desert ecosystems throughout southern Nevada, California, Utah, Arizona, and southwestern New Mexico in the Mojave, Sonoran, and Chihuahuan Desert (NDOW, 2007). It

seeks shelter in mammal burrows, thickets, and in rocks and crevices that have access to moisture (Stebbins R. , 2003). Habitat for the Gila monster is characterized by rocky, deeply incised topography, usually associated with relatively high mountain ranges (Lovich & Beaman, 2007). The preferred habitat within the study area includes rocky outcrops, mountainous slopes, and rocky bajadas, which are relatively common on the South Range Study Area. This species also inhabits thorn scrub, desert grasslands, and oak woodlands (Beck D. D., 2005).

The Gila monster habitat may overlap with the desert tortoise (*Gopherus agassizzii)* habitat given that tortoise eggs are one of the favored foods for the lizard (Gienger & Tracy, 2008). The species is known to submerge itself in water to cool off (Marshall Cavendish, 2001). Therefore, it could be found in association with desert washes, springs, and riparian habitats. It appears to prefer areas with more than 24% of the annual total rainfall occurring during the months of June to September (Lovich & Beaman, 2007). The species is most likely to be seen during the months of April-May searching to predate a nest or during the rainy season of July-August (Beck D. D., 2005). The home range of the banded Gila monster ranges from 14 to 363 acres, depending on available food and other resources. The males appear to have larger home ranges than females, especially during the spring and dry summer months (Gallardo, 2003).

Shelters provide escape from extreme desert temperatures and predators. The Gila monster usually usurps burrows dug by mammals, tortoises, and desert iguanas. It also may use natural occurring shelters such as a crevice on a rocky slope or among boulders, or a hollow tree branch or trunk (Beck D. D., 2005). Beck and Jennings (2003) observed that the lizards tend to return to the same sites each year and sometimes two lizards will share burrows. Winter burrows tend to be south-facing and deeper, allowing the Gila monster to maintain warmer body heat. Conversely, the summer burrows were shallow and humid. During the summer, Gila monsters remain in their burrows most of the time and emerge during the morning to hunt and bask (Beck D. D., 2005).

RECENT AND HISTORICAL OBSERVATIONS

Pitfall traps and diurnal surveys were initiated in 2010 by the Nellis Natural Resources Program (NNRP) to develop baseline information on reptiles, in general. No Gila monsters were observed during these surveys. The only recorded observation of banded Gila monsters was in 1978, outside of the study area on the south end of the Pahranagat National Wildlife Refuge (Figure 14).

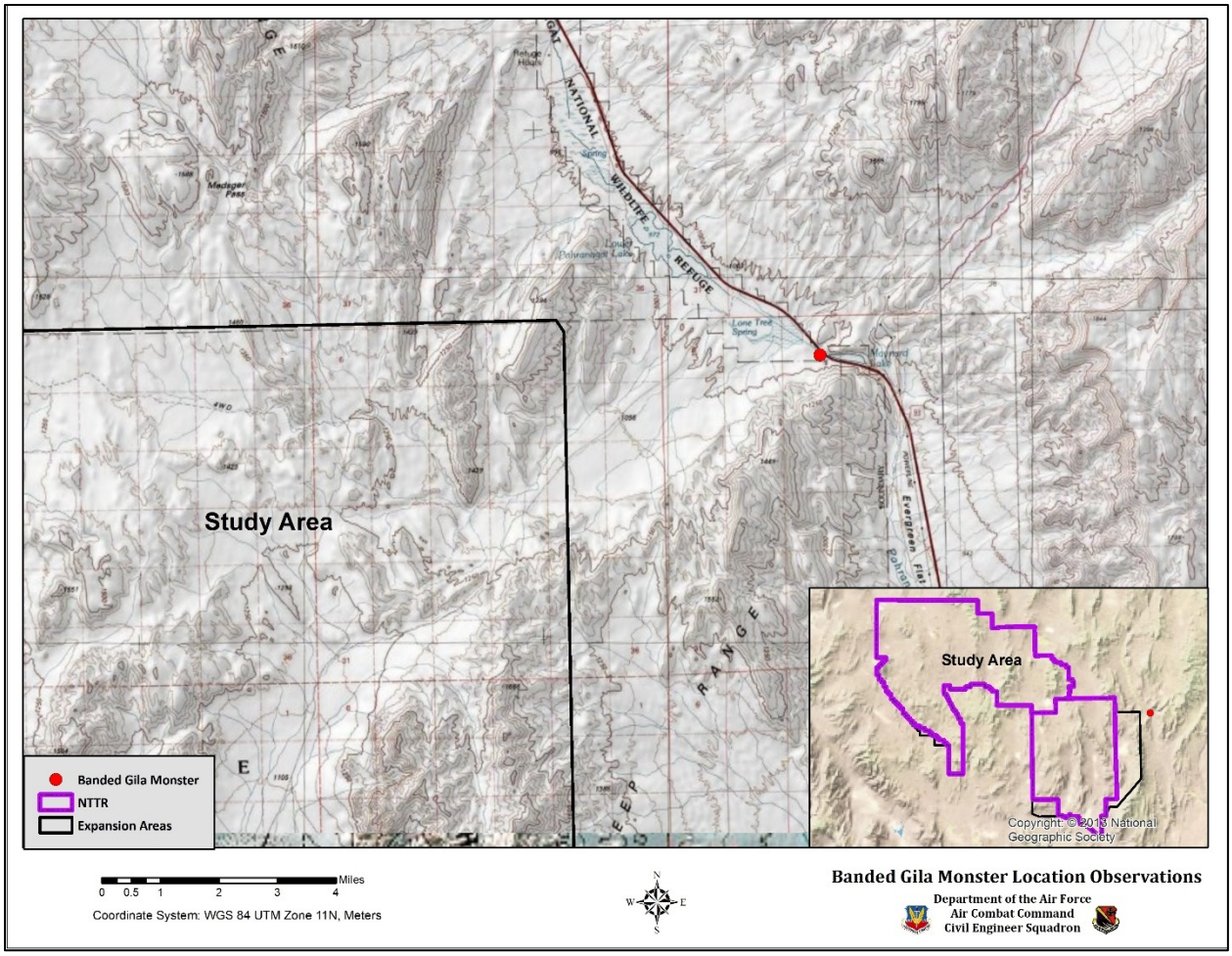


Figure 14. Locations where banded Gila monsters have been observed in and around the study area

NORTHERN GOSHAWK

Regulatory Status:

- United States Fish and Wildlife Service: None
- U.S. Forest Service: S
- Bureau of Land Management: S
- State of Nevada: Sensitive Bird
- Nevada Department of Wildlife: SOCP
- Nevada Natural Heritage Program Global Rank: G5
- Nevada Natural Heritage Program State Rank: S2

Northern goshawk (http://www.toothandclaw.org.uk/upload/files/Goshawk0003.jpg)

BACKGROUND INFORMATION

The northern goshawk (*Accipiter gentilis*) is a large raptor listed in the family Accipitridae, which is comprised of other diurnal raptors such as eagles, buzzards, and harriers. This hawk is 19-26 in. long with a wingspan of 40-48 in. (Nevada Department of Wildlife, 2017A). Female goshawks are slightly larger than male goshawks. Both sexes are blue-gray on their dorsal side and whitish on their

ventral side. Goshawks have a black or dark gray cap and eye patch with a white eyebrow or eye streak (Griggs, 1997). The northern goshawk also has distinct red or yellow eyes. Immature northern goshawks are brownish in color and can be confused with other species of hawks. However, upon reaching adulthood, the northern goshawk can be distinguished from other species in the genus by its paler and grayer back, broader tail, larger size, and the lack of rusty coloring on the abdomen (Nevada Department of Wildlife, 2017A). The tail is broad with pale bands (Griggs, 1997). When in flight, the wings of the northern goshawk are broad at the arm and narrowing at the hand. This wing structure allows for great maneuverability in dense stands of trees (Nevada Department of Wildlife, 2017A).

Goshawks, as with many raptors, are opportunistic hunters preying on squirrels, cottontails, songbirds, grouse, pheasants, crows, as well as many others. A single goshawk may consume one to two animals per day (Good, Anderson, Squires, & McDaniel, 2001). Being very agile, the goshawk can catch its prey on the ground, in the air, or in vegetation.

The goshawk is reputed to be among the most territorial and aggressive raptor species. Nests are often found by observing agitated behavior by adult birds (Smith & Keinath, 2004). Antagonistic behavior between females and males has been observed when the birds return to the nest area with prey (Smith & Keinath, 2004). Dismissal calls, alarm calls, and even physical attacks may accompany this behavior (Good, Anderson, Squires, & McDaniel, 2001). It should be noted that physical attacks on people have been documented (Parker J. W., 1999) and have also interrupted projects and operations (Bartelt, 1977).

The northern goshawk has been proposed for federal listing several times under the Endangered Species Act (ESA). Its status has been, and still is, the object of considerable litigation. It is currently not a federally listed species, but it is considered a species of special concern by various regulatory agencies and the state of Nevada lists it as a sensitive bird. On June 22, 1998, the USFWS announced a 12-month petition finding that listing the northern goshawk, in the contiguous United States west of the 100th meridian, as endangered or threatened under the ESA was not warranted (United States Fish and Wildlife Service, 1998). The USFWS contends that although the species does require mature forests or older trees for nesting habitat, no evidence of a decline in the overall habitat used by the northern goshawk exists. The USFWS found the species was widely distributed throughout the western range of the species. On June 28, 2001, this ruling was upheld in federal court by a U.S. District Court (Kennedy, 2003). Six BLM state offices, including Nevada, have listed the northern goshawk as a Sensitive Species per the direction of the BLM Washington Office *Instruction Memorandum IM 97-118 Guidance of Special Status Species Management* (Kennedy, 2003).

In North America, the goshawk habitat ranges from western central Alaska and the Yukon territories in the north to the mountains of northwestern and western Mexico (Clark & Wheeler, 1987). Northern goshawks are year-round residents in Nevada and across all of their range (Nevada Department of Wildlife, 2017A; Squires & Reynolds, 1997). The goshawk is often considered a “mature forest” indicator species because of its preference for older, well-established forests for nesting and foraging (Mahon, 2009).

In North America, the primary habitat for northern goshawks is coniferous, deciduous, and mixed forests, especially in mountains. In Nevada, northern goshawks nest primarily in aspen and riparian habitat (Nevada Department of Wildlife, 2017A). It has been suggested that goshawks may be habitat specialists with regard to forest structure, but generalists in terms of tree species composition (Greenwald, 2005). However, the northern goshawk appears to prefer some tree species including ponderosa pine, lodgepole pine, douglas fir, white fir, and hemlock spruce. Of these species, only very sparce populations of white fir and ponderosa pine are found within the study area in the higher elevations of the Kawich, Belted and Sheep Ranges.

Threats to this species include timber harvesting of old growth forests, logging activities near nests, fire suppression, wildfires, livestock grazing, drought, toxic chemicals, insect infestation on trees, tree disease outbreaks, and human disturbances associated with habitat development (Reynolds, et al., 1992). The only impacts anticipated for the study area would be wildfires, drought, insect infestations, and disease outbreaks. Military activities and infrastructure development in the higher elevations of these mountain ranges is minor; therefore, threats to the northern goshawk within these boundaries are anticipated to be minimal.

RECENT AND HISTORICAL OBSERVATIONS

As of 2016, one northern goshawk was observed on the study area by a wildlife camera located on the Cooper's Meadow Complex in the northern end of the Kawich Range (Figure 15). The goshawk was captured by trail cameras several times during the period from June 3 to July 10, 2012. Goshawks have not been observed during any migratory bird or raptor surveys prior to 2016. Much of the habitat preferred by the northern goshawk has not been formally surveyed. This habitat includes the higher elevations of the Sheep, Kawich, and Belted Ranges; and Stonewall Mountain, which are dominated by pinyon pine and other coniferous species. It is important to note that the northern goshawk prefers dense stands of large canopy trees. Tree species does not seem to be as important to habitat requirements as the structure of the habitat (Greenwald, 2005). NDOW indicates that most of the sightings of goshawk in Nevada have been made in aspen dominated woodlands (Nevada Department of Wildlife, 2017A). Thus, the potential for northern goshawk nesting in the study area would be considered low. Formal surveys may be warranted in the future if military mission plans change and impacts are imposed on those areas.

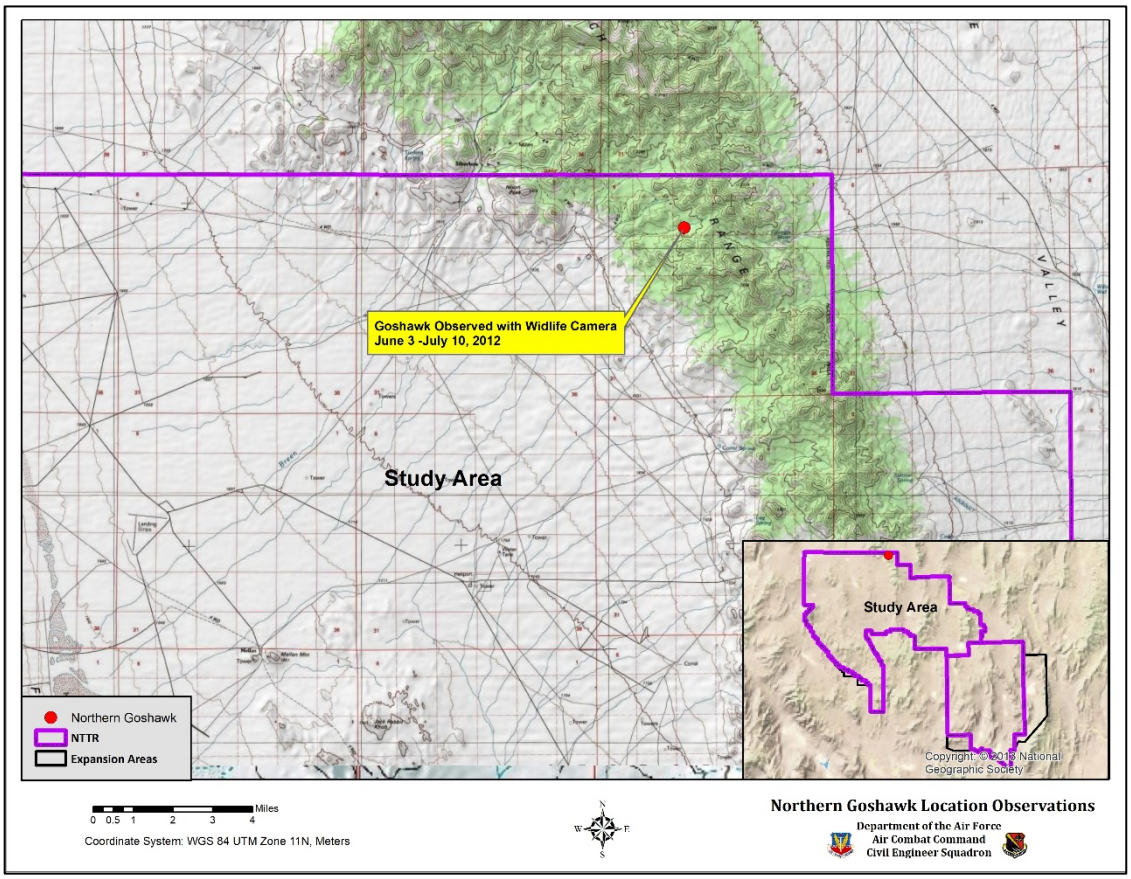


Figure 15. Location where a northern goshawk was observed on the study area in 2012

LOGGERHEAD SHRIKE

Regulatory Status:

- United States Fish and Wildlife Service: None
- U.S. Forest Service: None
- Bureau of Land Management: S
- State of Nevada: Sensitive Bird
- Nevada Department of Wildlife: SOCP
- Nevada Natural Heritage Program Global Rank: G4
- Nevada Natural Heritage Program State Rank: S4

Loggerhead shrike

BACKGROUND INFORMATION

The loggerhead shrike (*Lanius ludovicianus*) is a top-level predator in the order *Passeriformes,* occupying a unique niche within the bird community. It and the northern shrike (*Lanius excubator*) are endemic to North America. "Loggerhead" is descriptive of the bird's relatively large head and somewhat small body size. This shrike has an overall body length of 8.0 in. and weight of approximately 2.75 ounces (The Cornell Lab of Ornithology, 2013). The term "shrike" refers to the sharp shriek sound or call produced by the bird. Most vocalizations are used in breeding and for nest defense (Yosef R. , 1992). The loggerhead shrike is a gray bird with a black facial mask that makes the species relatively easy to identify in the field. The bill is black and slightly curved with a sharp hook at the end. The primary wing feathers and tail feathers are black with white edges that are visible in flight (Yosef R. , 1996).

Within the United States, the loggerhead shrike is found in the central to southern states and Mexico (Wiggins, 2005). The loggerhead shrike is a resident in the southern range and migratory in the more northern ranges (The Cornell Lab of Ornithology, 2013). It is also a resident species throughout Nevada, except in the Sierra Nevada mountains where it may be a migrant (Wildlife Action Plan Team, 2006).

The loggerhead shrike is a small bird known for impaling its prey on sharp thorns and barbed-wire fences. The beak of a shrike has a sharp hook at the end which is used to catch prey. The impaling of prey appears to be a unique adaptation to overcome the fact that shrikes do not have strong feet and talons characteristic of raptors (The Cornell Lab of Ornithology, 2013). They also kill their vertebrate prey by precisely attacking the neck of the prey and then severing the vertebrae. The tomial tooth in the upper mandible is used to penetrate quickly to the spinal cord, producing partial paralysis and facilitating an easy kill (Cade, 1967). The loggerhead shrike diet is comprised of arthropods, amphibians, small to medium-sized reptiles, small mammals (including bats), and other small birds. It may also eat road kill and carrion (Yosef R. , 1992; Anderson, 1976). It has not been observed drinking water in desert habitat, although it is often seen near water sources (Miller A. , 1931).

The loggerhead shrike hops (Miller A. , 1931) with its body held erect and head high, except when investigating ground objects. Although territorial, the loggerhead shrike is not an aggressive bird and rarely fights over established territory boundaries. Instead boundaries are maintained by vocalizations (Smith S. , 1972). A territory averages 25 to 40 acres in semi-desert habitat (Wildlife Action Plan Team, 2006). A pair of loggerhead shrikes are primarily monogamous, but polygamy has been documented (R.Yosef, 1992). Eggs are usually laid from early February through June (Yosef R. , 1992). Nests are placed in taller shrubs or low in trees and often at plant community edges, such as at the base of slopes or edge of a woodland (Yosef R. , 1992). The birds practice cooperative brood care for rearing of the young. However, the females may desert their mates once the young have left the nest, subsequently raising a

second brood in a nearby area with another male (Haas & Sloane, 1989). An average clutch is four to six eggs with incubation lasting 16 to 18 days (Luukkonene, 1987; Tyler, 1992). Young birds fledge at 17 to 20 days and achieve independence after 36 days (Wildlife Action Plan Team, 2006).

Loggerhead shrikes are generally found in open country with scattered trees and large shrubs (Yosef R. , 1992; Dorn & Dorn, 1999). They usually reside in habitat at lower elevations relative to the surrounding topography (Hall & Legrand, 2000). The most important habitat requirement appears to be the presence of dense shrubs or trees for nesting with nearby open herbaceous areas for foraging (Keinath & Schneider, 2005).

Direct loss and degradation of native grassland and sagebrush habitats have been cited as primary factors in the decline of the loggerhead shrike. In the west, livestock grazing in shrub steppe and short grass habitats may reduce local prey populations by changing plant community composition (Wiggins, 2005). Exotic grasses may invade native grasslands and sagebrush habitat contributing to a decline in the quality of habitat as well. The Audubon Society's breeding bird surveys have indicated a 71% population decline range wide from the year 1966 to 2000. The decline in this species is still largely unexplained, making appropriate mitigation difficult to determine (Wildlife Action Plan Team, 2006). Within Nevada, the population size reported in the Wildlife Action Plan was 162,000 with a 5% decline per year since 1966.

RECENT AND HISTORICAL OBSERVATIONS

Loggerhead shrikes have often been observed at many locations on the North Range Study Area. The species has been recorded in seven key habitats including: Desert Playas and Ephemeral Pools, Developed Landscapes, Intermountain Cold Desert Scrub, Lower Montane Woodlands, Mojave Mid-Elevation Mixed Desert Scrub, Mojave/Sonoran Warm Desert Scrub, and Sagebrush. These observations were often made within the common plant communities of Greasewood Flats, Big and Mixed Sagebrush, Semi-Desert Shrub Steppes, Pinyon-Juniper Woodlands, Creosote Bush-White Bursage Scrub, and on playas and low intensity developed open space.

Within the South Range Study Area, key habitats where observations have been made include Intermountain Cold Desert Scrub, Mojave Mid-Elevation Mixed Desert Scrub, and Mojave/Sonoran Warm Desert Scrub. These observations were often made within the common plant communities of Semi-Desert Shrub Steppes, Creosote Bush – White Bursage Scrub, and near developed open spaces. Figure 16 shows locations where the loggerhead shrikes have been observed during various bird surveys and by incidental observations during other surveys.

Table 4. Type and year of bird surveys and agency conducting the survey in which loggerhead shrikes were observed

No. Observed	Survey Year	Type of survey	Agency
2	2007	Winter Raptor Survey	NNRP
4	2007	Stationary Bird Survey	NNRP
21	2007	GBBO Nevada Bird Count	NNRP
8	2008	GBBO Nevada Bird Count	NNRP
9	2009	Stationary Bird Survey	NNRP
1	2010	Herp Funnel Trapping Survey	NNRP
3	2010	Raptor Driving Survey	NNRP
11	2010	Stationary Bird Survey	NNRP
8	2011	GBBO Nevada Bird Count	NNRP
5	2011	Stationary Bird Survey	NNRP
19	2011	Winter Raptor Survey	NNRP
7	2012	Stationary Bird Survey	NNRP
8	2012	Winter Raptor Survey	NNRP
3	2013	Small Mammal Trapping Survey	NNRP
4	2013	Stationary Bird Survey	NNRP
7	2013	Winter Raptor Survey	NNRP
7	2014	Christmas Bird Count	NNRP
1	2014	GBBO Nevada Bird Count	NNRP
3	2014	Raptor Driving Survey	NNRP
6	2014	Stationary Bird Survey	NNRP
13	2014	Winter Raptor Survey	NNRP
6	2015	GBBO Nevada Bird Count	NNRP
1	2015	Herp Diurnal Survey	NNRP
28	2015	Raptor Driving Survey	NNRP
13	2015	Stationary Bird Survey	NNRP
52	2016	GBBO Nevada Bird Count	NNRP
3	2016	Vegetation Survey	NNRP

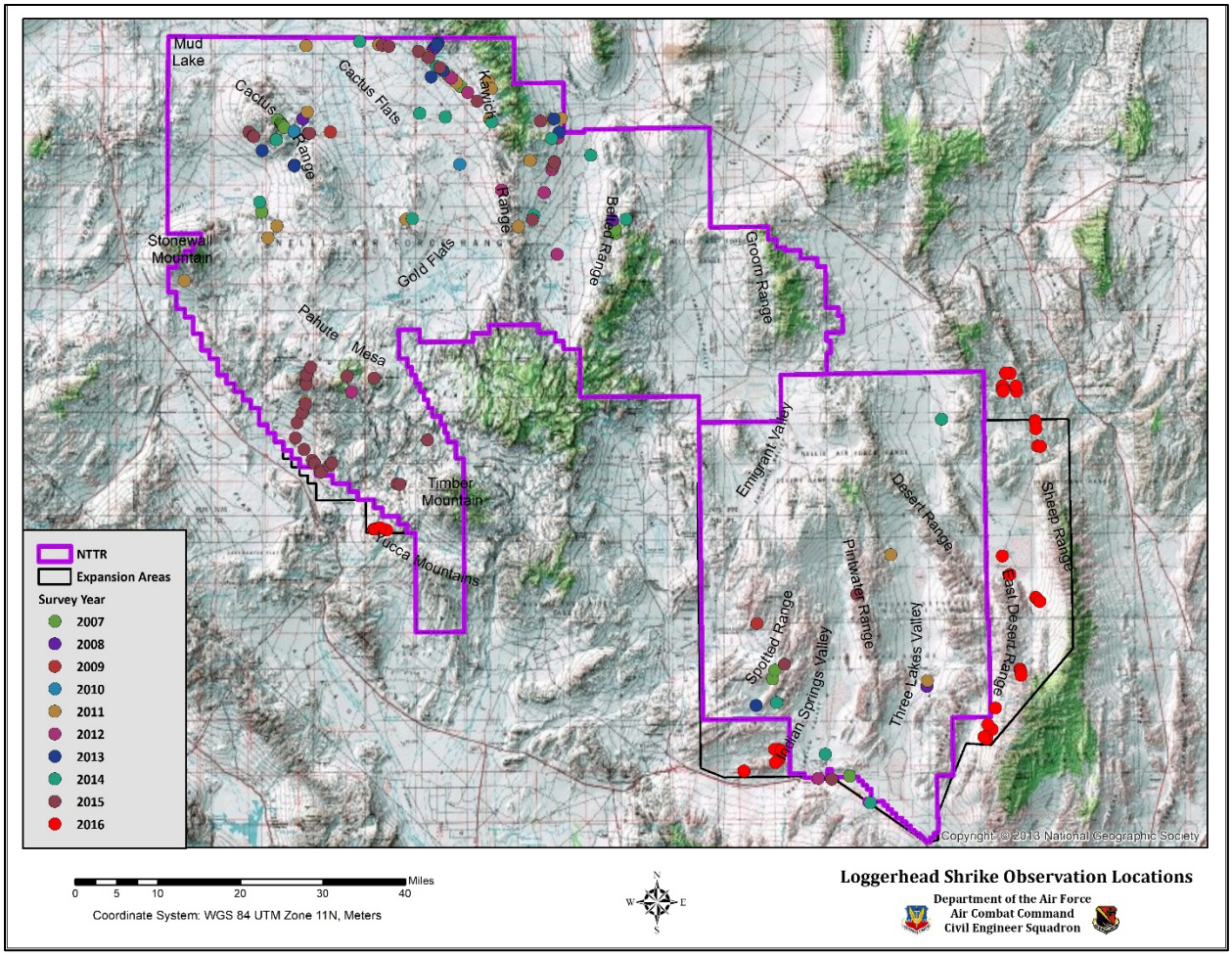


Figure 16. Locations where loggerhead shrikes have been observed in and around the study area

BREWER'S SPARROW

Regulatory Status:

- United States Fish and Wildlife Service: None
- U.S. Forest Service: None
- Bureau of Land Management: S
- State of Nevada: Sensitive Bird
- Nevada Department of Wildlife: SOCP
- Nevada Natural Heritage Program Global Rank: G5
- Nevada Natural Heritage Program State Rank: S4B

Brewer's sparrow

BACKGROUND INFORMATION

The Brewer's sparrow (*Spizella breweri*) is a small songbird found in the western United States, primarily in the Great Basin Desert. Brewer's sparrow is a medium size sparrow with a dull pink bill, faint head pattern, a brown crown with fine black streaks with no defined median stripe. The sparrow has a faint white eye-ring and brown rump feathers. The juveniles have fine stripes on their underparts and legs and feet that are gray-pink in color (Griggs, 1997). The length of this bird is

5 to 6 in. with a mass of 0.32 to 0.42 oz. (Wiens & Rotenberry, 1981). This species does not show sexual dimorphism.

The Brewer's sparrow has large breeding populations in the Great Basin Desert of the U.S. During the winter, some populations of the Brewer's sparrow migrate from the deserts of the southwestern U.S. to Baja California and Central Mexico (Rising & Beadle, 1996). The birds winter in shrublands and brushy deserts dominated by sagebrush, saltbush, and creosote (Rotenberry, Patten, & Preston, 1999).

Brewer's sparrows nest in loosely organized colonies with separate breeding territories (Hansley & Beauvais, 2004). The nest is open and cup shaped, about 3.15 in. in diameter (Rich, 1980) and is usually found in the dense foliage of big sagebrush (Petersen & Best, 1985; Rotenberry, Patten, & Preston, 1999). The species is monogamous (Paine, 1968) and both sexes incubate the eggs on the nest (Hansley & Beauvais, 2004). Pairs establish breeding territories in mid-April and nesting season lasts until early August (Paine, 1968). Clutch size is 3 to 4 eggs with incubation lasting 10 to 12 days and fledging taking place 20 to 22 days after hatch (Hansley & Beauvais, 2004).

The Brewer's sparrow has a spring and summer habitat preference of shrublands usually associated with significant stands of sagebrush. The bird has been observed in shrubby openings of pinyon-juniper and mountain mahogany woodlands (Hansley & Beauvais, 2004). They typically build their nests in dense foliage 1 to 20 in. above the ground (Petersen & Best, 1985) in a plant community with a canopy height of less than 5 ft. (Rotenberry, Patten, & Preston, 1999; Knick & Rotenberry, 1995).

Knick and Rotenberry (1995) showed that the probability of Brewer's sparrow occurrence was primarily a function of shrub cover, and, secondarily, shrub patch size. Probability of occurrence increased with increasing patch size (Hansley & Beauvais, 2004). Altman and Holmes (2000) defined the habitat as: "sagebrush cover of 10% to 30%, mean height greater than 25 inches, high foliage density, average herbaceous cover greater than 10%, and bare ground greater than 20%." In a Nevada specific study, Brewer's sparrows were more likely to be found on sites with fewer trees, greater sagebrush heights, and the presence of surface water within 0.6 miles (Great Basin Bird Observatory, 2010). The birds were also found in salt desert scrub, but to a lesser extent (Great Basin Bird Observatory, 2010).

The Brewer's sparrow is one of Nevada's most widely distributed and abundant birds (Floyd, et al., 2007), but is a conservation concern due to ongoing regional and range wide declines in populations (Sauer, Hines, & Fallon, 2008). Nevada hosts approximately 40% of the global breeding population of Brewer's sparrows (Great Basin Bird Observatory, 2010). The Audubon's Breeding Bird Surveys indicate range wide declines in distribution and abundance (Sauer, Hines, Gough, Thomas, & Peterjohn, 2003). Furthermore, solid evidence of widespread reduction in the amount and quality of breeding habitat has been reported (Hansley & Beauvais, 2004).

Table 5. Year and type of survey and the agency conducting the survey in which Brewer's sparrow was observed

No. Observed	Survey Year	Type of survey	Agency
6	2007	GBBO Nevada Bird Count	NNRP
3	2007	Stationary Bird Survey	NNRP
6	2008	GBBO Nevada Bird Count	NNRP
3	2008	Stationary Bird Survey	NNRP
9	2009	Stationary Bird Survey	NNRP
4	2010	GBBO Nevada Bird Count	NNRP
2	2011	GBBO Nevada Bird Count	NNRP
7	2011	Stationary Bird Survey	NNRP
12	2012	Stationary Bird Survey	NNRP
7	2013	GBBO Nevada Bird Count	NNRP
1	2015	Stationary Bird Survey	NNRP
22	2016	GBBO Nevada Bird Count	AEI
1	2016	Vegetation Survey	AEI

RECENT AND HISTORICAL OBSERVATIONS

NNRP has made 30 observations of Brewer's sparrow from 2007 to 2015 on the NTTR. Additionally, Adams Ecology ornithologists recorded 14 observations of Brewer's sparrows on Alternative 3C on the DNWR. No observations prior to 2007 have been recorded in or around the study area (Figure 17).

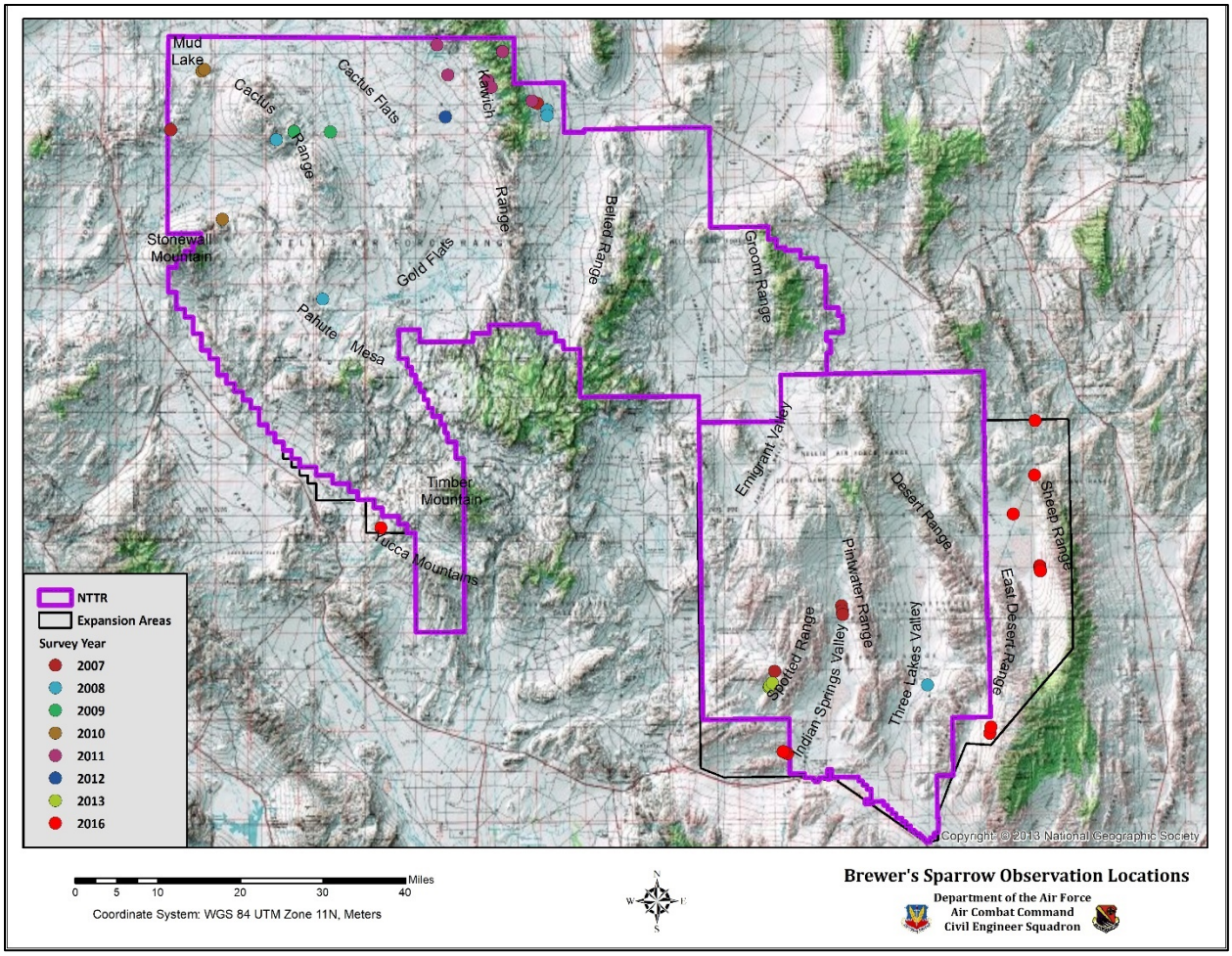


Figure 17. Locations where Brewer's sparrow has been observed in and around the study area

BENDIRE'S THRASHER

Regulatory Status

- United States Fish and Wildlife Service: None
- U.S. Forest Service: None
- Bureau of Land Management: S
- Nevada Department of Wildlife: SOCP
- Nevada Natural Heritage Program Global Rank: G4G5
- Nevada Natural Heritage Program State Rank: S1

Bendire's thrasher
(Photo by Gerry Dewaghe)

BACKGROUND INFORMATION

The Bendire's thrasher (*Toxostoma bendirei*) is a large, long-tailed, dull grayish brown thrasher with faint spots on its chest and abdomen (Cornell Lab of Ornithology, 1993). The species can be found in undisturbed desert and some farmland, but is currently threatened by loss and degradation of habitat (Kaufman, 2016). The male typically sings in the spring and summer to establish territory. Nests are placed 3 to 10 ft. above the ground in shrubs, trees, or cacti. Favorite plants used as nest sites include cholla, yucca, mesquite, acacia, and desert hackberry. Nests of Bendire's thrasher tend to be smaller, more compact, and comprised of finer materials compared to other thrashers. The nests usually have an outer layer

of twigs with an inner layer of grass, rootlets, feathers, and animal hair (Kaufman, 2016). Eggs are three to four in number and whitish to pale gray-green with brown or buff blotches. Both parents feed the nestlings and the young fledge about 12 days after hatching. Typically, two broods are produced each year (Kaufman, 2016).

Bendire's thrasher hunts for insects mostly on the ground. Sometimes the bird uses its bill to scratch or dig slightly in the soil or to turn over rocks or other items. Because this thrasher has a small bill, it cannot dig as effectively as most thrashers (Kaufman, 2016). The thrasher appears to avoid rocky soils and slopes that prevent digging (Nevada Natural Heritage Program, 2016). The bird feeds on insects and other arthropods, especially caterpillars, beetles, grasshopper, ants, and termites (Nevada Natural Heritage Program, 2016). Primary habitat for this species is within areas of tall vegetation, cholla cactus, creosote bush, and yucca within juniper woodland (Cornell Lab of Ornithology, 1993). Bendire's thrasher may occasionally be found in catclaw, palo verde, hackberry, willow, and saltbush (England & Laudenslayer, 1993). The birds are not found in dense vegetation, such as riparian corridors, but may be found in the edges (England & Laudenslayer, 1993). Populations are restricted to 0-5,900 ft. MSL (England & Laudenslayer, 1993).

Between 1966 and 2014, Bendire's thrasher populations declined approximately 90%, according to the North American Breeding Bird Survey. Partners in Flight estimated a current global breeding population of 70,000 (Cornell Lab of Ornithology, 1993).

RECENT AND HISTORICAL OBSERVATIONS

Bendire's thrasher has not been observed in or around the study area recently or historically. No map is provided because no observations have been documented for the study area.

PALLID BAT

Regulatory Status:

- United States Fish and Wildlife Service: None
- U.S. Forest Service: R5S
- Bureau of Land Management: S
- State of Nevada: Protected Mammal
- Nevada Department of Wildlife: None
- Nevada Natural Heritage Program Global Rank: G5
- Nevada Natural Heritage Program State Rank: S3

Pallid bat

BACKGROUND INFORMATION

The pallid bat (*Antrozous pallidus*) is the sole member of its genus in the family Vespertilionidae. The bat has distinctive ears that are about 1.0 in. long, broad, naked, and crossed by nine or eleven transverse lines (Schmidly D. , 2004). The pallid bat is relatively large, weighing as much as 1.0 oz. The bat is 3.0-5.0 in. long with a wingspan of 15-16 in. The tail, which is included within the uropatagium, is about 4.5 in. long. The bat's feet average 1.8 in. long (Schmidly D. , 2004).

Mating takes place in late autumn or early winter, and the female stores sperm in her reproductive tract until ovulation takes place in the spring. Births generally occur in large maternity colonies in May and June. Male bats are usually absent from these maternity colonies. Yearling females typically have a single offspring, while older females often conceive twins (Wilson & Ruff, 1999). In the summer, male and female pallid bats may roost together or separately (Vaughan & O'Shea, 1976). Nursery colonies of adult

females and young may number in the hundreds and bachelor roosts may have as many as 100 bats (Davis & Cockrum, 1963).

During hibernation, pallid bats roost singly or in small groups (Hermanson & O'Shea, 1983). Diurnal summer roosts are warm (Vaughan & O'Shea, 1976). In laboratory studies, pallid bats show highest metabolism at 25°C and reduced metabolism at 30°C. Bats that roost in clusters had lower metabolic rates than those roosting singly (Trune & Slobodchikoff, 1976). It has been suggested that the metabolism of pallid bats is optimized at warm, stable temperatures (Vaughan & O'Shea, 1976).

Most other bat species common to the study area typically emerge and begin to forage before the first pallid bat has left its roost. Emergence is latest relative to sunset in the spring and autumn and earliest during the summer (Vaughan & O'Shea, 1977).

This bat is an insectivorous terrestrial forager that occasionally eats small lizards. It is often observed foraging on the ground and flying low over vegetation (Schmidly D. , 2004). The pallid bat has been documented to having 54 different prey including flightless arthropods, ground crickets, ground beetles, grasshoppers, praying mantis, and sphingid moths, among others (Hermanson & Altenback, 1983). It is also known to eat Jerusalem crickets and scorpions within its Nevada range (Schmidly D. , 2004).

The foraging pattern of the pallid bat is unusual and its style of ground hunting makes it unique among other bats of similar range. Unlike other bat species, the pallid bat randomly flies low over an area at levels of 0.5 to 3.0 ft. above the ground. When prey is located, the bat lands on the ground, grabs the prey, and then flies to a feeding station (Schmidly D. , 2004). This ground-dwelling or low flight behavior makes pallid bats especially vulnerable to surface predation. This predatory pressure has probably led to the evolutionary selection of their light-colored pelage, which serves as a camouflage in the desert environment. It has been noted that the light-colored pelage is not advantageous in areas that are more densely vegetated because of development, agriculture, or irrigation (Chapman, McGuiness, & Brigham, 1994).

The pallid bat often uses low intensity echolocation calls that are audible to humans and sound like a whisper. This is a common strategy for bats that pick their prey directly off the ground or from foliage. By "whispering", such bats can approach their prey without being detected (Bat Conservation International, 1997). The pallid bat's characteristic echolocation range is within 29-31 kHz and can be distinguished by the presence of social calls.

Shrubs typically found in pallid bat habitat include antelope bitterbrush (*Purshia tridentata)*, sagebrush (*Artemisia* spp.), rabbitbrush (*Chrysothamnus* spp.), and forest cover types including ponderosa pine (*Pinus ponderosa*), along lower slopes and riparian forests (van Zyll de Jong, 1985).

Close-up of the pallid bat

The primary factors limiting the habitat range of this species within the study area include a source of water and roosting sites such as caves and mines. It commonly roosts in rock crevices, caves, mines, attics of houses, as well as, hollow trees. Throughout its range, the pallid bat is generally found in elevations below 6,000 ft. MSL. Geographically, it is found from British Columbia to Mexico; especially in canyon landscapes, rugged terrain, and deserts and grasslands of the southwest. It is usually found in the vicinity of rocky outcrops and dry canyonlands (Orr R. , 1954). Occasionally, the pallid bat is found at higher elevations in coniferous forests in the northern extent of their range. They

are most abundant in xeric ecosytems, such as the Great Basin and the Mojave and Sonoran Deserts (Sherwin, 2005).

This species has also been documented as especially sensitive to human disturbances. However, it is less susceptible during winter hibernation due to its deeper states of hiberation. However, significant disturbance during winter hibernation can result in mortality. Observations indicate that, during the summer months, the species has no tolerance to human disturbances (Vaughan & O'Shea, 1977). Researchers suggest that disturbing these bats during their night roosts will force them to emigrate from the area (Vaughan & O'Shea, 1977).

Table 6. Year and type of survey and the agency conducting the survey in which pallid bats were observed. Note that acoustic observations are number of calls and not number of individual bats.

No. Observed	Survey Year	Type of survey	Agency
5	1929	Unknown-Historical	DNWR
13	1929	Unknown-Historical	Unknown
2	1930	Unknown-Historical	DNWR
2	1940	Unknown-Historical	DNWR
2	1965	Unknown-Historical	Unknown
5	1996	Unknown-Historical	Unknown
2	2000	Unknown-Historical	Unknown
1	2001	Unknown-Historical	Unknown
1	2007	Unknown-Historical	Unknown
14	2008	Mist Netting Survey	NNRP
29	2010	Mist Netting Survey	NNRP
2	2010	Acoustic Survey	NNRP
3	2011	Mist Netting Survey	NNRP
119	2014	Acoustic Survey	NNRP
28	2015	Acoustic Survey	NNRP

RECENT AND HISTORICAL OBSERVATIONS

The USGS has documented the occurrence of the pallid bat in several counties in Nevada. The pallid bat has been trapped and identified on the Nevada National Security Site (NNSS). In 1928-1930, several pallid bat observations were recorded in the Indian Springs area. Specifically, it has been found in Clark, Lincoln, and Nye Counties, but no sightings of the pallid bat within the NTTR have been recorded prior to 2010. In 2008, 13 pallid bats were trapped in mist nets near Sandia Pond on the North Range Study Area. Mist net traps at Cactus Spring near Cactus Peak on the North Range Study Area caught ten pallid bats in 2010 and three in 2011. Acoustic Surveys on various locations on the North Range Study Area detected two pallid bats in 2010, five bats in 2014, and four bats in 2015 (Figure 18).

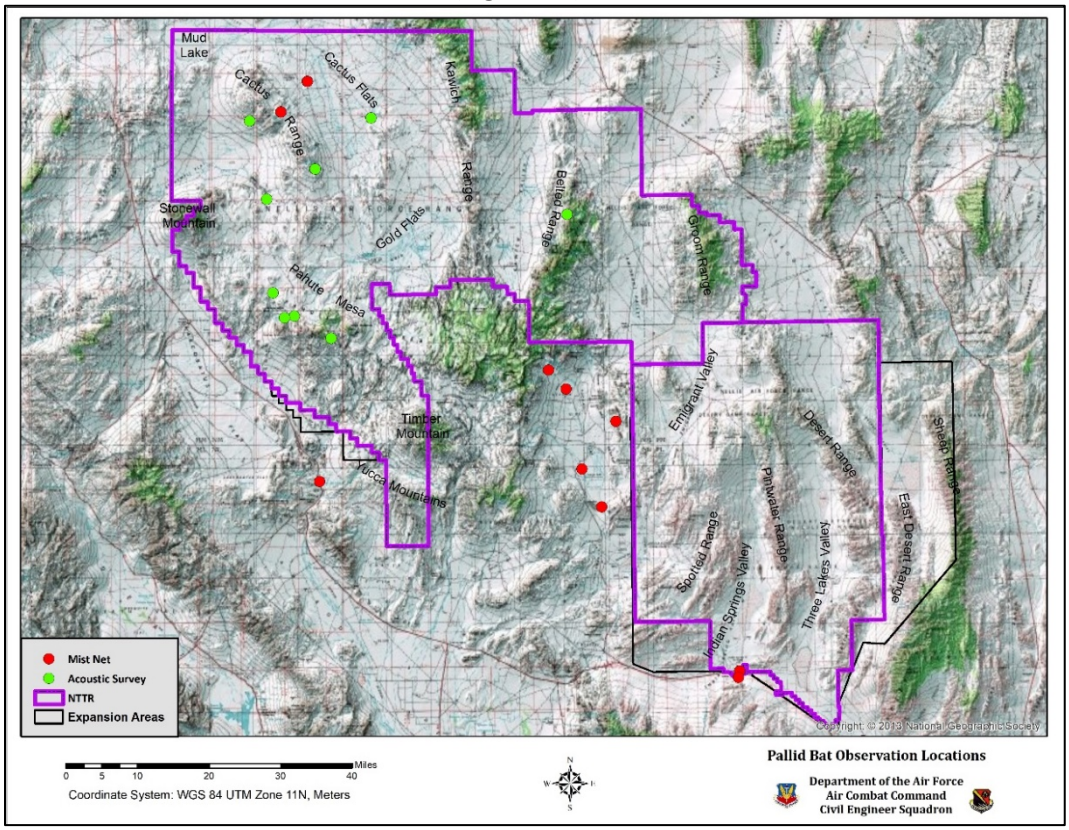


Figure 18. Locations where pallid bats have been observed in and around the study area

TOWNSEND'S BIG-EARED BAT

Regulatory Status:

- United States Fish and Wildlife Service: None
- U.S. Forest Service: R4S, R5S
- Bureau of Land Management: S
- State of Nevada: Sensitive Mammal
- Nevada Department of Wildlife: SOCP
- Nevada Natural Heritage Program Global Rank: G3G4
- Nevada Natural Heritage Program State Rank: S2

Townsend's big-eared bat

BACKGROUND INFORMATION

Townsend's big-eared bat (*Corynorhinus townsendii*) is a medium-sized, pale-gray or brown colored bat with a buff stomach. Its ears appear to be quite large (1.5 in.) in comparison to the rest of the bat and extend to the middle of the bat's back when folded backwards. The face is marked by two large glands on each side of its nose (Arizona-Sonora Desert Museum, 2017). Townsend's big-eared bat exhibits colonial behavior with females aggregating in the spring at nursery sites. Young are usually born in late spring or early summer. The nursery colonies remain intact until late summer or early fall when the young become independent. This bat population has declined by direct mortality as a result of abandonment of roosts caused by anthropogenic disturbance (Arroyo-Cabrales & Alvarez-Casteneda, 2008). These bats can be found throughout the western U.S. from British Columbia to central Mexico (Arizona-Sonora Desert Museum, 2017). Townsend's big-eared bats are found in several different habitats including coniferous forests and woodlands, deciduous riparian woodland, semi-desert, and montane shrublands (Nowak R. , 1999). The bat is usually found at elevations between 700 and 11,500 ft. MSL in Nevada in pinyon-juniper-mahogany, white fir, blackbrush, sagebrush, salt desert scrub, agricultural, and occasionally urban habitats (Nevada Natural Heritage Program, 2016).

Unlike most bats, the Townsend's big-eared bat prefers to roost on open rock faces and not in cracks and crevices in caves, mines, cliffs and canyons (Arizona-Sonora Desert Museum, 2017). The bat prefers caves and mine tunnels for hibernation and maternity colonization (Arroyo-Cabrales & Alvarez-Casteneda, 2008). Hibernacula are usually in cold areas such as cave or mine entrances and in well-ventilated areas (Nevada Natural Heritage Program, 2016).

Townsend's big-eared bats are insectivores that emerge late in the day to feed (Barbour & Davis, 1969). This species feeds on small moths, capturing them from foliage or in flight (Kunz & Martin, 1982). Moths contribute to about 90% of the diet of the Townsend's big-eared bat. Favorite feeding sites include edge habitat along streams adjacent to and within wooded habitats (Nevada Natural Heritage Program, 2016).

Table 7. Year and type of survey and the agency conducting the survey in which Townsend's big-eared bats were observed

No. Observed	Survey Year	Type of survey	Agency
10	1933	Unknown-Historical	Unknown
5	1961	Unknown-Historical	Unknown
1	1963	Unknown-Historical	Unknown
1	2004	Unknown-Historical	Unknown
2	2009	Acoustic Survey	NNRP
1	2010	Mist Net Survey	NNRP
1	2011	Mist Net Survey	NNRP
1	2013	Mist Net Survey	NNRP
1	2014	Acoustic Survey	NNRP
1	2015	Acoustic Survey	NNRP

RECENT AND HISTORICAL OBSERVATIONS

Only four observations of Townsend's big-eared bats have been recorded prior to 2009 for the study area. These occurred from 1933 to 1963 in Nye County near Beatty and on

the NNSS. The NNRP made several observations of the species via mist netting and Anabat surveys from 2009 to 2015. Locations of the observations are provided in Figure 19.

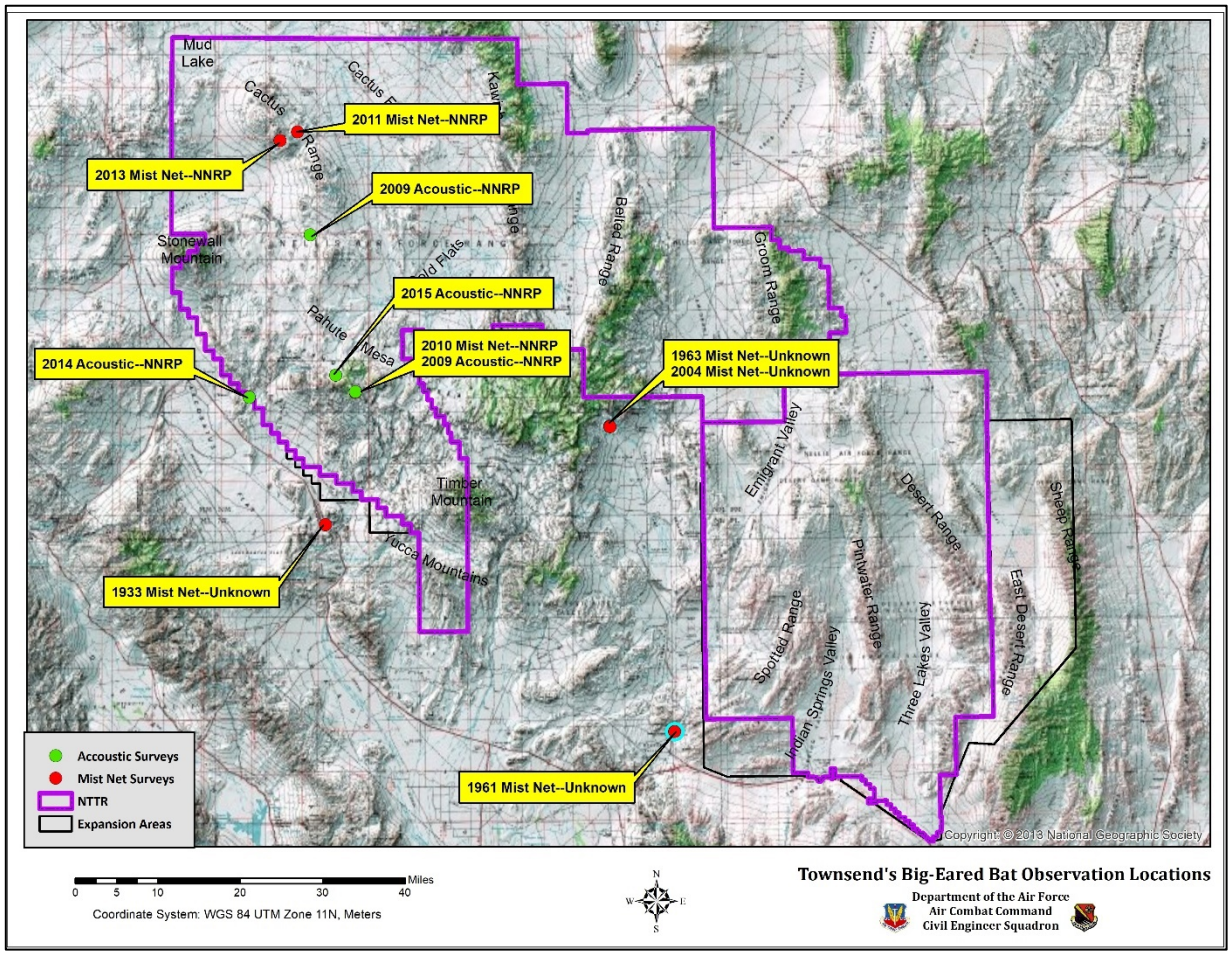


Figure 19. Locations where Townsend's big-eared bats have been captured in mist nets or detected in Anabat surveys in and around the study area

FRINGED MYOTIS

Regulatory Status:

- United States Fish and Wildlife Service: None
- U.S. Forest Service: R5S
- Bureau of Land Management: S
- State of Nevada: Protected Mammal
- Nevada Department of Wildlife: SOCP
- Nevada Natural Heritage Program Global Rank: G4
- Nevada Natural Heritage Program State Rank: S2

Fringed myotis

BACKGROUND INFORMATION

The fringed myotis (Myotis thysanodes) occurs in western North America, from British Colombia to southern Mexico, with a disjunctive population occurring in the Black Hills of Wyoming and South Dakota (O'Farrell & Studier, 1980). The fringed myotis

gained its name from the row of fringe hairs extending past the uropatagium. The full length of the bat is 1.5 to 2.5 in. The fur pelage is yellowish-brown to dark with olive-green tones across the entire body (O'Farrell & Studier, 1980). The color varies geographically, with darker coloration in northern populations (Miller & Allen, 1928).

This bat is commonly found in oak, pinyon, and juniper woodlands or ponderosa pine forest at mid-elevations (Roest, 1951). They also are found in deserts, grasslands, and other types of woodlands. Current information indicates that the fringed myotis is mostly found in dry habitats with mosaics of open areas (e.g., grasslands and deserts) interspersed with mature forests (usually ponderosa pine, pinyon-juniper, or oak) (Keinath D. A., 2004). Most desert and steppe populations are usually found within a one hour flight from forested or riparian areas at elevations from 4,000 to 7,000 ft. MSL (O'Farrell & Studier, 1980).

The fringed myotis is known to migrate but little is known about the migration patterns or destinations (Hoffmeister D. , 1970). Studies suggest that the fringed myotis colonizes maternity roosts in mid-April to mid-May, after which populations become stable until the end of summer when the bats slowly leave the roost (O'Farrell & Studier, 1975).

Fringed myotis maintains a low level of body fat throughout the spring and summer. The bats gain fat rapidly in late summer and early fall, suggesting that colonies may migrate to winter hibernacula (Wilson & Ruff, 1999). While the distance of the hibernacula from the breeding grounds is unknown, it is unlikely that the distance is great based upon the generally slow, maneuverable, and energetically demanding flight of this bat (Keinath D. A., 2004). Desert populations appear to migrate to higher locations in desert mountain ranges to hibernate to avoid warm temperatures at lower elevations (Keinath D. A., 2004).

Roost loss and modification, habitat alteration, and toxic chemicals are some of the possible causes for decline in fringed myotis populations.

RECENT AND HISTORICAL OBSERVATIONS

One fringed myotis female was trapped on the NNSS in 2004 near East Tunnel Pond (Figure 20). Three acoustic files were also recorded at that time and a juvenile male was captured. In 2006, several recordings of fringed myotis were documented on the NNSS. Last, one female and three juveniles were captured on NNSS in 2009. On the North Range Study Area, ten fringed myotis were captured at Pillar Spring in 2010. In 2011, one bat was captured at Cactus Peak. Additionally, acoustic surveys detected fringed Myotis at several locations in 2009 (Pillar and Antelope Springs), 2010 (Pillar Springs), 2014 (Yellow Gold Mine, Monte Cristo Spring, and Antelope Mines #1 and #4), and 2015 (Tolicha Peak Area).

Table 8. Year and type of survey and the agency conducting the survey in which fringed myotis were observed. Note that acoustic observations are number of calls and not number of individual bats.

No. Observed	Survey Year	Type of survey	Agency
4	2004	Unknown-Historical	Unknown
1	2004	Mist Netting Survey	NTS
1	2006	Mist Netting Survey	NTS
48	2006	Acoustic Survey	NTS
4	2009	Mist Netting Survey	NTS
3	2009	Acoustic Survey	NNRP
10	2010	Mist Netting Survey	NNRP
58	2010	Acoustic Survey	NNRP
1	2011	Mist Netting Survey	NNRP
96	2014	Acoustic Survey	NNRP
98	2015	Acoustic Survey	NNRP

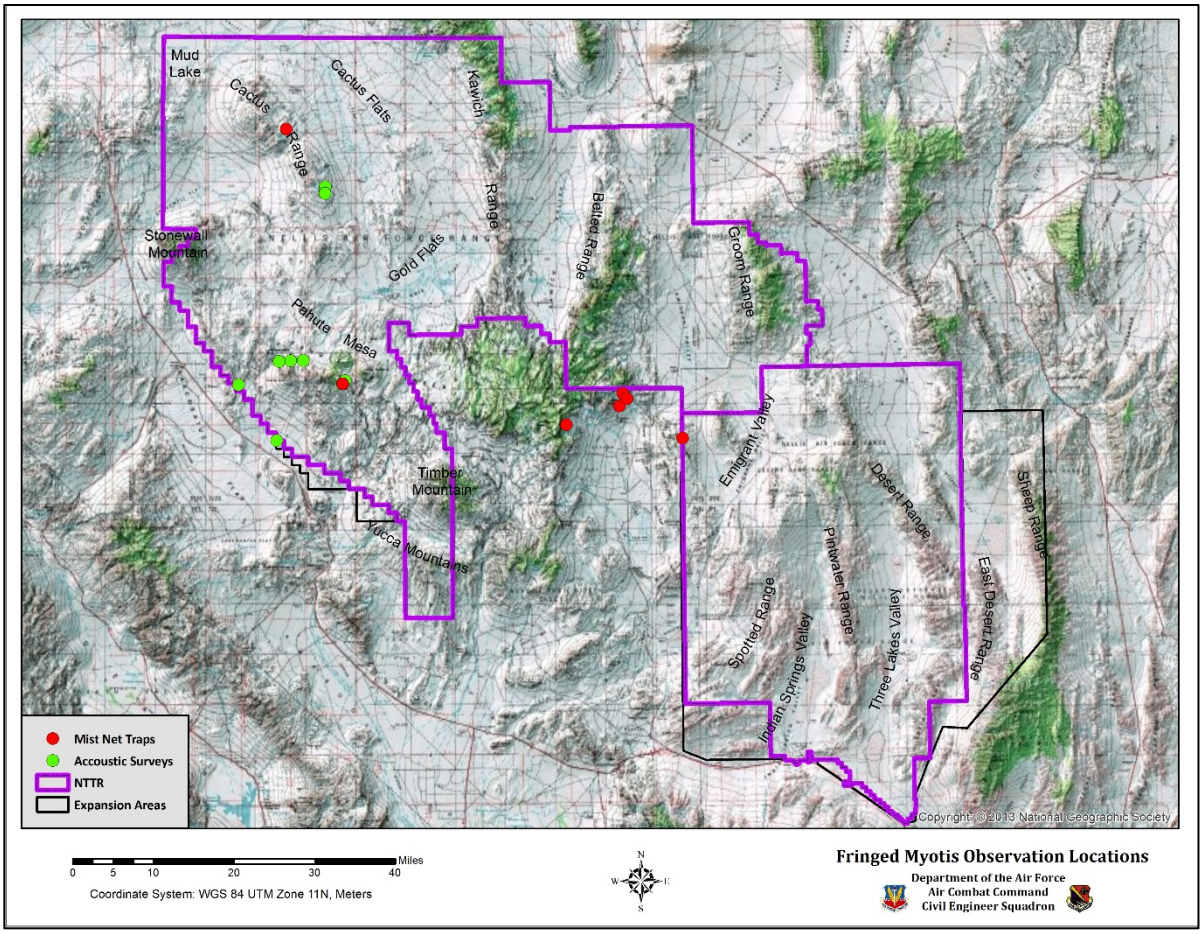


Figure 20. Locations where fringed Myotis bats were trapped or detected by acoustic surveys in and around the study area

MEXICAN FREE-TAILED BAT

Mexican free-tailed bat (Photo by S. Pedersen)

Regulatory Status:

- United States Fish and Wildlife Service: None
- U.S. Forest Service: None
- Bureau of Land Management: S
- State of Nevada: Protected Mammal
- Nevada Department of Wildlife: SOCP
- Nevada Natural Heritage Program Global Rank: G5
- Nevada Natural Heritage Program State Rank: S3S4B

BACKGROUND INFORMATION

The Mexican free-tailed bat (*Tadarida brasiliensis*) is also referred to as the Brazilian free-tailed bat, depending on the location. This bat is distinguished from other bats by the deep vertical wrinkles on its upper lip and its z-shaped third molar (Hall E. R., 1981). It is a small to medium-sized bat averaging 3.6 in. long. Its tail extends past the uropatagium, giving it a "free-tailed" appearance. The bat is dark brown with hairy flight membranes. The ventral pelage

is slightly lighter than the dorsum. The pelage is paler brown in individuals inhabiting caves, possibly resulting from bleaching by ammonia fumes (Wilkins, 1989).

Mexican free-tailed bats inhabit caves, mine tunnels, old wells, hollow trees, and other primary roost retreats (Feldhamer, Thompson, & Chapman, 2003). The bats prefer roosts that are dark, cool, and relatively dry and where a colony can exist. These colonies can range from several dozen to several million individuals. The caves, buildings and bridges are used for roosting because this species requires unobstructed space below the roost in which to drop when taking flight (Schmidly D. , 2004). The bats emerge early in the evening, usually a few minutes after sunset, but the exact time varies with environmental cues and energy requirements (Reichard, Gonzalez, Caitlin M. Casey, Hristov, & Kunz, 2009).

The diet of this bat is comprised of moths and beetles, with other foods including flying ants, true bugs, wasps and bees, termites, grasshoppers, spiders, lice, and mites (McWilliams, 2005). They are known to feed on swarms of insects and can have a significant impact on insect populations. This bat flies rapidly and aggressively, but rather high (45 ft. or more) except when sweeping over water to drink (Schmidly D. , 2004). The long, angular narrow wings of this species allow for easy identification in flight (Schmidly D. , 2004).

The Mexican free-tailed bat is one of the most widely distributed bat species in the western hemisphere. It lives in southern North America in the summer and migrates to South America during the winter. Populations around the central and southern U.S. often migrate west in late February to March to roost and raise young. In late August and September, they will migrate back to Mexico and Central America (Schwartz, et al., 2007).

The Mexican free-tailed bat is usually found in dry, lower elevations, but may be found as high as 9,800 ft. MSL in the western mountain ranges of the U.S. They are most often associated with desert scrub plant communities within Nevada as well as coniferous woodlands in higher elevations and throughout its larger range.

RECENT AND HISTORICAL OBSERVATIONS

Historically, the Mexican free-tailed bat has been identified as early as 1929 and 1934 near Indian Springs, Nevada (Figure 21). In 1965, the species was observed six miles north of Beatty along the Amargosa River. In 1996, a sighting of the species was made on the NNSS in East Yucca Flat. Although the Mexican free-tailed bat has not been captured by the NNRP, it has been detected by Anabat surveys at several locations across the North Range Study Area.

Table 9. Year and type of survey and the agency conducting the survey in which Mexican free-tailed bats were observed. Note that acoustic observations are number of calls and not number of individual bats.

No. Observed	Survey Year	Type of survey	Agency
1	1929	Unknown-Historical	USFWS
1	1934	Unknown-Historical	Unknown
3	1965	Unknown-Historical	Unknown
1	1996	Unknown-Historical	Unknown
1	2009	Acoustic Survey	NNRP
17	2010	Acoustic Survey	NNRP
352	2013	Acoustic Survey	NNRP
447	2014	Acoustic Survey	NNRP
2,025	2015	Acoustic Survey	NNRP

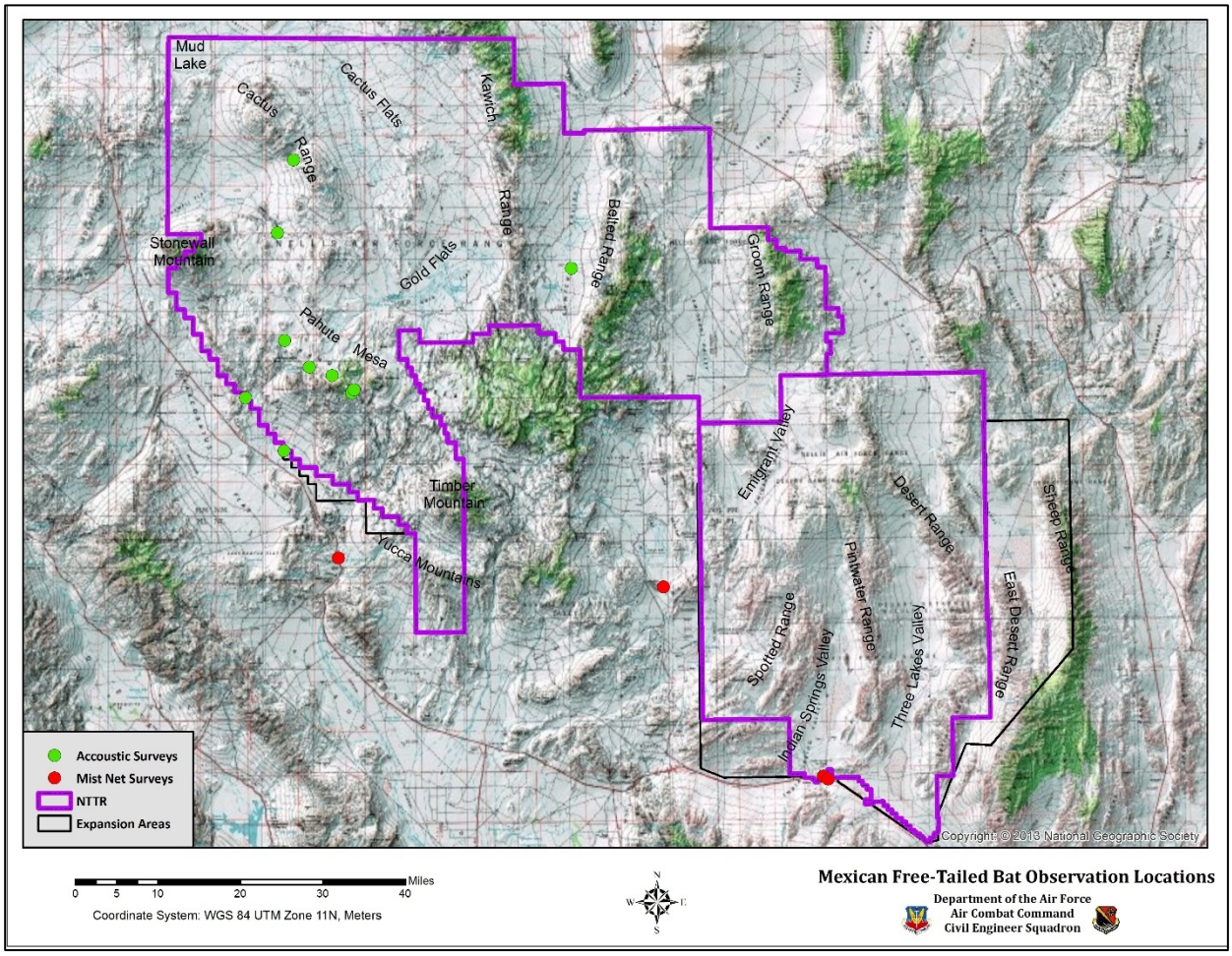


Figure 21. Locations where the Mexican free-tailed bat has been captured or detected by Anabat Surveys in and around the study area

DESERT POCKET MOUSE

Regulatory Status:

- United States Fish and Wildlife Service: None
- U.S. Forest Service: None
- Bureau of Land Management: None
- State of Nevada: None
- Nevada Department of Wildlife: SOCP
- Nevada Natural Heritage Program Global Rank: G5
- Nevada Natural Heritage Program State Rank: S1S2

Desert pocket mouse

BACKGROUND INFORMATION

The desert pocket mouse (*Chaetodipus penicillatus*) is found in the deserts of the southwestern United States (Linzey, Timm, Alvarez-Castaneda, Castro-Arellano, & Lacher, 2016). The average length of a desert pocket mouse is 8.0 in. including its 4.0 inch tail with an average weight of 0.50 to 0.80 oz. (Schmidly D. , 2004). This species has upper parts that are grayish-brown with sprinkles of black with a white underside. It has no lateral line or spines on its rump (Schmidly D. , 2004). The soles of the hind feet are whitish and about 1 in. long. The average lifespan for a desert pocket mouse is one year. Females may bear one or two litters during that year from early spring to late summer. On average, gestation takes 23 days with one to seven young per litter (Chebes, 2002).

The desert pocket mouse prefers sandy, sparsely-vegetated desert habitat especially rock-free bottom-land soils along rivers and streams (Hall E. , 1946; Ingles L. , 1965). Desert pocket mice are nocturnal and may become torpid for several days in the summer if temperatures are high (Nevada Natural Heritage Program, 2016). The home range size for the desert pocket mouse is less than one acre (Nevada Natural Heritage Program, 2016; Chebes, 2002).

The desert pocket mouse forages on seeds of grasses, forbs, and shrubs; preferably under the brush canopy. Mesquite, creosote-bush, and broomweed seeds have been found to be part of the mouse's diet (Chebes, 2002). It burrows into the desert soil to find seeds from grasses or shrubs. The mouse builds burrows for winter seed storage. In some areas, the desert pocket mouse may be inactive for the winter months in southern Arizona, but remains active year-round in most of its range (Chebes, 2002).

RECENT AND HISTORICAL OBSERVATIONS

No historic or recent observations of the desert pocket mouse have been made in the vicinity of the study area.

DESERT VALLEY KANGAROO MOUSE

Regulatory Status:

- United States Fish and Wildlife Service: None
- U.S. Forest Service: None
- Bureau of Land Management: S
- State of Nevada: Protected Mammal
- Nevada Department of Wildlife: SOCP
- Nevada Natural Heritage Program Global Rank: G4T2
- Nevada Natural Heritage Program State Rank: S2

Desert Valley kangaroo mouse (Photo by Aaron Ambos)

BACKGROUND INFORMATION

The desert valley kangaroo mouse (*Microdipodops megacephalus albiventer*) is a subspecies of the dark kangaroo mouse (*Microdipodops megacephalus*). It is a bipedal rodent who uses its hind legs to hop and its long tail for balance as a major mode of escape and fast movement (Burnie, 2001). The mouse also makes use of its short forelimbs for slower movements, such as foraging (Jameson & Peeters, 2004). The desert valley kangaroo mouse is endemic to the western U.S. and is found in most of Nevada.

The desert valley kangaroo mouse has a head that is about the same size as its body. It has large ears and prominent eyes. This mouse is equipped with fur-lined external cheek pouches used to store and carry food (Rafferty, 2011). The desert valley kangaroo mouse excavates a simple, unbranched underground burrow system (Roots, 2006) with burrows or tunnels no longer than 6 ft. and rarely more than 1 ft. deep with the entrance usually located near or under a shrub. The desert valley kangaroo mouse will typically

plug the entrance to the burrow when it returns after a night of foraging to prevent water evaporation (Ingles L. , 1947).

The desert valley kangaroo mouse typically hibernates between November and March (Rafferty, 2011). After hibernation in the spring, the mice emerge from their burrows and the breeding season is initiated (Reid, 2006). The female kangaroo mouse averages two to seven young (Burnie, 2001), with most of the litters being born in May and June. Most females produce more than one litter each season (Rafferty, 2011).

The male desert valley kangaroo mouse establishes its territory, which is as large as 1.5 acres. Females also establish territories that are usually much smaller than those of the male, being less than 0.1 acre in size (Burnie, 2001).

The diet of the desert valley kangaroo mouse is dominated by small seeds (Burnie, 2001), but may also include small insects (Rafferty, 2011) such as beetles and butterfly larvae (Verts & Carraway, 1998). The desert valley kangaroo mouse also occasionally eats green vegetation (Verts & Carraway, 1998). Most research indicates that this rodent does not appear to actively drink water (Burnie, 2001) and obtains moisture and water from the food it eats (Rafferty, 2011). Water loss is minimized by efficient removal of water from urine and feces, resulting in highly concentrated urine and dry feces (Rafferty, 2011).

The desert valley kangaroo mouse stores body fat in the center of its tail (Rafferty, 2011), which becomes larger during the summer as more fat is deposited. The tail decreases in size during hibernation as the fat is removed and used as a source of energy (Bowers, Bowers, & Kaufman, 2007).

RECENT AND HISTORICAL OBSERVATIONS

The only historical observation of this species was in 1937 near Groom Lake in Emigrant Valley. More recently in 2005, the species was identified by John C. Hafner during small mammal surveys on the North Range of the NTTR (Figure 22).

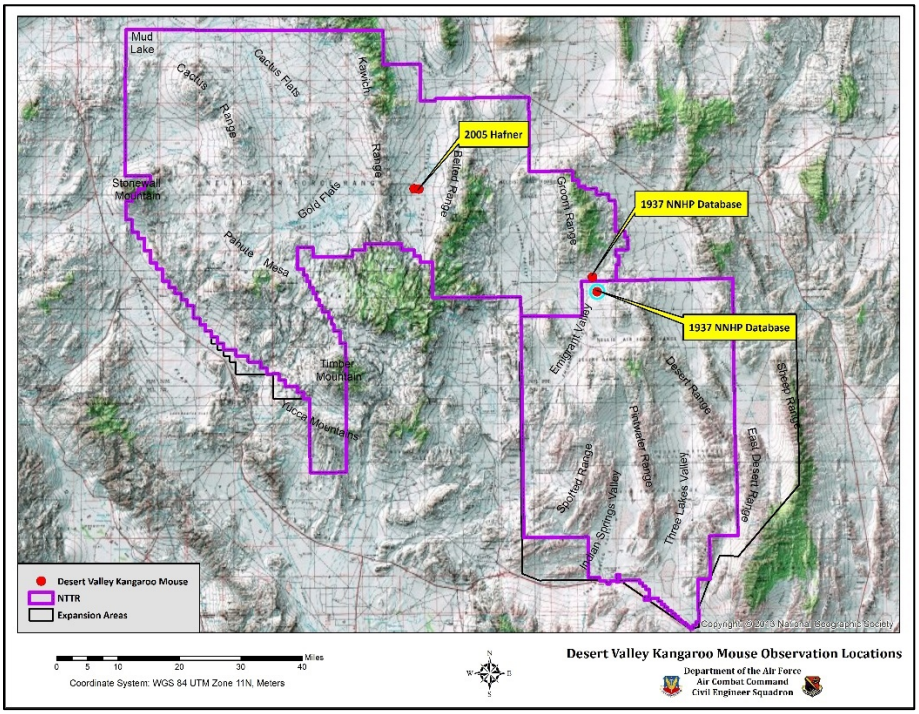


Figure 22. Locations where the desert valley kangaroo mouse has been identified in and around the study area

PALLID KANGAROO MOUSE

Regulatory Status:

- United States Fish and Wildlife Service: None
- U.S. Forest Service: None
- Bureau of Land Management: S
- State of Nevada: Protected Mammal
- Nevada Department of Wildlife: SOCP
- Nevada Natural Heritage Program Global Rank: G3
- Nevada Natural Heritage Program State Rank: S2

Pallid kangaroo mouse

BACKGROUND INFORMATION

The pallid kangaroo mouse (*Microdipodops pallidus*), also known as the pale kangaroo mouse, is a small, rodent endemic to the Great Basin Desert of western North America (Hafner & Hafner, 1998). The mouse's body is about 6 in. long, with a 3 to 4 in. tail (O'Farrell & Blaustein, 1974). The top coat of the mouse is pale pink-cinnamon and the undercoat is white. The pallid kangaroo mouse lacks the black-tipped tail that is common on most other kangaroo mice. The tail of the pallid kangaroo mouse is widest near its center and thin at each end (Hall & Kelson, 1959). In general, most of the female pallid kangaroo mice have more than one litter per season (Nowak R. , 1999). Breeding begins in March and lasts until August, with most liters born in May and June. Litters range from two to seven young (Woods, 1990; Nowak R. , 1999). Burrows are approximately 4 in. deep and can be easily crushed by people, large animals, and heavy equipment (Hall & Kelson, 1959). Common predators include coyotes, badgers, rattlesnakes, owls, and hawks (Hall E. R., 1941).

The pallid kangaroo mouse has an external, fur-lined pouch on each cheek that the mouse uses to carry seeds to its burrow for storage. They primarily forage nocturnally (Merriam, 1901). Hall (1946) described this species as being primarily granivorous, but also eats insects. Free water is not required because all water is obtained through food and an efficient kidney (Woods, 1990). Like many kangaroo mice, this species' tail thickens in the proximal third or half for fat storage in preparation for hibernation or torpor (Bartholomew & MacMillen, 1961). Torpidity is recurrent and related to both environmental temperatures and food supply. Thus, the mouse can maintain body weight and accumulate food stores under a variety of conditions (Brown & Bartholomew, 1969). These adaptations make the kangaroo mouse highly successful in the Mojave/Sonoran and Great Basin ecosystems.

The pallid kangaroo mouse habitat is restricted to areas of fine sand which support some plant growth (Bartholomew & MacMillen, 1961) such as intermountain cold desert scrub habitats, and is typically found in sandy habitats of southern Nevada (Hafner, Upham, Reddington, & Torres, 2008). Microhabitats include alkaline sinks and desert scrub dominated by various species of shadscale (*Atriplex* spp.) or big sagebrush (*Artemisia tridentata*). The mouse favors loose, windblown sand accumulating at the base of shrubs and is less common in gravelly soil (Wildlife Action Plan Team, 2006). They spend the day below ground in their burrows which are plugged shut by the mice to conserve moisture (Hall E. R., 1941). The male of this species establishes a territory about 1.63 acres in size, while the female has a smaller territory about 1.0 acre in size (Nowak R. , 1999).

RECENT AND HISTORICAL OBSERVATIONS

The NNRP has found this species only within the vicinity of sand dunes or sandy soils on the NTTR. All captures occurred in areas supporting loose, sandy soils, often on sand dunes and stabilized sand dunes (Figure 23). In 1921, four populations were identified just south of the Groom Range in Emigrant Valley.

In 1931, several pallid kangaroo mice were observed in the basins on the east side and west side of the Kawich Range. Two of the species were trapped in Stonewall Flats on the North Range Study Area by John C. Hafner in 2003 and 2005. In 2006, traps were set at the Kawich Dunes and sandy soils located north of Lamb's Pond in the North Range Study Area. During these trapping events, twenty-one females and thirteen males were captured. Six pallid kangaroo mice (three females, three males) were captured in sandy soils located on the east side of Mud Lake in 2009. In 2013, three females and six males were captured in stabilized dunes located near the Cactus Range. These results indicate that pallid kangaroo mice are present and inhabit sandy soils on the North Range Study Area. Sand dunes on the South Range Study Area have not been surveyed as of 2016, but could potentially support populations of pallid kangaroo mice.

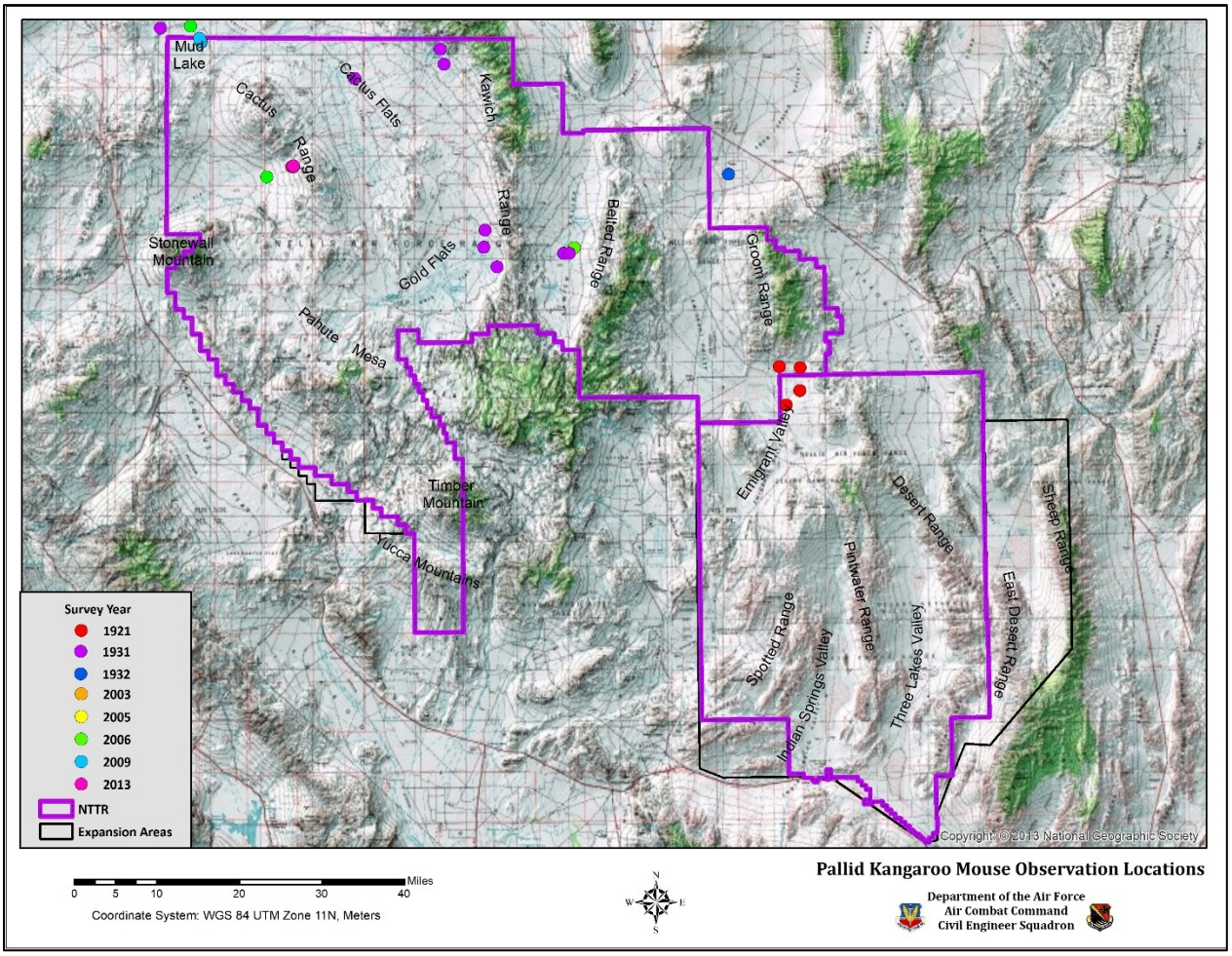


Figure 23. Locations where pallid kangaroo mice were trapped in and around the study area

PAHRANAGAT VALLEY MONTANE VOLE

Regulatory Status:

- United States Fish and Wildlife Service: None
- U.S. Forest Service: None
- Bureau of Land Management: None
- State of Nevada: Sensitive Mammal

- Nevada Department of Wildlife: None
- Nevada Natural Heritage Program Global Rank: G5T2
- Nevada Natural Heritage Program State Rank: S1S2

BACKGROUND INFORMATION

The Pahranagat Valley montane vole (*Microtus montanus fucosus*) is generally found in alpine meadows in Nevada. According to the Nevada Wildlife Action Plan, the vole prefers Mojave rivers and streams, intermountain rivers and streams, wet meadows, agricultural land, and marshes. In agricultural areas, they especially enjoy grassy fields, pastures and legumes along fence rows, streams and lakes (Wildlife Action Plan Team, 2006). Typically, the vole constructs burrows and surface runways that are shallow. The vole diet includes grasses, sedges, and the leaves, stems, and roots of forbs (Cassola, 2016). Predators include hawks, owls, foxes, badgers, and coyotes. Montane voles are active throughout the year but are nocturnal in summer months. The vole breeds during the period from April to October and typically produces six young in each of two to three litters per year (Cassola, 2016). The population appears to be a subspecies isolated to the springs in Pahranagat Valley with one population identified at Pahranagat Creek (Wildlife Action Plan Team, 2012).

RECENT AND HISTORICAL OBSERVATIONS

The Pahranagat Valley montane vole has not been observed in or around the study area recently or historically. No map is provided.

CORN CREEK PYRG

Regulatory Status:

- United States Fish and Wildlife Service: None
- U.S. Forest Service: None
- Bureau of Land Management: None
- State of Nevada: None
- Nevada Department of Wildlife: SOCP
- Nevada Natural Heritage Program Global Rank: G1
- Nevada Natural Heritage Program State Rank: S1

BACKGROUND INFORMATION

The Corn Creek pyrg (*Pyrgulopsis fausta*) is a freshwater spring snail that inhabits thermal springs at about 73° F. Only two sightings have been made of this species, both in Clark County, Nevada. The minimum known elevation is 2,900 ft. MSL (NatureServe Explorer, 2016; Nevada Natural Heritage Program, 2016). Development of the thermal springs at Corn Creek resulted in a reduction in the abundance of the species. The reduction in population appeared to be the result of the construction of a concrete liner at the main outflow of the Corn Creek Spring. Estimates of the populations in 1999-2001 indicated that the species was restricted to an estimated 3.3 ft. x 16.4 ft. area of habitat (Hershler R. , 1998). The species is currently under review to determine its status as an endangered or threatened species. The 2011, a 90-day petition indicated that further research to determine status was warranted (U.S. Fish and Wildlife Service, 2011). Although a few species of this genus are widespread in the region, 22 of the new species appear to be restricted to single localities. This fauna is largely restricted to specific spring areas, but a few springs are known to harbor two or three species of this genus (Hershler R. , 1998).

RECENT AND HISTORICAL OBSERVATIONS

No recent or historic observations of this species have been made in or around the study area. Therefore, no map of observations is provided.

PLANOCONVEX CORDMOSS

Regulatory Status:

- United States Fish and Wildlife Service: None
- U.S. Forest Service: None
- Bureau of Land Management: None
- State of Nevada: None
- Nevada Department of Wildlife: None
- Nevada Natural Heritage Program Global Rank: G1
- Nevada Natural Heritage Program State Rank: S1

BACKGROUND INFORMATION

The Planoconvex cordmoss (*Entosthodon planoconvexus*) is an ephemeral moss only known from 3 locations worldwide (Rare Plant Committee, 2005). The plant is a typical cordmoss with yellowish green with contorted leaves caused by dryness. A full description of the species can be found in detail in the Flora of North America (Miller & Miller, 2007). The minimum known elevation where this species has been found is 3,790 ft. MSL. The moss is often intermixed with an undescribed and apparently rare species of liverwort (*Targionia spp.)* (NatureServe Explorer, 2016).

RECENT AND HISTORICAL OBSERVATIONS

The only sighting of this moss in the vicinity of the study area is found on the NNSS in Mercury Valley/Rock Valley in the north-facing foothills of the Specter Mountains in 2001 (Figure 24).

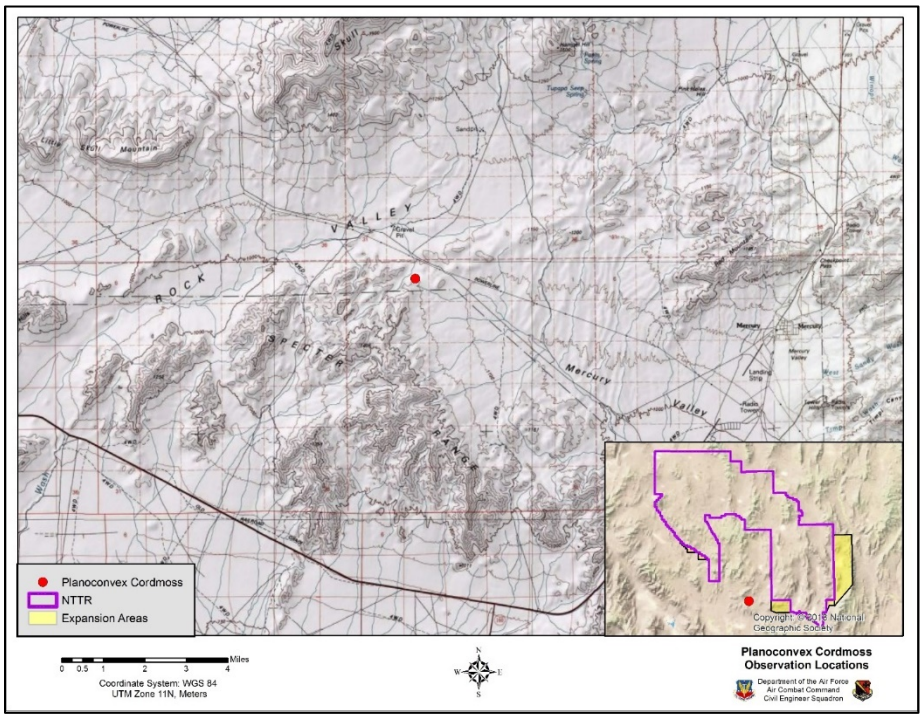
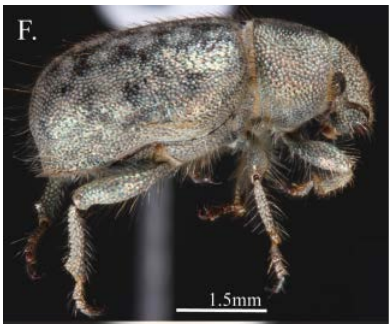


Figure 24. Locations where planoconvex cordmoss has been observed in and around the study area

BIG DUNE MILODERES WEEVIL

Regulatory Status:

- United States Fish and Wildlife Service: None
- U.S. Forest Service: None
- Bureau of Land Management: S
- State of Nevada: None
- Nevada Department of Wildlife: None
- Nevada Natural Heritage Program Global Rank: G1
- Nevada Natural Heritage Program State Rank: S1



Big Dune Miloderes weevil (Photo by Van Dam)

BACKGROUND INFORMATION

The Big Dune Miloderes weevil (*Miloderes* sp.) is in the Miloderes genus which encompasses a small variety of endemic desert weevils found in the Mojave Desert and the Amargosa Desert (Van Dam & O'Brien, 2015). Their primary habitat is sand dunes, with a major site in Nevada being Big Dune in the Northern Mojave, located south of Beatty. Within this habitat, only a portion of the dune offers protection for the genus. Off-road vehicle activity on Big Dune threatens the genus (The Nature Conservancy of Nevada, 2001).

RECENT AND HISTORICAL OBSERVATIONS

No observations of this species have been made recently or historically in or around the study area. The species has only been positively identified in the Big Dune area, but the species could potentially be found in sand dune habitat on the study area. No map of observations is provided.

ENDEMIC ANT

Regulatory Status:

- United States Fish and Wildlife Service: None
- U.S. Forest Service: None
- Bureau of Land Management: None
- State of Nevada: None
- Nevada Department of Wildlife: None
- Nevada Natural Heritage Program Global Rank: G1
- Nevada Natural Heritage Program State Rank: S1

Endemic ant

BACKGROUND INFORMATION

The endemic ant (*Neivamyrmex nyensis)* is a type of army ant found in parts of Nye County, Nevada. Very little is known about these insects. Specimens have been found in Coconio County in Arizona, in Imperial, Riverside and San Bernardino Counties in California, and in Baja California (Snelling & Snelling, 2007). The ants are approximately 0.1 inches long with sides curved outwards. Their bodies are shiny and smooth, though some parts are less shiny due to places where the sides of the mesothorax are granulated. The ants are yellow with red to brown mandibles. The point where their antenna attach to their head is not depressed and their tarsal claws have no teeth. The ant's eyes do not have a convex cornea (Watkins J. F., 1977).

The species has only been found in a limited number of places. A primary source of specimens by Watkins (1977) were collected under partially buried rocks following a rain. Thus, there is some question about

the species, and a synonymy analysis indicates the species identified by Watkins may have been worker ants from the species *Neivamyrmex mojave* (Snelling & Snelling, 2007).

RECENT AND HISTORICAL OBSERVATIONS

No observations of this species have been made recently or historically in or around the study area. No map of observations is provided.

GIULIANI'S DUNE SCARAB

Regulatory Status:

- United States Fish and Wildlife Service: None
- U.S. Forest Service: None
- Bureau of Land Management: S
- State of Nevada: None
- Nevada Department of Wildlife: None
- Nevada Natural Heritage Program Global Rank: G1
- Nevada Natural Heritage Program State Rank: S1

Guiliani's dune scarab (Photo by Richard Rust)

BACKGROUND INFORMATION

Giuliani's dune scarab (*Pseudocotalpa giulianii*) is a Nevada sand dune beetle which occupies the Big Dune complex and Lava Dune complex south of Beatty (Fish and Wildlife Service, 1978). These beetles are 0.75 to 1.0 in. long and 0.25 to 0.50 in. wide. The adults are light tan with a yellowish head, and the legs are darker tan with reddish brown feet (tarsi) and claws. Males and females are similar in appearance, but can be identified by the size of the claws at the end of their rear legs. Female claws are equal, whereas the outer claw of the male is twice as long as the inner (Fish and Wildlife Service, 2012)

While inactive, the beetles reside underground, typically about 15 inches beneath the surface (Wild Earth Guardians, 2016). This action protects them from the harsh surface weather, which is hot and arid. Sand dunes are typically not stable, though the depth at which the beetles bury is sufficiently stable for short time periods. The beetles live on decomposing plant matter. It should be noted that while the species inhabits Big Dune and Lava Dune, a combined area of approximately 1,200 acres, the range may extend into surrounding sandy areas. However, the beetles have not been found on other dunes in the area (Fish and Wildlife Service, 2012).

Upon a 1978 review, the species was considered threatened by the Fish and Wildlife Service (Fish and Wildlife Service, 1978). However, a Congressional deadline was not met and the proposal failed (Wild Earth Guardians, 2016). During more recent research, it was found that the population of the species was rather small, with estimates of 1,000 to 5,000 total individuals. Larvae and eggs were also found, but the time of larvae emerge has not been determined. While research suggests a sex ratio favoring females by a factor of 5 to 10, actual samplings have found significantly more males than females, at a value of 136:4 (Fish and Wildlife Service, 2012). A dominant factor threatening the beetle population is off-road vehicle recreation, which disturbs the beetle's habitat (Wild Earth Guardians, 2016).

RECENT AND HISTORICAL OBSERVATIONS

No observations of this species have been made recently or historically in or around the study area. The species is known in the area of Big Dune and Lava Dune, both of which are not in close proximity to the study area. Sand dune habitat in the study area could potentially support populations of these species, but because of the distance from the known location, it is doubtful. No map of observations is provided.

LARGE AEGIALIAN SCARAB

Regulatory Status:

- United States Fish and Wildlife Service: None
- U.S. Forest Service: None
- Bureau of Land Management: S
- State of Nevada: None
- Nevada Department of Wildlife: None
- Nevada Natural Heritage Program Global Rank: G1
- Nevada Natural Heritage Program State Rank: S1

Large Aegialian scarab (Photo by Richard W. Rust (Bureau of Land Management, 2004)

BACKGROUND INFORMATION

The large Aegialian scarab (*Aegialia magnifica*) is a small, reddish beetle found in the Big Dune and Lava Dune complexes and the surrounding sandy areas (Fish and Wildlife Service, 2012). These beetles are about 0.25 in. long and less than 0.25 in. wide. The adults are pale red with yellowish-red mouthparts and underside. They have a smooth upper back and no wings. Little is known about the larvae of the large Aegialian scarab (Fish and Wildlife Service, 2012).

Within their range, the beetle's distribution appears to be patchy. Despite this, all species of vegetation in Big Dune have been found to support beetle populations. The beetles, both larval and adult, can be found in wet sand 1.5 to 3.0 ft. under the surface. In collection surveys, a total of 316 of these beetles were found. Some beetles were found at Lava Dune, though the sample was limited and the quantity found was not documented. Within Big Dune, an area of 1,920 acres was found to be of significant concern for these beetles, thus leading the BLM to prohibit off-road vehicle recreation in a 22-acre area of the dunes and in vegetated areas (Fish and Wildlife Service, 2012).

RECENT AND HISTORICAL OBSERVATIONS

No observations of this species have been made recently or historically in or around the study area. The species is known in the areas of Big Dune and Lava Dune, both of which are not in close proximity to the study area. Like the Big Dune scarab, sand dune habitat in the study area could potentially support populations of the large Aegialian scarab, but because of the distance from the known location, it is doubtful. No map of observations is provided.

SPECIAL STATUS SPECIES

A second list of special status species was prepared to include all plant and animal species that were of special interest to cooperating agencies. Most of these species are imperiled (S2) or vulnerable to decline (S3). These wildlife species are listed below in Table 10. In the paragraphs that follow Table 10, each of these species are briefly described and a map showing observations of those species on the study area is provided. A map is not provided if no observations were documented in or around the study area.

Table 10. Special status wildlife species found in or around the study area

SCIENTIFIC NAME	COMMON NAME	STATE RANKING	GLOBAL RANKING	US-WFS	NEVADA STATUS	BLM STATUS	USFS STATUS	NDOW WILD-LIFE ACTION PLAN
AMPHIBIANS								
Anaxyrus cognatus	Great Plains toad	S2	G5	None	None	None	None	SOCP
REPTILES								
Arizona elegans	Glossy snake	S4	G5	None	None	S	None	None
Chionactis occipitalis	Western shovelnose snake	S4	G5	None	None	S	None	SOCP
Coleonyx variegatus	Western banded gecko	S4	G5	None	None	None	None	SOCP
Crotalus cerastes	Sidewinder	S4	G5	None	None	S	None	SOCP
Crotaphytus bicinc-tores	Great Basin collared lizard	S4	G5	None	None	None	None	SOCP
Diadophis punctatus	Ring-necked snake	S3	G5	None	None	None	None	SOCP
Dipsosaurus dorsalis	Desert iguana	S3	G5	None	None	None	None	SOCP
Gambelia wislizenii	Longnose leopard lizard	S4	G5	None	None	None	None	SOCP
Phrynosoma platyrhinos	Desert horned lizard	S4	G5	None	None	None	None	SOCP
Phyllorhynchus decurtatus	Spotted leafnose	S4	G5	None	None	None	None	SOCP
Rena humilis	Western blind snake	S4	G5	None	None	None	None	SOCP
Xantusia vigilis	Desert night lizard	S4	G5	None	None	None	None	SOCP
Plestiodon gilberti rubricaudatus	Western red-tailed skink	S2S3	G5T4Q	None	None	None	None	SOCP
Sauromalus ater	Chuckwalla	S3	G5	None	None	S	None	SOCP
BIRDS								
Amphispiza belli	Sage sparrow	S4B, S4N	G5	None	None	None	None	SOCP
Athene cunicularia hypugea	Western burrowing owl	S3B	G4T4	None	None	S	None	SOCP
Buteo regalis	Ferruginous Hawk	S2	G4	None	None	S	None	SOCP
Charadrius nivosus nivosus	Western snowy plover	S3B	G3T3	None	None	S	None	SOCP
Chordeiles minor	Common nighthawk	S5B	G5	None	None	None	None	SOCP
Falco mexicanus	Prairie falcon	S4	G5	None	None	S	None	SOCP
Falco peregrinus	Peregrine falcon	S2	G4	None	EB	S	S	SOCP
Gymnorhinus cya-nocephalus	Pinyon jay	S3S4	G5	None	None	S	None	SOCP
Numenius ameri-canus	Long-billed curlew	S2S3B	G5	None	None	None	None	SOCP
Oreoscoptes monta-nus	Sage thrasher	G5	S5B	None	SB	None	None	SOCP

SCIENTIFIC NAME	COMMON NAME	STATE RANKING	GLOBAL RANKING	US-WFS	NEVADA STATUS	BLM STATUS	USFS STATUS	NDOW WILD-LIFE ACTION PLAN
Otus flammeolus	Flammulated owl	G4	S4B	None	None	None	R4S	SOCP
Phainopepla nitens	Phainopepla	G5	S2B	None	None	None	None	None
Spizella atrogularis	Black-chinned sparrow	S3B	G5	None	None	None	None	SOCP
Toxostoma crissale	Crissal thrasher	S3	G5	None	None	None	None	SOCP
Toxostoma lecontei	Le Conte's thrasher	S2	G4	None	None	S	None	SOCP
Vireo vicinior	Gray vireo	G4	S3B	None	None	None	None	None
MAMMALS								
Dipodomys deserti	Desert kangaroo rat	S2S3	G5	None	None	None	None	SOCP
Eptesicus fuscus	Big brown bat	S4	G5	None	None	S	None	None
Euderma macula-tum	Spotted bat	S2	G4	None	TM	None	None	None
Lasiurus cinereus	Hoary bat	S3N	G5	None	None	S	None	SOCP
Lasionycteris noc-tivagans	Silver-haired bat	S3B	G5	None	None	S	None	SOCP
Myotis californicus	California myotis	S4	G5	None	None	S	None	None
Myotis ciliolabrum	Western small-footed myotis	S3	G5	None	None	S	None	SOCP
Myotis evotis	Long-eared myotis	S4	G5	None	None	S	None	SOCP
Myotis volans	Long-legged myotis	S4	G5	None	None	S	None	None
Myotis yumanensis	Yuma myotis	S3S4	G5	None	None	S	None	None
Parastrellus hes-perus	Canyon bat	S4	G5	None	None	S	None	None
Sorex tenellus	Inyo shrew	S2	G4	None	None	None	None	SOCP
Notiosorex craw-fordi	Crawford's desert shrew	S3	G5	None	None	None	None	None
Sorex merriami	Merriam's shrew	S3	G5	None	None	None	None	SOCP
Brachylagus ida-hoensis	Pygmy rabbit	S3	G4	None	None	S	None	SOCP
GASTROPODS								
Pyrgulopsis micro-coccus	Oasis Valley pyrg	S2	G3	None	None	S	None	SOCP
Pyrgulopsis turbatrix	Southeast Nevada pyrg	S2	G2	None	None	S	None	SOCP
INSECTS								
Perdita cephalotes	Big-headed perdita	SNR	G1G3	None	None	None	None	None
Euphilotes bernar-dino inyomontana	Bret's blue (Spring Mtns phenotype)	S2	G3G4T3T4	None	None	None	None	None
Andrena balsamo-rhizae	Mojave gypsum bee	S2	G2	None	None	S	None	None
Limenitis weidemey-erii nevadae	Nevada admiral	S2S3	G5T2T3	None	None	None	None	None
Megandrena mentzeliae	Red-tailed blazing star bee	S2	G2	None	None	None	None	None
Perdita meconis	Mojave poppy bee	S2	G2	None	None	S	None	None

None: *The agency has not established a status for the species and, therefore, the species is not afforded protection under the regulations of that agency.*

BLM Status:

S - Nevada Special Status Species, USFWS listed, proposed, candidate species or otherwise protected by Nevada state law

USFS Status:

S - Sensitive Species

State of Nevada Status:

SB - Sensitive Birds (NAC 503.050.3)
EB - Endangered Birds (NAC 503.050.2)
TM - Threatened Mammal (NAC 503.030.2)

Global Rank or State Rank:

G - Global rank indicator, based on worldwide distribution at the species level
T - Global trinomial rank indicator, based on worldwide distribution at the intraspecific level
S - State rank indicator, based on distribution within Nevada at the lowest taxonomic level
X - Presumed Extinct — Known from only historical occurrences but still some hope of rediscovery
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, abundant populations or occurrences, with little to no concern from declines or threats.
Q - Taxonomic status uncertain
B - Breeding - Conservation status refers to the breeding population of the element in the nation or state/province.
N - Non-Breeding - Conservation status refers to the non-breeding population of the element in the nation or state/province (e.g., wintering bird populations).
NR - Taxon Not Ranked – rank not yet assessed.

NDOW Wildlife Action Plan:

SOCP – Species of Conservation Priority

GREAT PLAINS TOAD

Great Plains toad (Photo by Randy Babb)

The Great Plains toad (*Anaxyrus cognatus*) inhabits deserts, grasslands, semi-desert shrublands, open floodplains, and agricultural areas, and stream valleys at sea level to 7,900 ft. MSL. The species resides in underground burrows when inactive. Typical breeding areas include surface accumulations of storm water, flooded areas, ponds and reservoirs. Eggs and larvae prefer to develop in clear, shallow water (IUCN SSC Amphibian Specialist Group, 2015). The toad is nocturnal, and emerges from burrows at dusk to forage or breed (Nigro, 2016). The Great Plains toad feeds on invertebrates with no preference as to type of species. Woodhouse's toads (*Anaxyrus woodhousii*) appear to be displacing this species in Nevada. This species has not been recently or historically observed in or around the study area. A map is not provided.

GLOSSY SNAKE

Glossy snake (Photo by The George Walker House)

The glossy snake (*Arizona elegans)* is found in desert scrub, semi-desert grasslands, and Plains and Great Basin grasslands. It prefers to inhabit relatively flat, open, shrubby areas overlying sandy or loamy soils (Brennan T. , 2008). They have been observed below sea level to 7,300 ft. MSL, but most often are found slightly above sea level (Dixon, 1959). This species has not been recently or historically observed in or around the study area. A map is not provided.

WESTERN SHOVELNOSE SNAKE

The western shovelnose snake (*Chionactis occipitalis*) is a nocturnal reptile, emerging at night to hunt and forage over fairly extensive areas of desert (Norris & Kavanau, 1966). It is typically found in sparsely vegetated desert, rocky slopes, dunes, washes, and sandy flats (Stebbins R. C., 2003). The snake tends to be inactive in cold or extremely high temperatures and is rarely seen on the ground surface except at night and spends the daytime in its burrows. The snake's diet is comprised of insects, spiders, scorpions, and centipedes (Hammerson G. , 2005). This species has not been recently or historically observed in or around the study area.

Western shovelnose snake (Photo by E. Grunwald)

WESTERN BANDED GECKO

The western banded gecko (*Coleonyx variegatus*) is considered a species of conservation priority because of its vulnerability to decline due to significant loss or conversion of habitat. The species is additionally listed as Moderately Vulnerable on the CCVI (Climate Change Vulnerability Index) (Wildlife Action Plan Team, 2012). The western banded gecko is a "small, cream-yellow lizard with reddish brown cross bands, spots, and reticulations on the body and tail" (Brennan T. C., 2008C). It has protruding eyes with uniformly granular, smooth scales and soft skin. Its toes are narrow and lack climbing pads. Males of this species have been observed to have spurs on each side of the base of their tails (Cockrum A. , 2012).

Western banded gecko

The species is found in southern Nevada from the Mojave Desert into the Great Basin (Wildlife Action Plan Team, 2012). It is found in a range of habitats including sand dunes, creosote flats, rugged rocky slopes and high desert plateaus (Brennan T. C., 2008C). Preferred plant communities include creosote-bush, sagebrush, pinyon-juniper, and catclaw-grama grass at elevations of below sea level to 5,000 ft. MSL (Stebbins R. C., 2003).

The reptile is nocturnal due to its preference for lower body temperatures and its propensity for high rates of evaporative water loss (Lawrence & Lovich, 2009). When inactive, western banded geckos move to sites under rocks, fallen yucca, cow dung, or mammal burrows (Wildlife Action Plan Team, 2012). The diet of this gecko is predominantly termites, beetles, spiders, and insect larvae (Parker W. S., 1974).

The western banded gecko has been observed on the South Range Study Area by the NNRP during night reptile surveys in 2012 (Figure 25).

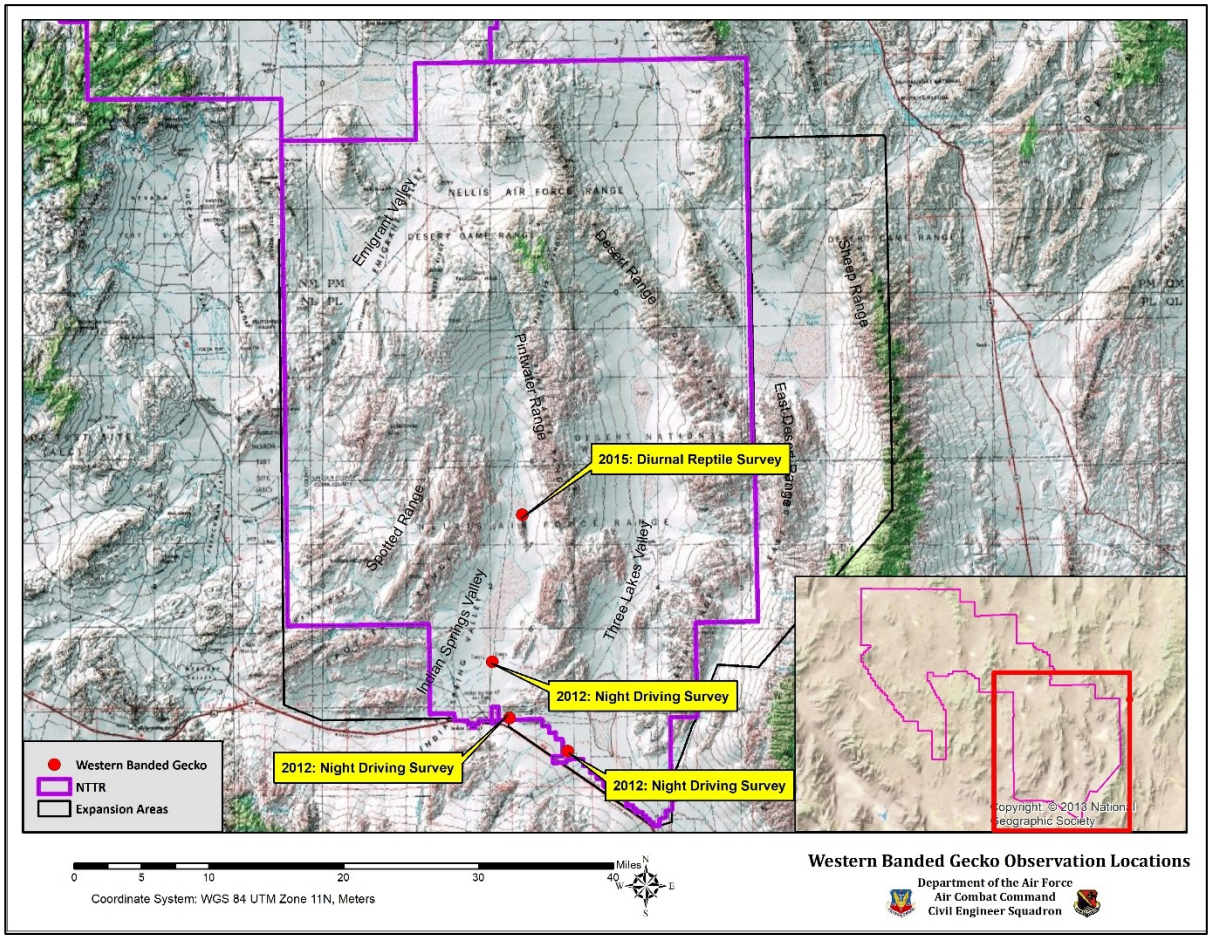


Figure 25. Locations where the western banded gecko has been observed in and around the study area

SIDEWINDER

Sidewinder

The sidewinder (*Crotalus cerastes*) is an inhabitant of the Mohave Desert and its distribution extends south to the lower reaches of Arizona Upland Sonoran Desert Scrub. It prefers open, flat, creosotebush scrub with sandy and loamy soil (Brennan T. C., 2008A). This snake generally inhabits windblown sand on desert flats with sandy washes, or sparsely vegetated sand dunes dominated with creosote bush or mesquite. At times, it may be found in rocky or gravelly sites (Lowe, 1986; Stebbins R. C., 2003). In the Mojave Desert, this snake also inhabits areas near washes and relatively dense vegetation where mammal burrows are common (Brown & Lillywhite, 1992). During the daytime when the snake is inactive, its retreats into underground burrows or under bushes. After active periods at night, the snake will bury itself in sand with a minimum of the body exposed and remain there through daylight until the sand becomes too hot (Brown & Lillywhite, 1992). The sidewinder will typically hibernate in burrows of rodents or tortoises (Brown & Lillywhite, 1992; Secor, 1994). Sidewinders rarely climb into vegetation and prefer open, sandy areas (Frost, Hammerson, & Gadson, 2007).

The sidewinder has been observed by the NNRP in 2010, 2011, and 2012 during desert tortoise surveys and night reptile surveys on the South Range Study Area (Figure 26).

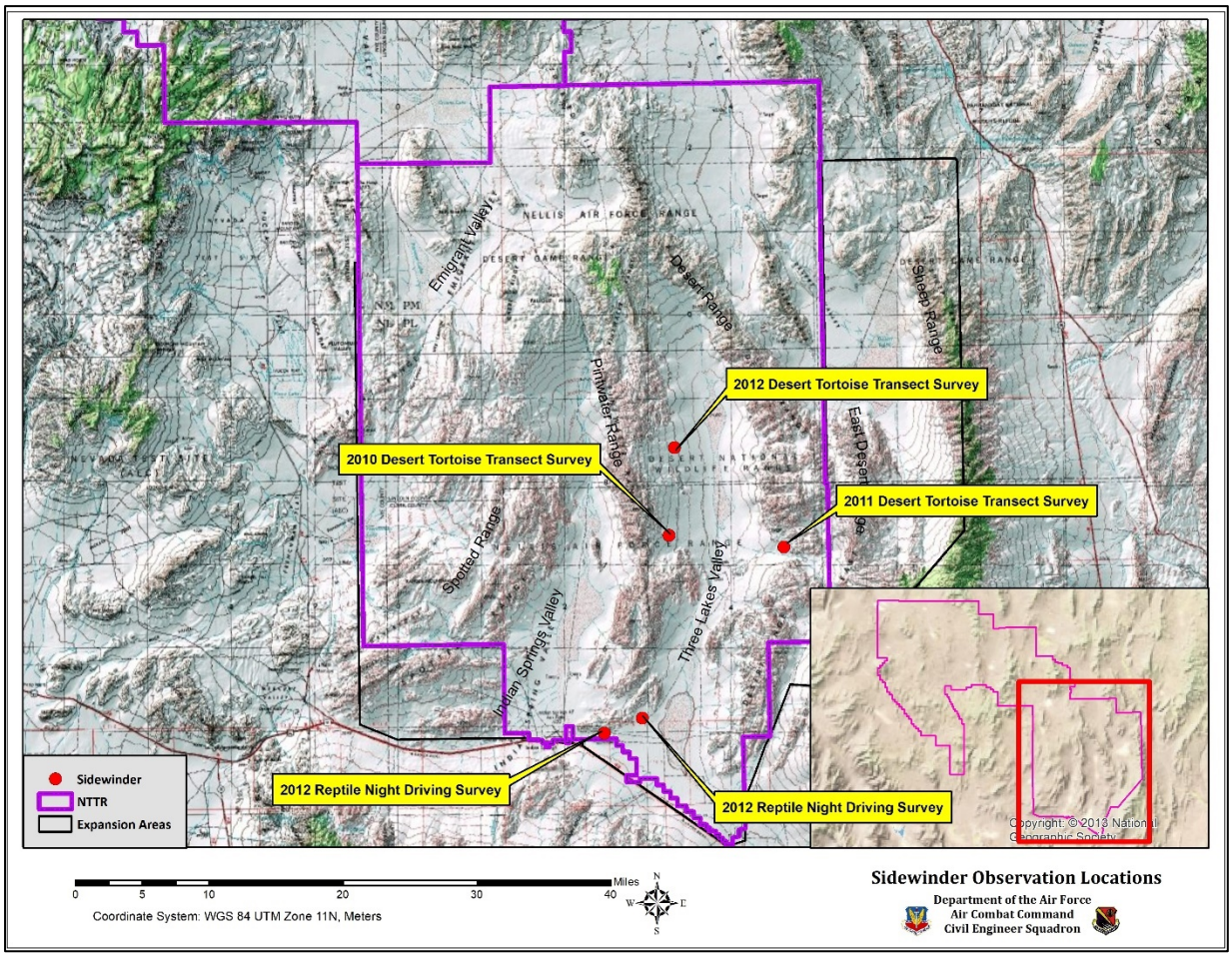


Figure 26. Locations where sidewinders have been observed in and around the study area

GREAT BASIN COLLARED LIZARD

The Great Basin collared lizard (*Crotaphytus bicinctores*) is considered a species of concern because of commercial collection pressure (Wildlife Action Plan Team, 2012). This lizard has a very large head with a conspicuous black and white collar across the back of the neck. The tail of the lizard is flattened from side to side. The color of collared lizards varies from tan to olive with pale yellow cross-bands and white spots on the back. This species tends to be more inclined to bite compared to other lizards (Cockrum A. , 2012).

This species is found primarily in xeric, rocky areas where they use the cover of large rocks for protection

Great Basin collared lizard

(Cockrum A. , 2012). The lizard can be found in lower elevations in the Mojave and Sonoran Desert scrub all the way up to the pinyon-juniper tree line from March to mid-April (Wildlife Action Plan Team, 2012). Eggs are laid in sands, burrows, or under rocks (Hammerson G. A., 2007). This species is omnivorous, and eats a wide variety of insects, spiders, lizards, and some plant materials (Stebbins R. C., 2003).

Table 11. Year and type of survey and the agency conducting the survey in which the Great Basin collared lizard was observed

No. Observed	Survey Year	Type of survey	Agency
1	2005	Desert Tortoise Monitoring	NNRP
5	2010	Herp Diurnal Survey	NNRP
18	2011	Herp Diurnal Survey	NNRP
1	2011	Unknown-Incidental	NNRP
19	2012	Herp Diurnal Survey	NNRP
3	2013	Herp Diurnal Survey	NNRP
13	2014	Herp Diurnal Survey	NNRP
14	2015	Herp Diurnal Survey	NNRP
1	2016	Vegetation Survey	AEI

The Great Basin collared lizard has been identified by the NNRP at forty-seven different locations on the North Range Study Area and twenty-three different locations on the South Range Study Area during various surveys in 2005 and from 2010 to 2015 (Table 11, Figure 27). AEI observed the species during a vegetation survey in Alternative 3C in 2016.

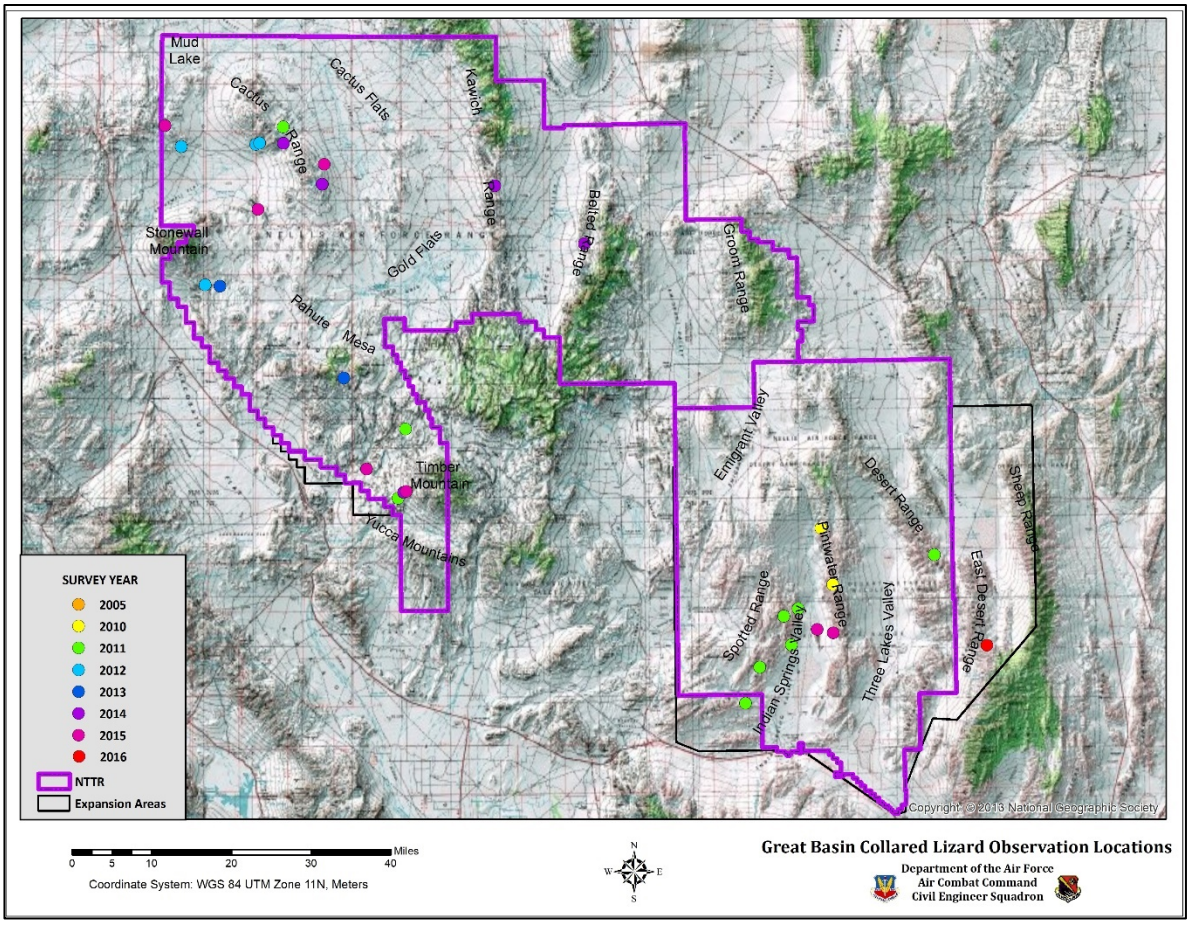


Figure 27. Locations where the Great Basin collared lizard has been observed in and around the study area

RING-NECKED SNAKE

The ring-necked snake (*Diadophis punctatus*) is listed as Moderately Vulnerable on the CCVI. It is considered a species of conservation priority by NDOW due to the drying of its unique mesic microhabitat, potentially caused by desertification of riparian habitats (Wildlife Action Plan Team, 2012). In dry regions, such as the Mojave Desert, the snake prefers sites near springs and washes (Brennan T. , 2012).

Ring-necked snake (www.californiaherps.com)

The ring-necked snake is a small, thin snake with rear-fangs and smooth scales. Its colors include light gray, olive-gray, or olive with a yellowish or light orange underside lightly speckled with black dots. An orange band circles the neck. The snake is mildly venomous but not considered a danger to humans (Brennan T. , 2012).

This species has a wide geographical range and is found locally in the eastern part of Nevada (Wildlife Action Plan Team, 2012). The snake inhabits forests, woodlands, grassland, chaparral, and riparian corridors (Stebbins R. C., 2003). The snake is mostly active in the morning and avoids the hottest part of the day (Brennan T. , 2012). The diet of the ring-necked snake includes earthworms, slugs, salamanders, snakes, and various small invertebrates (Wildlife Action Plan Team, 2012). They are known to lay up to 18 eggs in the late spring or early summer (Brennan T. , 2012).

This species has not been recently or historically observed in or around the study area and would most likely only occur on the North Range Study Area mountain ranges and possibly the Sheep Range on the South Range Study Area (Cockrum A. , 2012).

DESERT IGUANA

The desert iguana (*Dipsosaurus dorsalis dorsalis*) is listed as Moderately Vulnerable on the CCVI and is considered a species of conservation priority due to its vulnerability to decline due to significant habitat conversion and commercial collection (Wildlife Action Plan Team, 2012). This iguana is a medium sized (10-16 in. long), relatively fast-moving reptile with a brown, round head, a long tail, and sturdy legs (Schwenkmeyer, 2017). The lizard often has darker coloration around the shoulder blade giving way to a reddish-brown net-like pattern and gray or white spotting on the neck and trunk, eventually becoming rings around its tail (Cockrum A. , 2012). Both sexes have a pinkish hue on their sides during breeding season (Schwenkmeyer, 2017).

Desert iguana

In Nevada, the desert iguana is restricted to the Mojave Desert, especially sandy habitats with scattered creosote bush or sandy washes (Norris K. S., 1953). The species uses burrows extensively and often climb into shrubs for forage and cover. The lizard primarily feeds on vegetation, preferring yellow wildflowers, but is known to consume insects and carrion (Schwenkmeyer, 2017). The desert iguana is the most heat tolerant of North American reptiles. They are inactive during cold weather and most active on hot, sunny days; capable of foraging for long periods of time compared to most other lizards (Wildlife Action Plan Team, 2012).

The iguana was identified during other wildlife surveys in 2007 on the North Range Study Area and 2010 on the South Range Study Area. In 2016, a desert iguana was observed during Rare Plant and Migratory Bird surveys in Alternative 3C of the expansion areas (Figure 28).

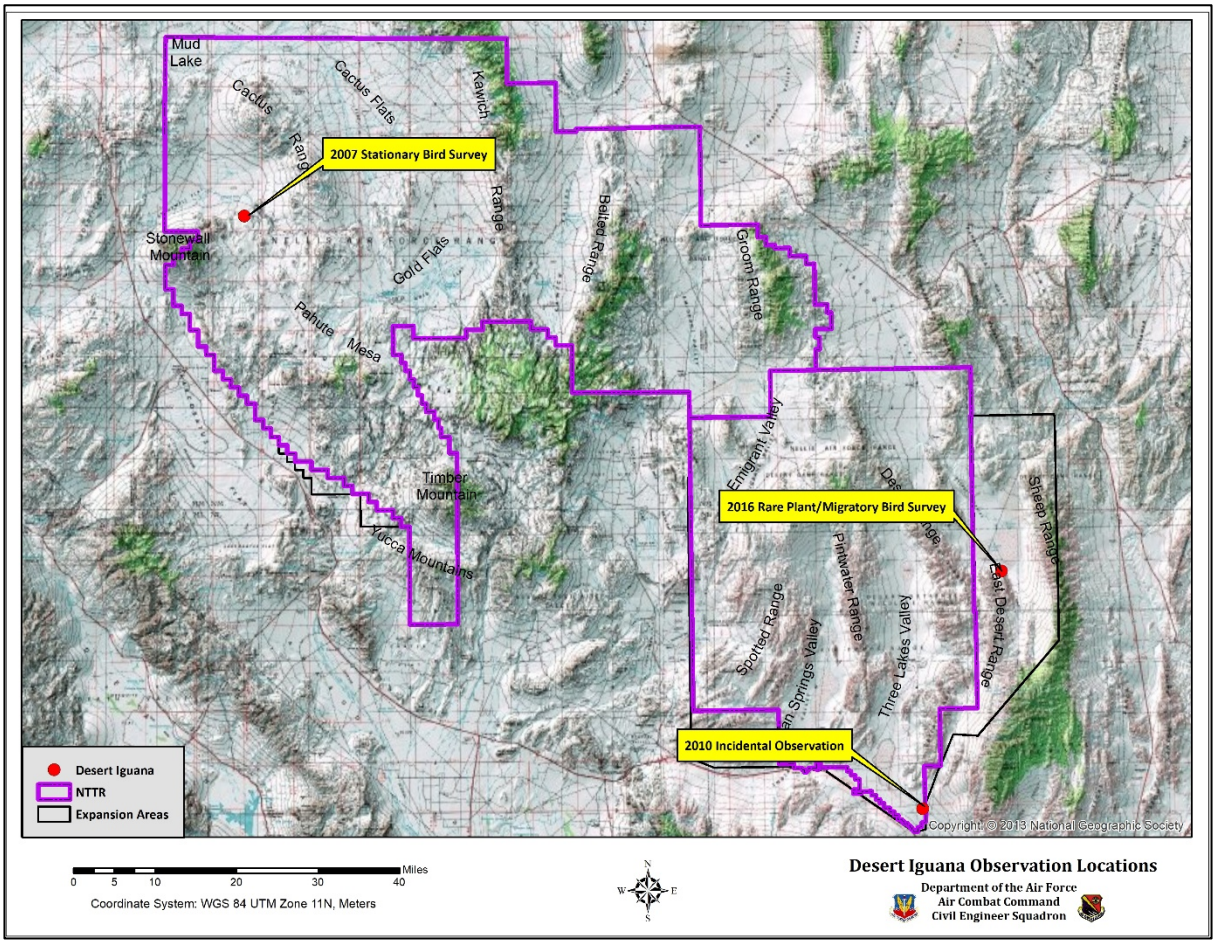


Figure 28. Locations where the desert iguana has been observed in and around the study area

LONGNOSE LEOPARD LIZARD

The longnose leopard lizard (*Gambelia wislizenii*) is considered a species of conservation priority due to its vulnerability to excessive collection (Wildlife Action Plan Team, 2012). The longnose leopard lizard is a fairly large (5.5 in.), slender reptile with a round tail that is gray or brown in color with many dark spots encircled by white rings on the body and tail. White crossbars are usually evident on the back, sides, and tail. Fertile females and juveniles occasionally have red-or-ange spots (Cockrum A. , 2012). This lizard can change its color and color pattern when neces-sary for camouflage (Brennan T. C., 2008) When

Longnose leopard lizard

threatened, the lizard typically searches for cover, flattens its body, and then remains motionless (Fallahpour & Hollingsworth, 2017).

This species is widely distributed throughout Nevada, often found in semiarid habitat where soil is sandy or gravelly, vegetation is sparse or clumpy, and rodent burrows are common (Cockrum A. , 2012; Wildlife Action Plan Team, 2012). The lizard is mostly ground dwelling and is active from late March to late October in southern Nevada. Hatchlings dominate the late summer populations. The species is omnivorous, with insects, lizards, small snakes, rodents, and vegetation dominating the diet (Wildlife Action Plan Team, 2012). The species can be cannibalistic if the opportunity arises. Predators of the lizard include predatory birds, snakes, coyotes, badgers, and kit fox (Fallahpour & Hollingsworth, 2017).

This lizard has been observed twenty times between 2005 and 2015 on the North Range Study Area. On the South Range Study Area, eleven total observations of this species have been made; five in 2010, one in 2015, and five in 2016 (Table 12, Figure 29).

Table 12. Year and type of survey and the agency conducting the survey in which the Great Basin collared lizard was observed

No. Observed	Survey Year	Type of survey	Agency
1	2005	Desert Tortoise Monitoring	NNRP
3	2010	Desert Tortoise Monitoring	NNRP
1	2010	Herp Night Driving Survey	NNRP
1	2010	Small Mammal Trapping Survey	NNRP
1	2010	Unknown-Incidental	NNRP
1	2011	Herp Diurnal Survey	NNRP
1	2011	Herp Night Driving Survey	NNRP
2	2011	Herp Pitfall Array Survey	NNRP
1	2011	Small Mammal Trapping Survey	NNRP
5	2012	Herp Diurnal Survey	NNRP
2	2013	Herp Diurnal Survey	NNRP
6	2014	Herp Diurnal Survey	NNRP
1	2015	Herp Day Driving Survey	NNRP
4	2015	Herp Diurnal Survey	NNRP
1	2015	Herp Pitfall Array Survey	NNRP
7	2016	GBBO Nevada Bird Count	AEI

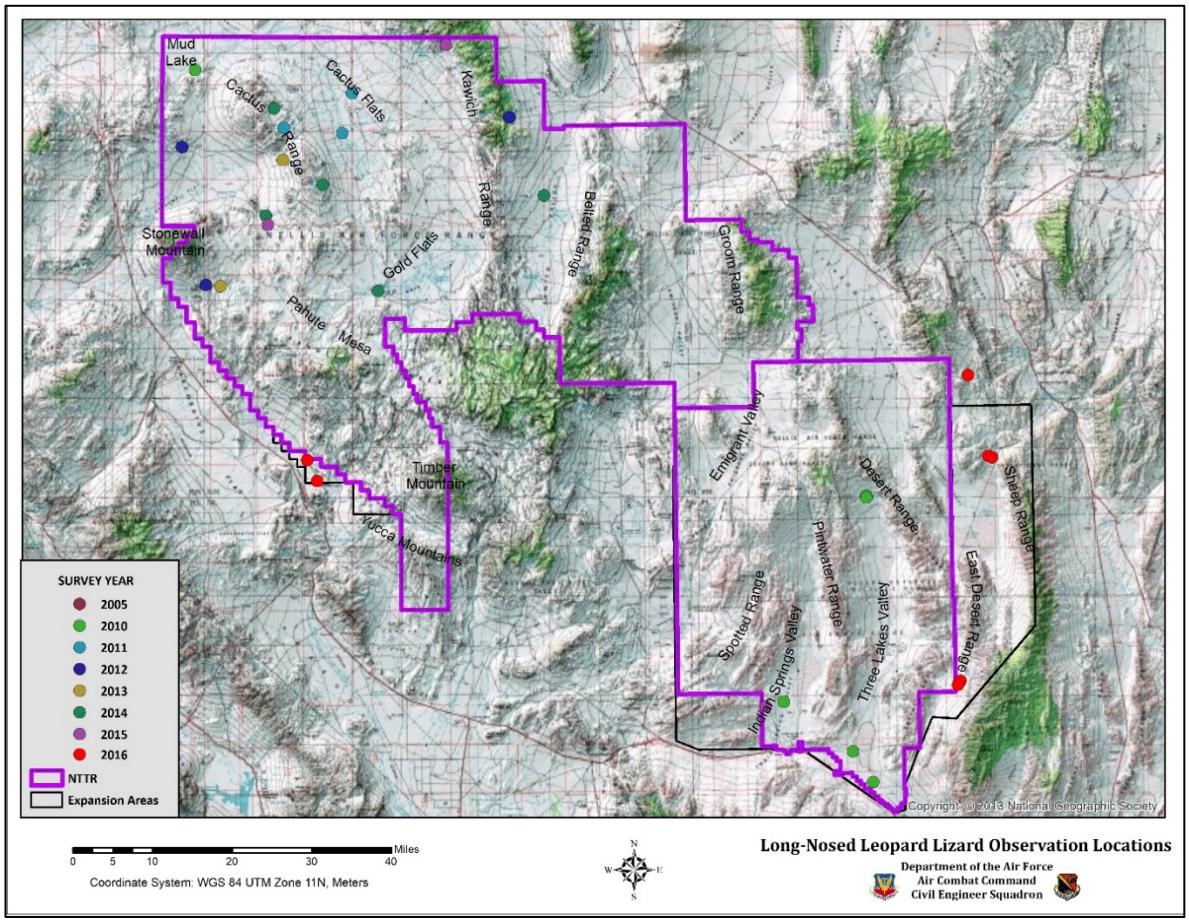


Figure 29. Locations where the longnose leopard lizard has been observed in and around the study area

DESERT HORNED LIZARD

The desert horned lizard (*Phrynosoma platyrhinos*) is listed as a species of conservation priority due to high commercial collection pressure and habitat degradation (Wildlife Action Plan Team, 2012). Additionally, the introduction of non-native ant species to their habitat range has displaced the lizard's primary food source causing decline in the health of populations.

Desert horned lizard

The desert horned lizard is a small lizard with a flat body consisting of an oval shaped trunk. It has specialized pointed scales on the crown of the head and along the fringe of its body, with smooth scales along the belly (Cockrum A. , 2012). The lizard's best defense is its ability to adapt and change its coloring to blend with the surrounding environment (Schwenkmeyer & Hollingsworth, 2017). When threatened, the lizard will flatten its body, hiss, jab with its horns, and may occasionally release a small stream of blood from its eyes to evade predators (Nafis, 2017).

The desert horned lizard is a common yearlong resident in the Mojave, Sonoran, and Colorado Deserts (Schwenkmeyer & Hollingsworth, 2017). It is associated with creosote bush, saltbush, greasewood, cactus and ocotillo in the Mojave Desert (Wildlife Action Plan Team, 2012). The lizard prefers sandy flats, alluvial fans, along washes, and sandy areas at the edges of dunes. It is most active from April to July at lower elevations and May to September at higher elevations (Schwenkmeyer & Hollingsworth, 2017). The diurnal lizard primarily feeds on harvester ants and obtains water from its food. Predators include coyotes, snakes, prairie falcons, roadrunners, and hawks (Schwenkmeyer & Hollingsworth, 2017).

The desert horned lizard has been observed commonly throughout the study area from 2005 to 2016 (Table 13, Figure 30).

Table 13. Year and type of survey and the agency conducting the survey in which the desert horned lizard was observed

No. Observed	Survey Year	Type of survey	Agency
1	2005	Desert Tortoise Monitoring	NNRP
1	2010	Desert Tortoise Monitoring	NNRP
1	2010	Small Mammal Trapping Survey	NNRP
1	2010	Unknown-Incidental	NNRP
3	2011	Herp Diurnal Survey	NNRP
2	2011	Herp Funnel Trapping Survey	NNRP
4	2012	Herp Diurnal Survey	NNRP
1	2013	Herp Diurnal Survey	NNRP
1	2013	Small Mammal Trapping Survey	NNRP
5	2014	Herp Diurnal Survey	NNRP
1	2014	Small Mammal Trapping Survey	NNRP
1	2015	Herp Diurnal Survey	NNRP
30	2016	GBBO Nevada Bird Count	AEI

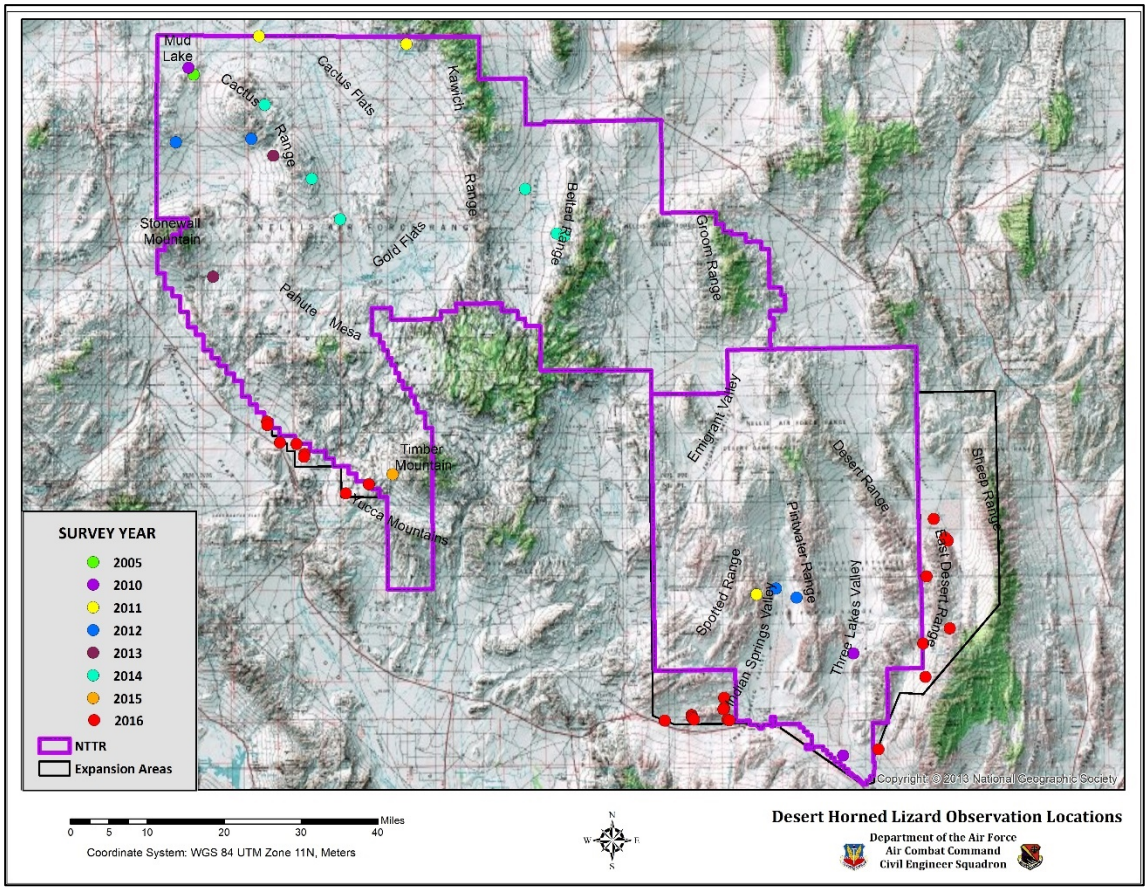


Figure 30. Locations where the desert horned lizard has been observed in and around the study area

SPOTTED LEAFNOSE SNAKE

The spotted leafnose snake (*Phyllorhynchus decurtatus*) is considered a species of conservation priority because of habitat fragmentation, especially from urban and alternative energy development (Wildlife Action Plan Team, 2012). This small, 20-inch long snake has a blunt snout and smooth, shiny scales. It is light tan to pinkish tan with more than 17 brown blotches on the body and a dark line from each eye to the upper lip (Brennan T. C., 2008B). The snake also displays a unique, triangular-shaped snout scale which enables it to burrow into shallow sand (Cockrum A. , 2012).

Spotted leafnose snake

The spotted leafnose snake can be found within the Mojave Desert of southern Nevada (Wildlife Action Plan Team, 2012). The habitat for this species generally consists of rocky, gravelly, or sandy desert plains or dunes with creosote bush (Stebbins R. C., 2003). The snake is primarily found beneath the soil, often under rocks or buried in loose sand. It is nocturnal and active in the early evening during mild to warm weather, with its greatest seasonal activity occurring from April to July (Wildlife Action Plan Team, 2012). This species feeds on small lizards and their eggs.

Only one observation of this species has been made on the study area. This occurred in June 2012 on the South Range Study Area on the south end of Indian Springs Valley during a reptile night driving survey (Figure 31). No other observations have been made of the species in and around the study area.

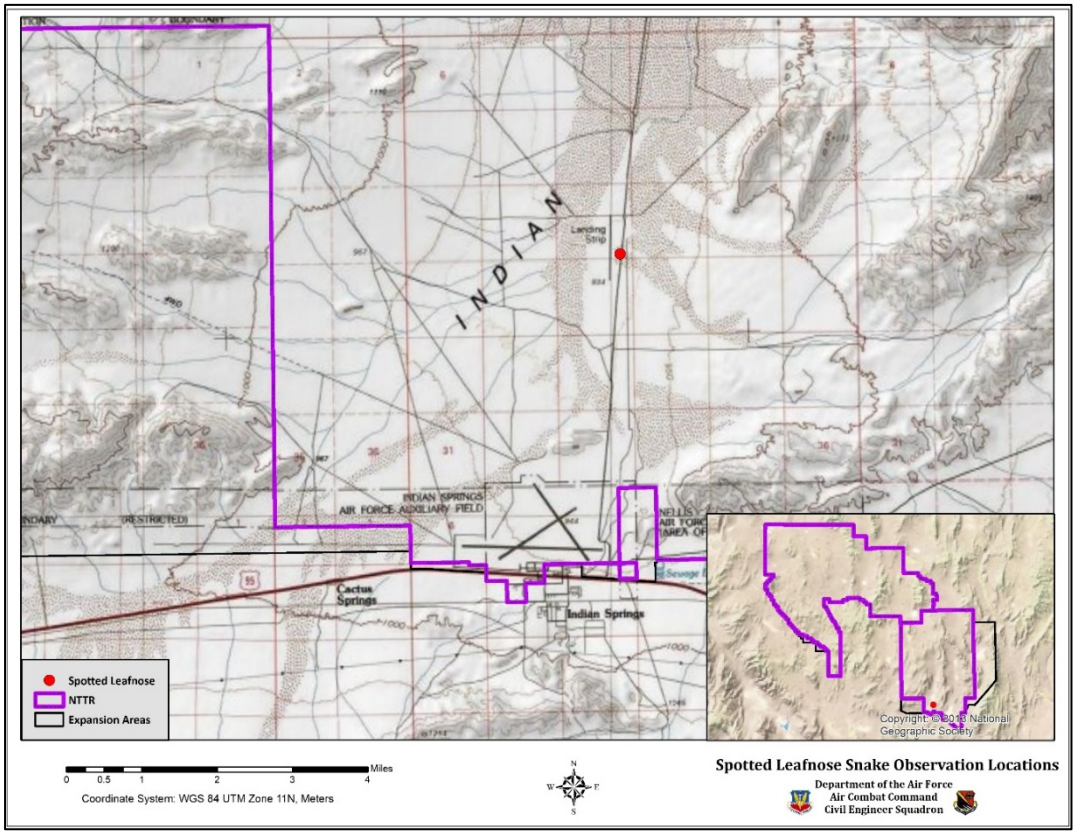


Figure 31. Locations where the spotted leafnose snake has been observed in and around the study area

WESTERN BLIND SNAKE

The western blind snake (*Rena humilis*) inhabits deserts, desert-grasslands, brush-covered mountain slopes, rocky hillsides, canyon bottoms or washes near stream courses, riparian corridors, and springs. This snake sometime hides under rocks, wood, or debris, among plant roots, or in crevices, often in loose damp soil (Hammerson, Frost, & Santos-Barrera, 2007). The western blind snake has been designated as a Species of Conservation Priority because it requires a moist microhabitat that is vulnerable to drying from the potential effects of climate change (Wildlife Action Plan Team, 2012). This species has not been observed recently or historically in or around the study area. No map of observations is provided.

Western blind snake (Photo by C. Hayes)

DESERT NIGHT LIZARD

Desert night lizard

The desert night lizard (*Xantusia vigilis*) is listed as Moderately Vulnerable on the CCVI. It is considered a species of conservation priority due to its vulnerability to decline from significant habitat conversion, especially from development and fires (Wildlife Action Plan Team, 2012). The lizard is a small, olive, yellow, brown, or orange reptile found in southern Nevada. Its upper body is usually covered with many small dark spots forming rows. It has vertical pupils with no eyelids used to enhance sight in low light. An eye stripe extends from above the eye down the forearm (Cockrum A. , 2012; Wildlife Action Plan Team, 2012). This species is primarily found in desert habitats and may live under the debris of yuccas, cactus, or pine logs. They are most active in the daytime but spend most of their time under some type of cover (Stebbins R. C., 2003). The species feeds on termites, ants, beetles, and flies (Cockrum A. , 2012).

Only one observation of the desert night lizard has been made on the study area. The species was observed on May 15, 2011, during a reptile diurnal survey in Spotted Canyon on the South Range Study Area (Figure 32). No other observations have been made of the species in and around the study area.

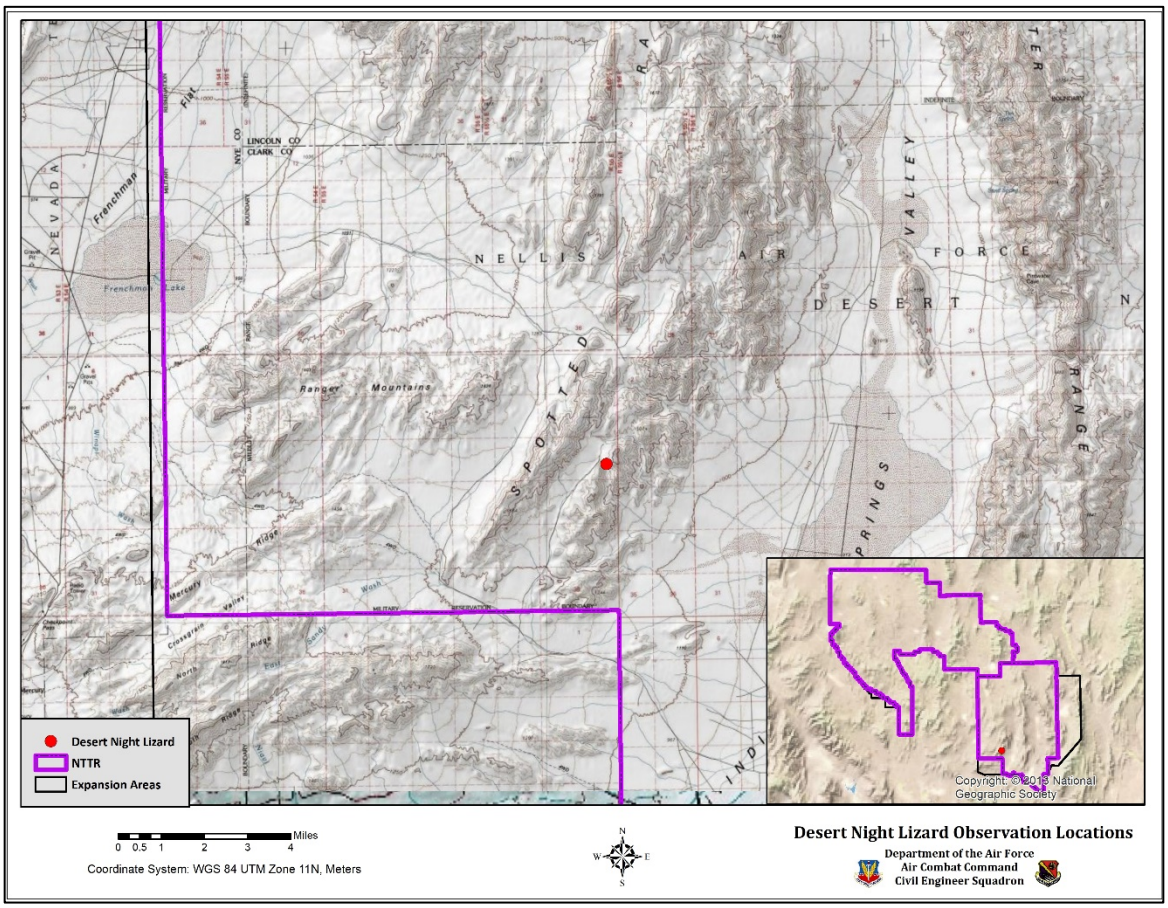


Figure 32. Locations where the desert night lizard has been observed in and around the study area

WESTERN RED-TAILED SKINK

Western red-tailed skink

The western red-tailed skink (*Plestiodon gilberti rubricaudatus*) is considered a Species of Conservation Priority because they require mesic microhabitats which are vulnerable to drying from the effects of climate change (Wildlife Action Plan Team, 2012). This skink prefers areas where moisture is present nearby; including grassland, chaparral, woodlands, and pine forests (Stebbins & McGinnis, 2017). It can be found ranging from sea level to elevations of about 7,300 ft. MSL. Courtship and mating occur mostly during the fall and winter. Males recognize females chiefly by odor (Mount, 1963). Nesting activity is greatest from April through June. Usually, from 3 to 7 eggs are laid in nest cavities constructed in the soil at depths varying from several inches to six feet. Red-tailed skinks appear to be gregarious (Mount, 1963). This species has not been observed recently or historically in or around the study area. No map of observations is provided.

CHUCKWALLA

Chuckwalla

The chuckwalla (*Sauromalus ater*) is a large lizard in the family *Iguanidae*. Adults can reach 16 inches in total length (Nevada Department of Wildlife, 2017A) and weigh approximately 2 pounds. Males are generally light gray with orange, yellow or red hues; depending on the locality. They may also have a dark gray to blackish chest, head and limbs with a light-yellow tail. Females tend to be less showy in coloration and have the banding pattern characteristic of young chuckwallas (Nevada Department of Wildlife, 2017A). As females get older and larger, they may resemble males (Johnson S. R., 1965). Males have distinct femoral pores on the inside of their thighs which are used for marking territory (Nevada Department of Wildlife, 2017A). These pores can be used for sexual identification of captured animals. Common chuckwallas are considered a Species of Conservation Priority as a result of habitat conversion and unsustainable levels of commercial collection (Wildlife Action Plan Team, 2012).

Chuckwallas mate in April with egg laying occurring in mid to late June (Berry, 1974; Johnson S. R., 1965). Clutch size varies from 3 to 15 eggs per clutch and is related to body size (Abts, 1987; Prieto & Sorenson, 1977; Werman, 1982). Although chuckwallas are active from February through October (Becthel Nevada Corporation: Ecological Services, 1997), the peak in activity coincides with the growing season of plants when food is available. Chuckwallas appear to be most active at temperatures of 95° to 104°F (Johnson S. R., 1965).

The chuckwalla occurs in the desert regions of southeastern California, western Arizona, southern Nevada, southern Utah, and adjacent portions of Mexico (Shaw, 1945). Typical habitat is marked primarily by rock outcrops and boulders, which provide cover and basking sites (Prieto & Ryan, 1978; Tanner & Jorgensen, 1963). The chuckwalla is commonly found along the base or slopes of mountains from sea level to 4,500 ft. MSL. The diet of the chuckwalla is predominantly herbaceous plants with a preference for the flowers

rather than the leaves (Johnson S. R., 1965). They also feed occasionally on insects in the wild (Hansen, 1974) and mice in captivity (Johnson S. R., 1965).

Chuckwallas have been observed on both the North Range Study Area and South Range Study Area. They have been identified as far north as Alkali Canyon, just south of Stonewall Mountain. Dames and Moore identified 50 chuckwallas in 1994 during a chuckwalla habitat study (Table 14, Figure 33).

Table 14. Year and type of survey and the agency conducting the survey in which chuckwallas were observed

No. Observed	Survey Year	Type of survey	Agency
50	1994	Chuckwalla Survey	Dames and Moore
1	2010	Herp Diurnal Survey	NNRP
15	2011	Herp Diurnal Survey	NNRP
1	2011	Large Mammal Helicopter Survey	NNRP
1	2011	Unknown-Incidental	NNRP
1	2012	Desert Tortoise Transect Survey	NNRP
9	2012	Herp Diurnal Survey	NNRP
1	2013	Herp Diurnal Survey	NNRP
4	2014	Herp Diurnal Survey	NNRP
2	2015	Herp Diurnal Survey	NNRP
7	2016	Vegetation Survey	AEI

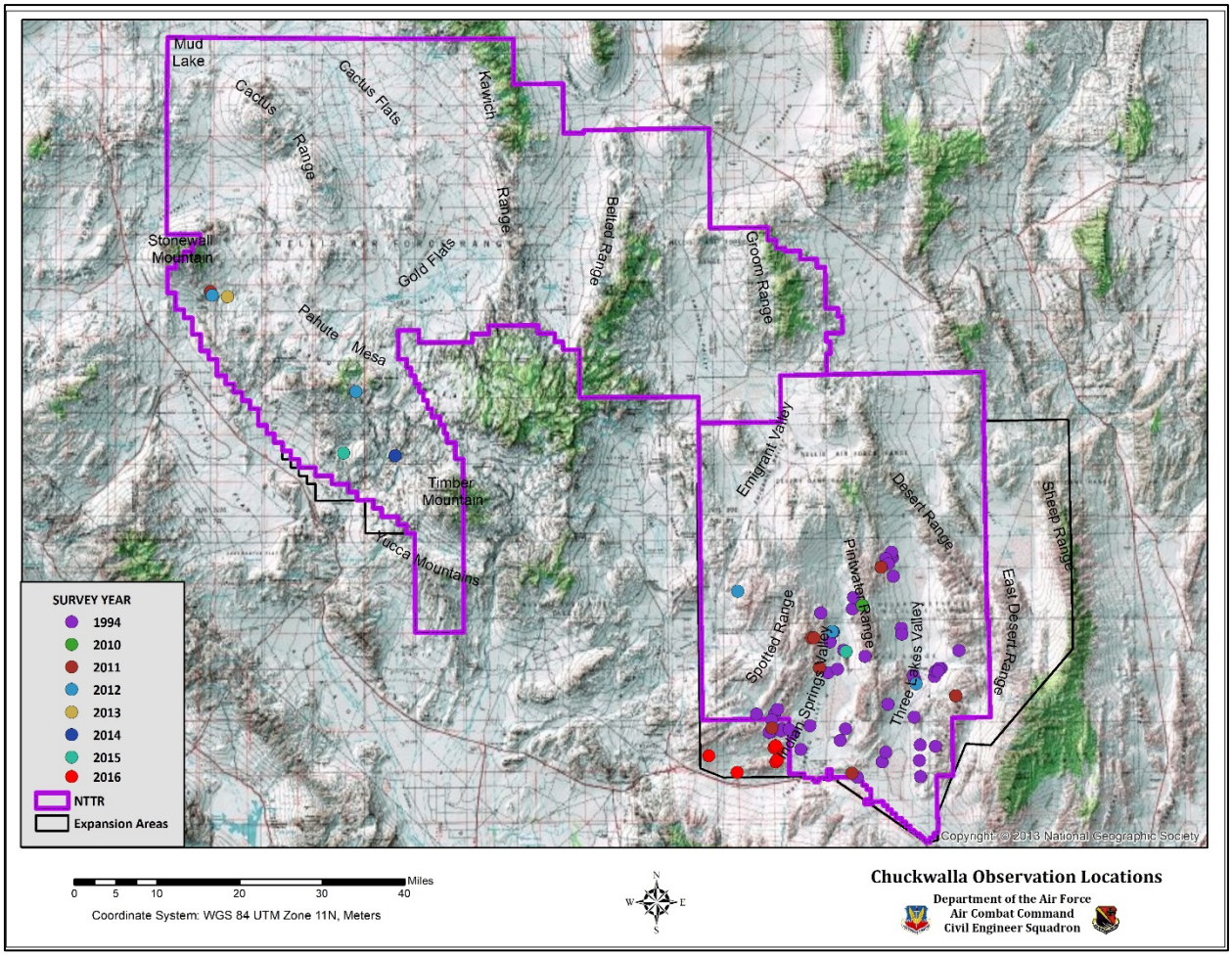


Figure 33. Locations where chuckwallas have been observed in and around the study area

SAGE SPARROW

Sage sparrow

The sage sparrow (*Amphispiza belli*) is an inconspicuous, well-camouflaged bird that characteristically hides under dense scrub and remains close to the ground. It is a medium sized sparrow with a length of 6.25 in. and a wingspan near 8.25 in. (Johnson & Marten, 1992). The upper part of the back and wings are brownish gray, with the head being slightly grayer. This sparrow has a thin white eye ring and a broad white sub-moustache with mostly white under parts and a dark spot on the chest (Martin & Carlson, 1998). In Nevada, breeding generally takes place from early April to early August (Great Basin Bird Observatory, 2010). Sage sparrows typically nest in shrubs or bunch grasses and occasionally nest on the ground under shrubs. Shrub species preferred for nesting appear to vary with sage sparrow subspecies. Sage sparrows are most abundant in sagebrush habitat, but may also be found in salt desert scrub more often than other sagebrush "obligate" birds (Knick, Rotenberry, & Leu, 2008). Sage sparrows are found at elevations as high as 6,500 ft. MSL (Rising, 1996). Sage sparrows avoid highly fragmented landscapes and are most abundant in large expanses of uniform shrubland (VanderHaegen, Dobler, & Pierce, 2000; Knick & Rotenberry, 1995). Sage sparrow abundance appears to be positively related to high sagebrush density, large patch size, spatial homogeneity, and low levels of disturbance (Rotenberry & Knick, 1999; Knick & Rotenberry, 1995). At a microhabitat scale, the sage sparrow population size increases with increased density of sagebrush, total shrub foliar cover, and percent bare ground (Holmes & Johnson, 2005; Paige & Ritter, 1999). The sage sparrow appears to be sensitive to cheatgrass invasion because dense populations of cheatgrass often result in less sagebrush cover for nesting and less bare ground for foraging (Paige & Ritter, 1999).

Sage sparrows are relatively common on the North Range Study Area, but have only been observed once on the South Range Study Area. The observations were made mostly during formal migratory bird surveys from 2007 to 2014 (Table 15; Figure 34).

Table 15. Year and type of survey and the agency conducting the survey in which sage sparrows were observed

No. Observed	Survey Year	Type of survey	Agency
17	2007	GBBO Nevada Bird Count	NNRP
10	2008	GBBO Nevada Bird Count	NNRP
8	2010	Stationary Bird Survey	NNRP
1	2011	GBBO Nevada Bird Count	NNRP
4	2011	Stationary Bird Survey	NNRP
159	2014	Christmas Bird Count	NNRP
5	2014	GBBO Nevada Bird Count	NNRP

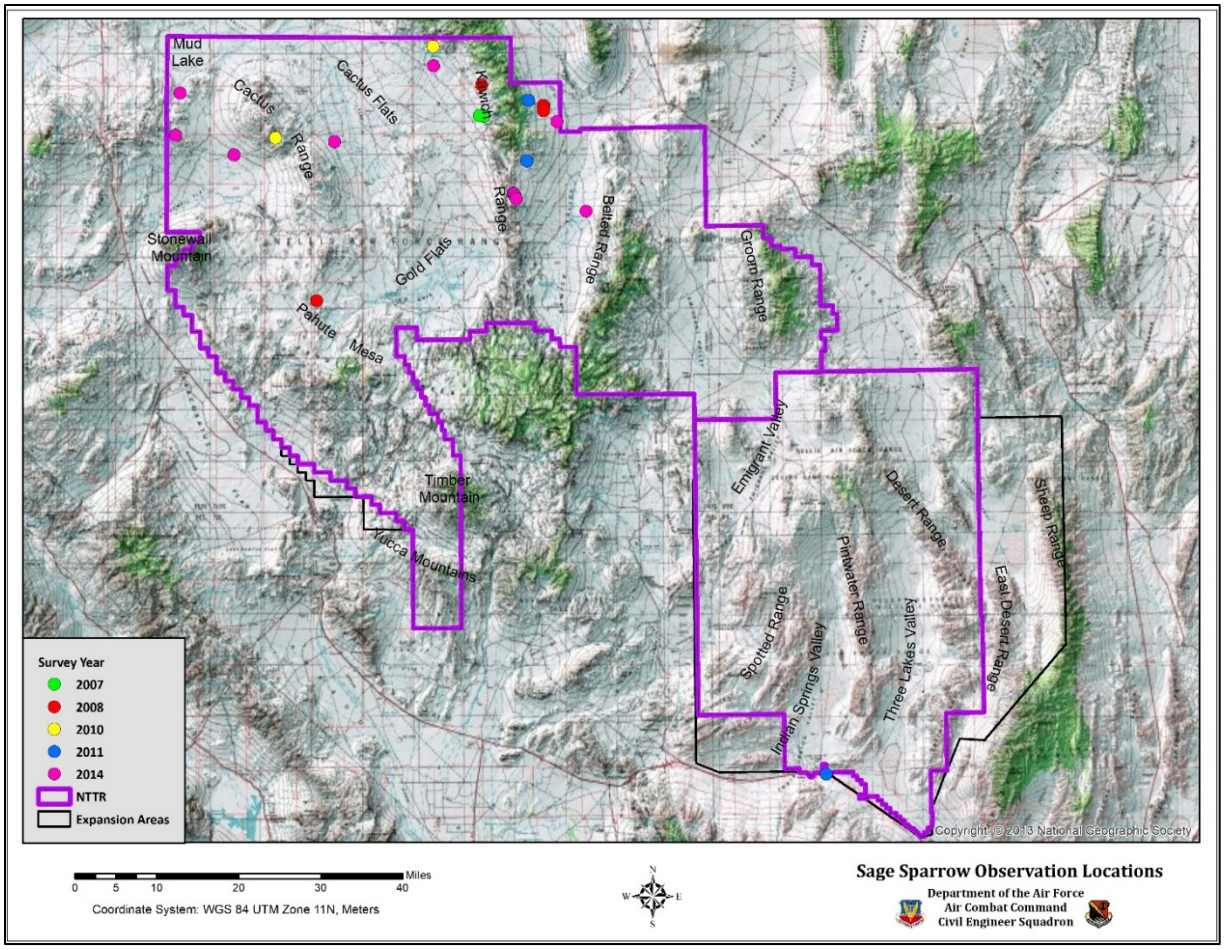


Figure 34. Locations where sage sparrows have been observed in and around the study area

WESTERN BURROWING OWL

The western burrowing owl (*Athene cunicularia hypogea*) is a relatively small owl weighing around 5 oz. and standing 7 to 10 inches in height. The head is rounded, lacking ear tufts, with a sandy colored back and neck. The breast and belly are white-to-cream colored with barring (Nevada Department of Wildlife, 2017A). The burrowing owl has binocular vision, yellow eyes and a yellow-gray beak. These owls have prominent white eyebrows and a white "chin" patch which they expand and display during certain behaviors, such as a bobbing of the head when agitated.

Western burrowing owl

The western burrowing owl is found throughout south-central Canada, the central and western United States, and Mexico, in a variety of habitats. These areas tend to be open, well-drained grasslands, steppes, deserts, prairies, and agricultural lands (Haug, Millsap, & Martell, 1993). The burrowing owl has long legs, which enables it to sprint as well as fly when hunting. Western burrowing

owls prefer annual and perennial grasslands, deserts, and shrublands characterized by low-growing vegetation having less than 30% ground cover allowing the owls to easily observe prey (Zam, 1974).

Western burrowing owls prefer to nest in open areas having natural burrows excavated by various animals including badgers, kit foxes, or desert tortoises (Haug, Millsap, & Martell, 1993). Haug (1985) described nesting habitat as well-drained, level to gently sloping areas characterized by sparse vegetation and bare ground. Active burrows are easily identified by the presence of molted feathers, pellets, prey remains, or excrement at or near a burrow entrance (The California Burrowing Owl Consortium, 1993).

Western burrowing owls are relatively tolerant of urban development, and increasing human presence has encouraged western burrowing owls to use highly maintained areas such as golf courses, airports, and road cuts for habitat (G.B. Herron, 1985). In disturbed habitat, burrows may be excavated along the edges of concrete flood control channels. Burrows can be located in man-made structures such as cement culverts, debris piles, and openings beneath pavement (California Department of Fish and Game, 1995). Artificial burrows have been successfully constructed to replace destroyed natural burrows and provide protection and shelter for burrowing owls.

Thirteen burrowing owls have been identified on the North Range Study Area from 2007 to 2015. Of the thirteen, three were identified during owl call-back surveys and the remaining ten were incidentally observed during other wildlife surveys. Only two burrowing owls have been observed on the South Range Study Area, one in 2010 and one in 2012 (Figure 35).

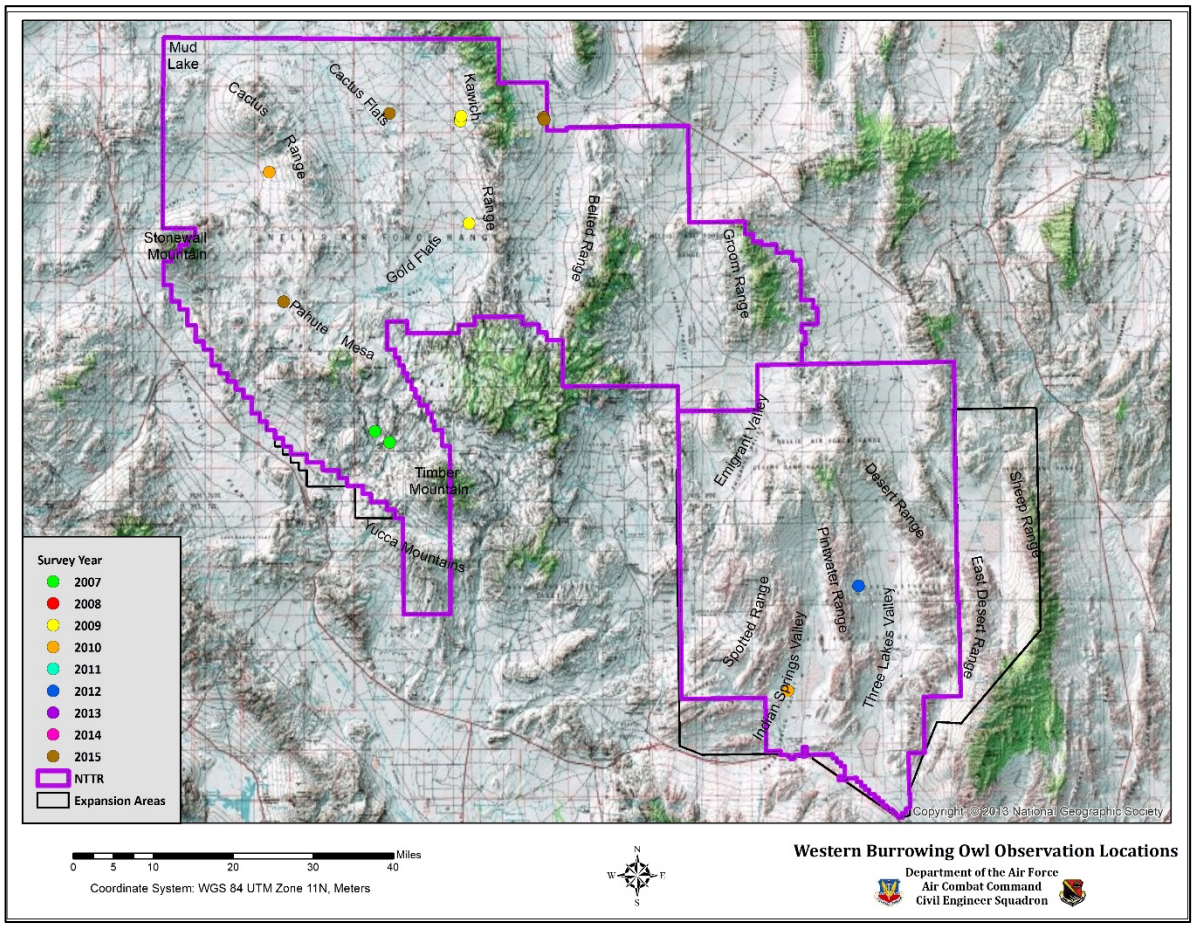


Figure 35. Locations where the western burrowing owl has been observed in and around the study area

FERRUGINOUS HAWK

The ferruginous hawk (*Buteo regalis*) is the largest species in the genus Buteo. It ranges in size from 20 to 26 in. long with a wingspan of 48 to 60 in. Open country, sagebrush, saltbush-greasewood shrubland, deserts, periphery of pinion-juniper and other woodlands comprise the majority of the preferred habitat for the ferruginous hawk throughout Nevada (Nevada Department of Wildlife, 2006).

Ferruginous hawk

Ferruginous hawks prefer to nest in sagebrush/shrub-steppe, grassland, mixed shrub/grassland, and in the transition zone between woodland and shrub or grassland habitats (Howard & Wolfe, 1976; Blair & Schitoskey, 1982; Perkins & Lindsey, 1983; McAnnis, 1990). In the absence of trees, the ferruginous hawk readily nests on the ground, favoring buttes, cut banks, rocky pinnacles, outcrops, and cliff faces (Cameron, 1914; Roth & Marzluff, 1989; Ramakka & Woyewodzic, 1993; Ayers, 1996). Ferruginous hawks will also nest on man-made features such as haystacks, high-voltage power line towers, abandoned buildings, gas and oil condensation tanks, and artificial nest structures (Gaines R. , 1985; Call, 1995; Apple, 1997). Ferruginous hawks have been observed nesting in Joshua trees (*Yucca brevifolia*) and on electrical poles on the North Range Study Area in early May (Nellis Air Force Base, 2016). Clutch size is usually 2 to 4 eggs with incubation lasting 32 to 33 days. The female typically stays on the nest while the male provides food. The young fledge in 35 to 50 days, but remain at the nest and dependent on the parents for several weeks more. The ferruginous hawk rarely lays a second clutch of eggs, even when a clutch is lost (Woffinden, 1975; Palmer, 1988). Ferruginous hawks are territorial and often return to the same nest in the same territory in alternate years (Davey, 1930; Weston, 1968; Houston, 1995). Clutch size, fledging rate, and breeding density appear to be associated with cycles of prey availability. First year mortality was observed to be 66 percent in the Great Plains Region (Schmutz J. K., 1987).

Threats to this species include actions that may result in decreasing populations of prey such as prairie dogs and rabbits, as well as loss of habitat due to removal of native vegetation for agricultural or urban development often resulting in the encroachment of invasive plant species. Improper application or management of pesticides can impose direct and indirect impacts to this species (Wildlife Action Plan Team, 2006).

All observations of ferruginous hawks have been made on the North Range Study Area from 2007 to 2014. Two hawks were observed on active nests, one on a Joshua tree and one on a power pole. No other observations have been recorded in or around the study area (Table 16; Figure 36).

Table 16. Year and type of survey and the agency conducting the survey in which ferruginous hawks and their nests were observed

No. Observed	Survey Year	Type of survey	Agency	Nest?
1	2007	GBBO Nevada Bird Count	NNRP	No
1	2008	GBBO Nevada Bird Count	NNRP	No
1	2008	Stationary Bird Survey	NNRP	No
1	2009	Raptor Cliff Survey	NNRP	Yes
1	2009	Stationary Bird Survey	NNRP	No
1	2009	Winter Raptor Survey	NNRP	No
1	2010	Stationary Bird Survey	NNRP	No
1	2010	Winter Raptor Survey	NNRP	No
1	2011	GOEA Productivity Survey	NNRP	No
1	2012	Large Mammal Helicopter Survey	NNRP	Yes
1	2014	Powerpole Raptor Survey	NNRP	No
1	2014	Stationary Bird Survey	NNRP	No

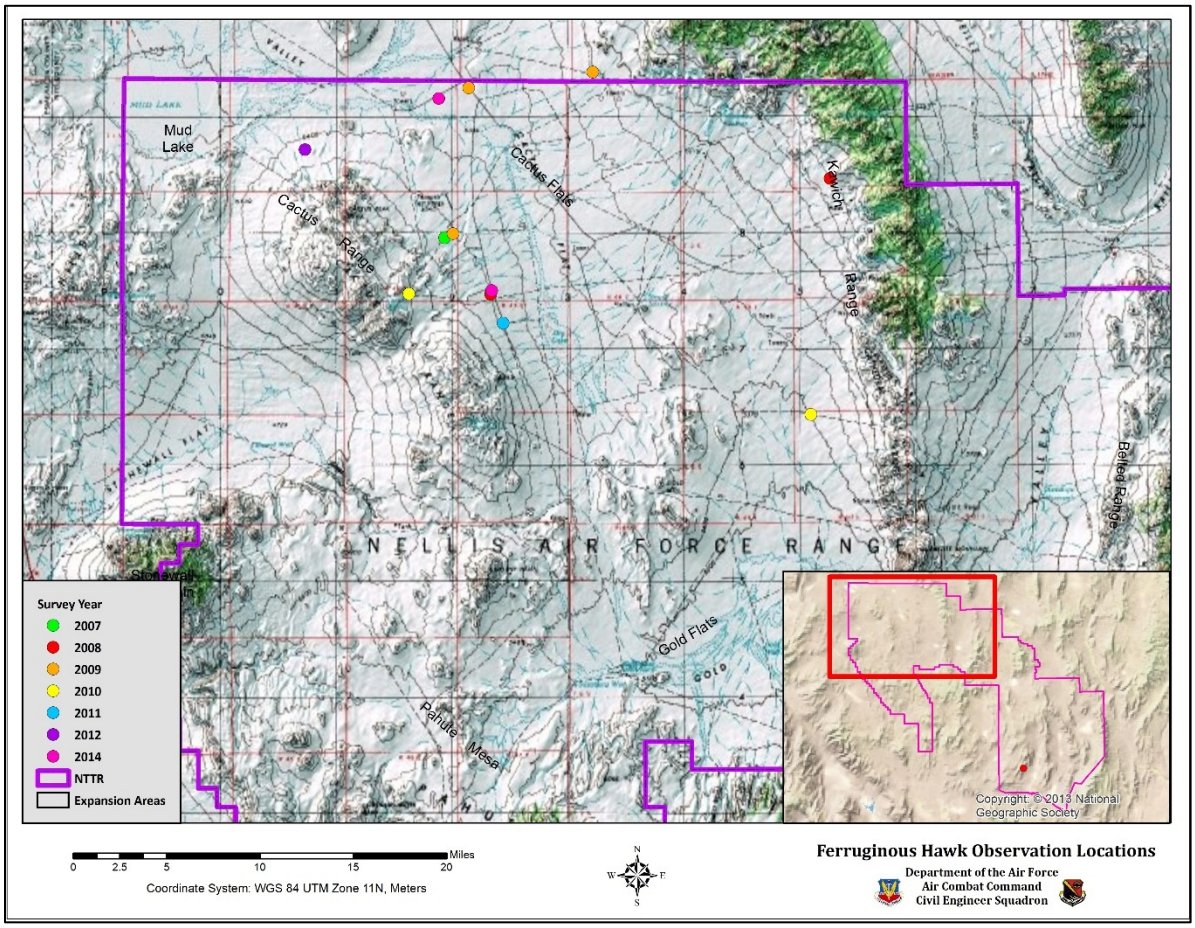


Figure 36. Locations where the ferruginous hawk has been observed in and around the study area

WESTERN SNOWY PLOVER

Western snowy plover (Photo by Bob Gress)

The western snowy plover (*Charadrius alexandrinus nivosus*) is a small shorebird found on beaches, shores, rivers, lakes, and ponds. The bird is pale gray-brown on the top of its head and back, while white occurs on its abdomen, neck, and face. Dark brown to black patches are found on the front of its head above the eyes, on its cheek below the eyes, and on the neck above the wings. The bill and legs are dark gray to black (U.S. Fish and Wildlife, 2001). When breeding, the males have an obvious black crown. The breeding season for the western snowy plover in Nevada ranges from late March to July (Great Basin Bird Observatory, 2017A). They nest on bare ground usually near a water edge, but can be up to 1.8 miles away (The Cornell Lab of Ornithology, 2013). The snowy plover is usually found on barren shorelines of alkaline playa lakes in Nevada (Wildlife Action Plan Team, 2006). The bird has also been identified on desert playas, ephemeral pools, wetlands, alkali mudflats, lakes and reservoirs which are good sources for invertebrates and insects, particularly brine flies, which are an important part of the plover's diet. Shrubs found in plover habitat include greasewood (*Sarcobatus vermiculatus*) and saltbush (*Atriplex sp.*) (Herman, Bulger, & Buchanan, 1988). Plovers can nest and raise broods

even when water sources are small, such as a spring or seep. On alkali flats, plovers usually nest in areas of moderate relief, clustering near wet or dry channels or depressions on playas (Shuford & Gardali, 2008). Breeding and nesting sites should not be disturbed because eggs may be trampled or the birds' foraging time interrupted. This species has not been observed recently or historically in or around the study area and a map of observations is not provided.

COMMON NIGHTHAWK

Common nighthawk (Photo by B.E. Small)

Common nighthawks (*Chordeiles minor*) are medium-sized birds with colorations that vary between mottled gray, brown, black, buff, and white. The bird has long, pointed wings with a diagnostic white stripe slightly below the wing tip. The bird also has a buff to white v-shaped throat patch. The bill is only visible at its tip (The Cornell Lab of Ornithology, 2011). The breeding habitat of the common nighthawk is varied throughout its range and includes open habitats devoid of vegetation such as "…sand dunes, beaches, logged areas, burned-over areas, forest clearings, rocky outcrops, rock barrens, prairies, peat bogs, and pastures" (Savignac, 2007). Preferred foraging habitats include broad, open fly-ways over wet meadows, wetlands, lakes, rivers, and shrub-covered valleys and plains. Overall, this bird is a generalist with a wide habitat range. It has become well-adapted to urban habitats and often uses flat gravel covered roofs for nesting (Gross, 1940). Common nighthawks are rarely found above 6,900 ft. MSL (Gaines D. , 1990). The common nighthawk's entire breeding range extends across Canada virtually throughout North America, in portions of Middle America, and on into portions of South America (The Cornell Lab of Ornithology, 2011).

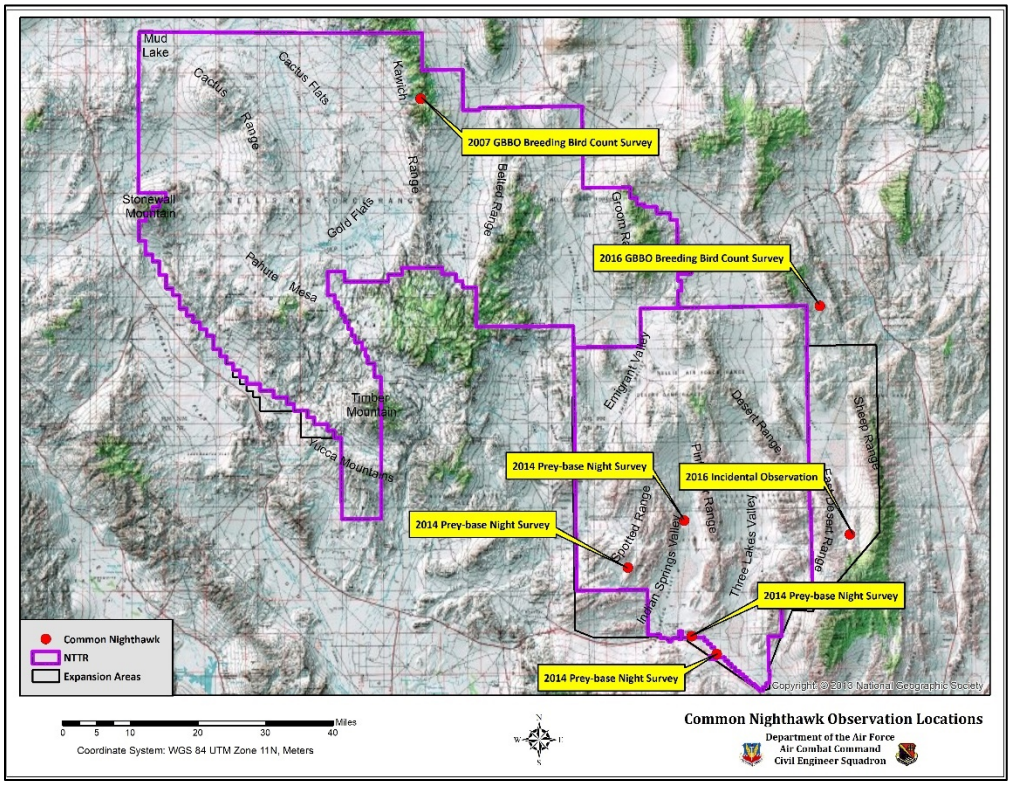


Figure 37. Locations where the common nighthawk has been observed in and around the study area

One nighthawk was observed on the North Range Study Area in the Kawich Range in 2007. Six observations were made of the species on the South Range Study Area in 2014 and 2016 (Figure 37). No other recent or historic observations of the species have been recorded.

PRAIRIE FALCON

Prairie falcon

The prairie falcon (*Falco mexicanus*) is similar in size and range to the peregrine falcon (*Falco peregrinus*). It is a pale brown rather than slate blue and lacks the "helmeted appearance" for which peregrines are known. Breeding habitat includes open areas below 11,000 ft. MSL, such as, "arid plains and steppes of interior North America, wherever cliffs or bluffs are present for nesting sites" (Brown & Amadon, 1968). Other habitats documented in reports are shrub-steppe desert, grasslands, mixed shrub and grasslands, alpine tundra (Steenhof K. , 1998), chaparral, creosote bush and burrobush (Millsap, 1981), as well as montane meadows (Dekker, 1984). The prairie falcon is known to breed in Nevada from February to July (Great Basin Bird Observatory, 2010). Although, they do not build nest structures, prairie falcons are sometimes observed laying eggs in stick nests built by other raptors. Nests are typically found on cliffs, trees (Maclaren, Runde, & Anderson, 1984), power line structures (Bunnell, White, Paul, & Bunnell, 1997), buildings (Nelson, 1974), or inside stone quarries (Smith & Murphy, 1973). Vertical cracks and horizontal shelves provide the excellent locations for nesting on basalt, granite, and conglomerate cliffs. Most cliff nest sites have some degree of overhang. As shown in Figure 38, prairie falcons have been observed all over the study area. A total of 191 observations have been made from 2007 to 2016.

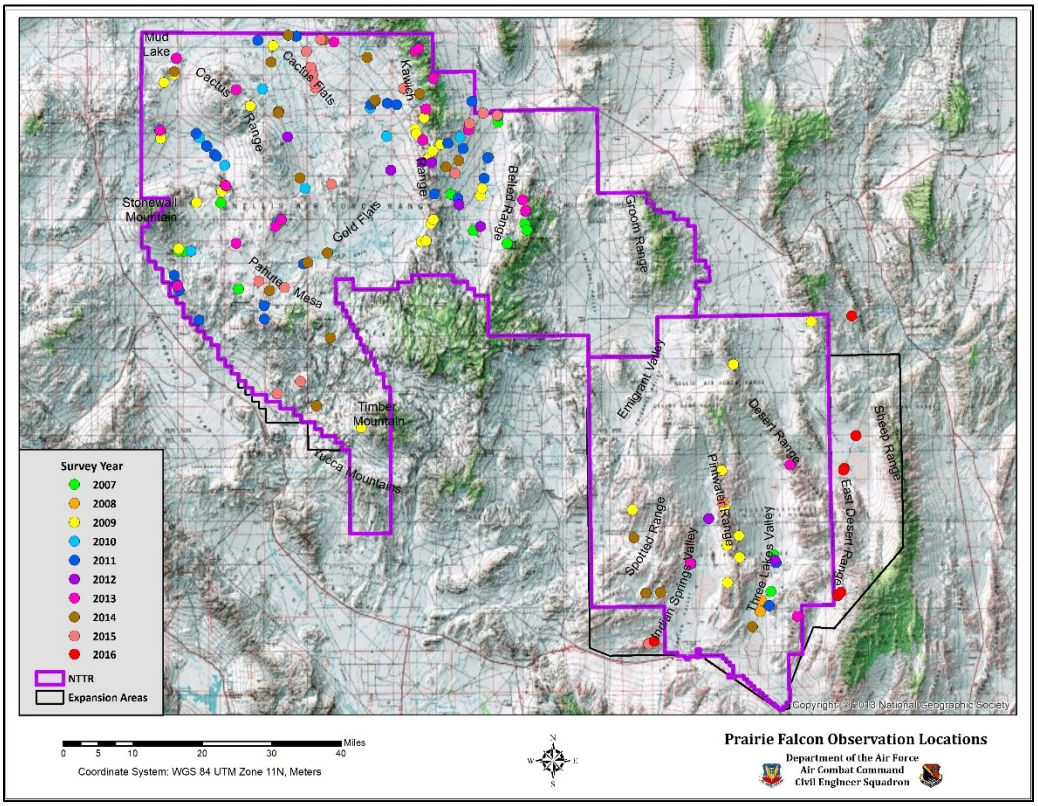


Figure 38. Locations where prairie falcons have been observed in and around the study area

PEREGRINE FALCON

Peregrine falcon

The peregrine falcon (*Falco peregrinus*) is a large raptor in the Falconidae family. The peregrine is known for its speeds over 200 mph during its characteristic hunting swoops (U.S. Fish and Wildlife Service, 2008). The scientific name comes from the Latin words falco, meaning "hook-shaped" and may refer to the beak or claws, and peregrinus, meaning "to wander". Peregrines have one of the widest distributions of any bird of prey and are found on every continent except Antarctica. They live in a wide variety of habitats from tropics, deserts, and maritime to the tundra (The Peregrine Fund, 2017).

Throughout their range, the peregrine will nest on cliffs, as well as, tall buildings in urban areas. They tend to return to their same nest or nesting area each year (GBBO, 2011). Within Nevada, they may be found in steppe, open water, desert shrub, mountains, and open forest habitat, as well as tall buildings (North American Classification Committee, 1983). When peregrines are not breeding, they collect in areas where potential prey concentrates, such as marshes, lake shores, rivers and river valleys, cities and airports (Wildlife Action Plan Team, 2006).

Peregrine falcons are less common on the study area compared to the prairie falcon. Sixteen peregrines were observed on the South Range Study Area from 2009 to 2016 on the Spotted, Pintwater, and Desert Ranges. Of the sixteen, nine were nesting. Only three observations have been made on the North Range Study Area in 2011 and 2013. These were on the Kawich and Belted Ranges (Figure 38).

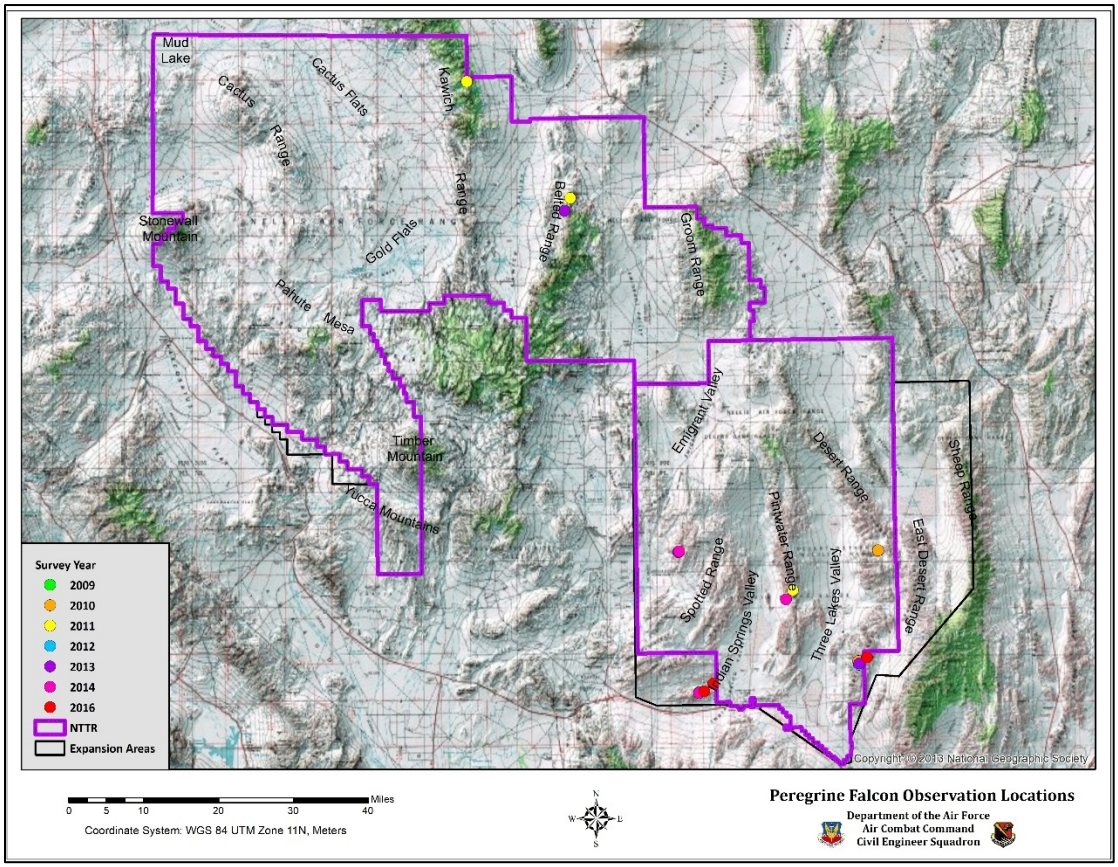


Figure 39. Locations where the peregrine falcon has been observed in and around the study area

PINYON JAY

Pinyon jays

The pinyon jay (*Gymnorhinus cyanocephalus*) is a crestless jay in the family Corvidae. They average a total length of 10-11 in. The bird is almost entirely dull blue with the chin, throat, and breast being streaked white. The inner webs of the primary feathers are black. Juveniles have a uniformly mouse-gray plumage whereas, the immature pinyon jays appear more similar to the adults but with a dull overtone. The sexes are mostly alike with a darker, deeper blue-colored crown shown on males (Balda R. P., 2002). In Nevada, pinyon jays breed from late March to August (Great Basin Bird Observatory, 2017) and nest in mature pines or juniper trees near the trunk, often on south-facing slopes (Balda & Bateman, 1971). They are also known to nest socially and are highly synchronized with egg laying and nesting within their flocks (Balda R. P., 2002). In Nevada, the pinyon jay prefers lower montane woodlands dominated by pinyon-juniper mixed with scrub oak and sagebrush (North American Classification Committee, 1983). The Great Basin Bird Observatory conducted a study in 2007 which indicated that pinyon jays prefer a mixed-age mosaic of woodland transitioning into, or interspersed with, sagebrush shrubland. In areas where they roost and nest outside of

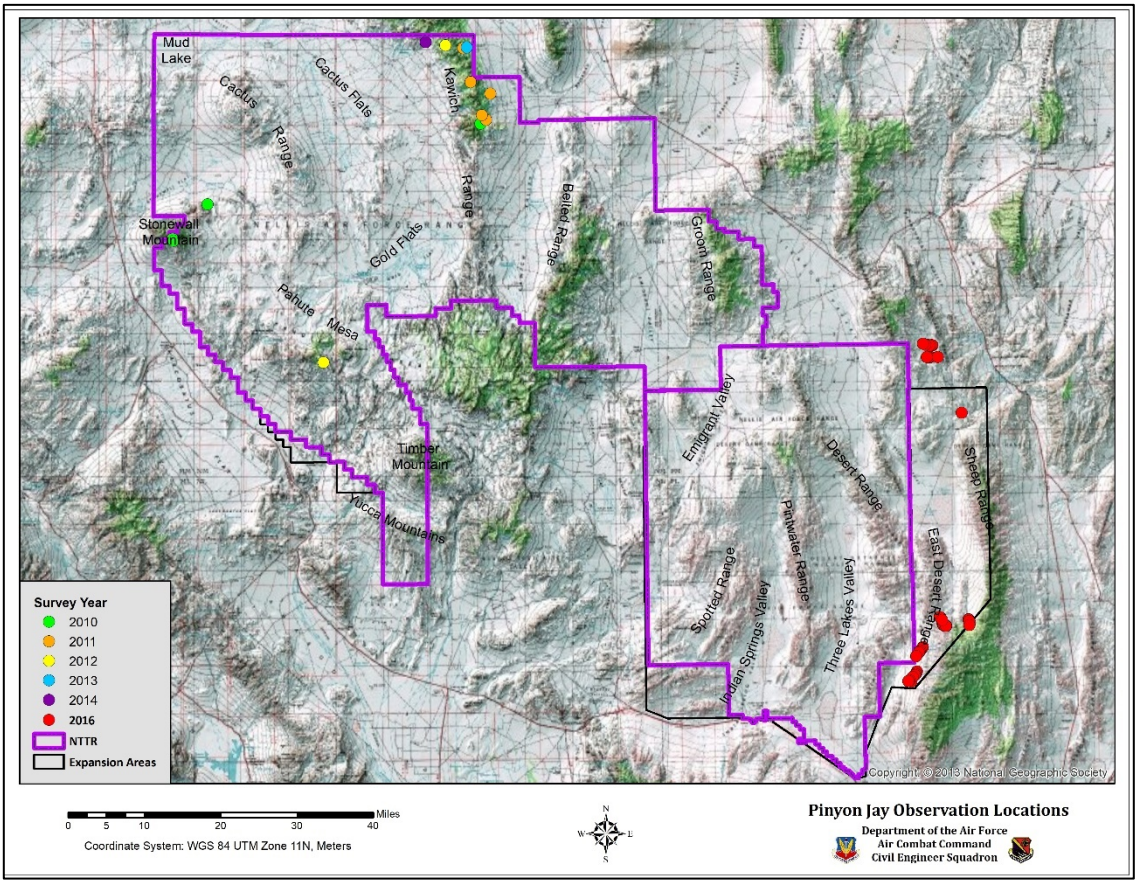


Figure 40. Locations where pinyon jays have been observed in and around the study area

this association, they were typically found within 1.2 miles of the woodland-sagebrush habitat edge (Great Basin Bird Observatory, 2017). Most of the habitat frequented by pinyon jays in Nevada are usually at lower elevations with sunny aspects (Great Basin Bird Observatory, 2017). Pinyon jays tend to be year-round residents in Nevada. However, they may fly long distances in search of food when the seed crop is low (Ryser, 1985).

Table 17. Year and type of survey and the agency conducting the survey in which pinyon jays were observed

No. Observed	Survey Year	Type of survey	Agency
1	2010	GBBO Nevada Bird Count	NNRP
1	2010	Small Mammal Trapping Survey	NNRP
8	2010	Stationary Bird Survey	NNRP
1	2010	Wildlife Camera	NNRP
8	2011	Stationary Bird Survey	NNRP
4	2012	Stationary Bird Survey	NNRP
1	2013	Trapping Survey	NNRP
1	2014	Herp Pitfall Array Survey	NNRP
301	2016	GBBO Nevada Bird Count	AEI

Flocks of pinyon jays have been observed on both the North Range Study Area and the South Range Study Area. Observations have been documented from 2010 to 2016 (Table 17; Figure 40). Pinyon jays have almost always been observed in pinyon-juniper plant communities.

LONG-BILLED CURLEW

The long-billed curlew (*Numenius americanus*) is the largest nesting, regularly occurring sandpiper in North America. It is 20-26 in. long with a 24-35 in. wingspan and a weight of 1.08–2.09 lbs. Adult curlews have a long bill that curves downward and measures 4.4 to 8.6 in. The bird has a long, light cinnamon colored neck and a small head. The bird's underparts are also light cinnamon, while the top of the head is streaked with brown. This species exhibits sexual dimorphism with the female having a much longer bill than the male (Dugger & Dugger, 2002). The loss and conversion of large areas of short grass prairie into agricultural land within its range has probably impacted the species and is likely to be the most important current threat to curlew populations (BirdLife International, 2016).

Long-billed curlew (Photo by Tom Munson)

No recent or historic observations of the long-billed curlew have been made in or around the study area. No map of observations is provided.

SAGE THRASHER

The smallest of the thrashers, the sage thrasher (*Oreoscoptes montanus*) is a relatively short-billed and short-tailed bird with an overall length of 7.8-9.0 in., a wingspan of 12.6 in., and a weight of 1.4-1.8 oz. (Reynolds, Rich, & Stephens, 1999). Although males and females have the same color, the males are slightly larger than females. Both sexes possess a white eye stripe with a gray back and wings, and buff colored chest that is boldly mottled with dark brown spots (Reynolds, Rich, & Stephens, 1999). Juveniles have paler upper parts with less streaking compared to adults (Reynolds, Rich, & Stephens, 1999). The current breeding range lies in the western United States with a small population in south central British Columbia. This species is mostly restricted to elevations of 4,900 ft. to 8,200 ft. MSL (Nevada Partners in Flight, 1999). The thrasher winters from southern Nevada to the western two-thirds of Texas and into Mexico (Reynolds, Rich, & Stephens, 1999). Nevada currently supports about one-fifth of the global population of sage thrashers. Within Nevada, they breed

Sage thrasher (Photo by Paul Higgins)

and nest north of the southern tip of the state from April to late August (Great Basin Bird Observatory, 2010). Nests are usually found in big sagebrush plant communities, with birds seeking shelter in tall and dense shrubs for protection from predation from raptors and loggerhead shrikes. Nests are oriented to face the east and catch the warm morning sun, thus shielding them from the piercing afternoon rays (Reynolds, Rich, & Stephens, 1999).

Sage thrashers have been observed on the North Range Study Area from 2008 to 2016 mostly in sagebrush habitat. Seven observations were recorded. On the South Range Study Area, one sage thrasher was observed in 2009 on the Pintwater Range and one bird was observed on the north end of the Sheep Range in 2016 (Figure 41).

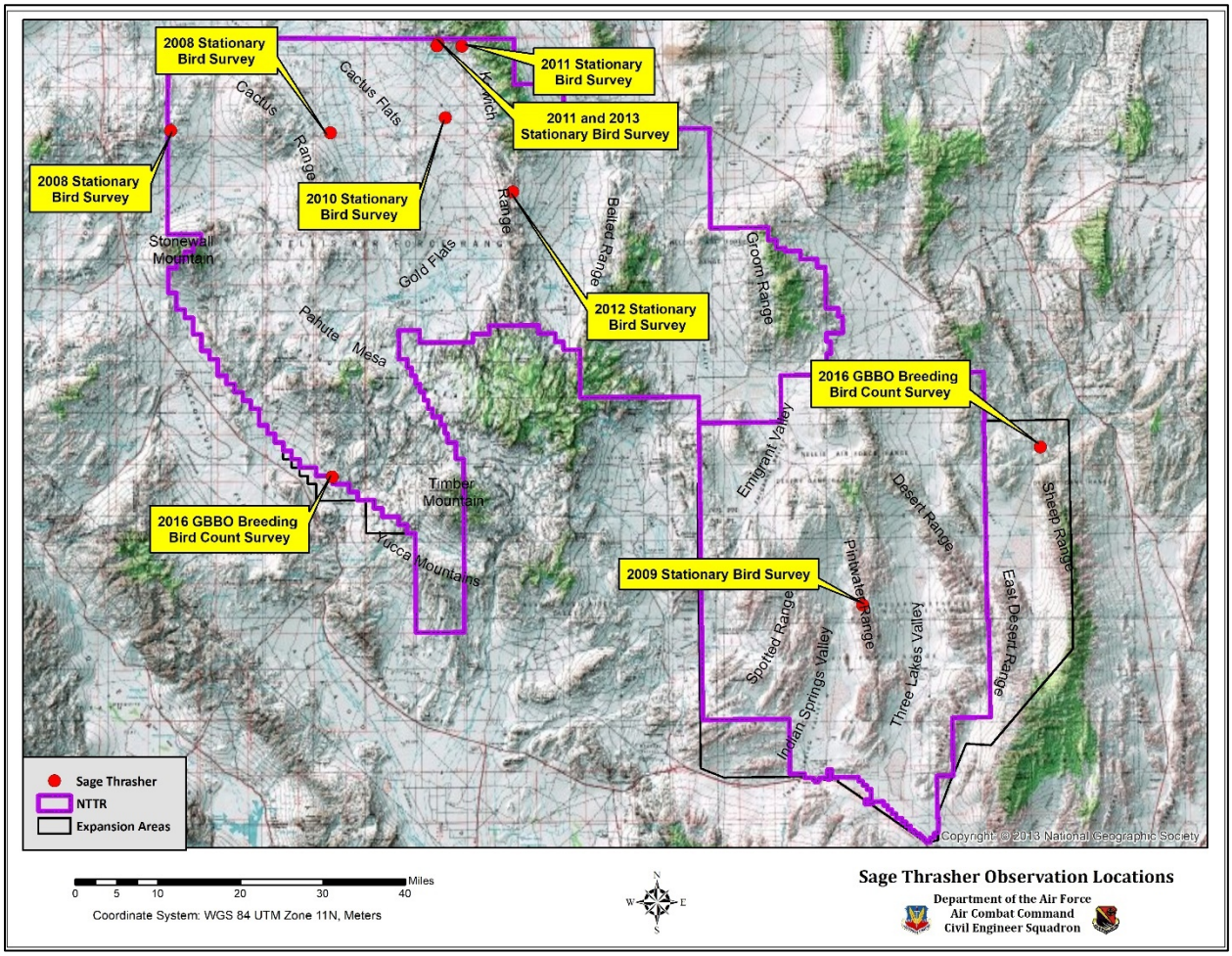


Figure 41. Locations where sage thrashers were observed in and around the study area

FLAMMULATED OWL

Flammulated owl (Photo by Paul Higgins)

The flammulated owl (*Psiloscops flammeolus*) is a small nocturnal and insectivorous bird sometimes referred to as the "dwarf owl" due to its size. It is a migratory, secondary tree cavity nester confined to coniferous forest vegetation in western North America (Marshall, 1967). The bird weighs 2 oz. and is 6-6.5 in. long with a 14-in. wingspan. Males and females have similar plumage and size (HawkWatch International, 2014). They have dark eyes, indistinct ear tufts, a grayish back, a light-colored abdomen and generally covered with scattered reddish and dark gray markings (McCallum, 2013). The Latin world "flammeolus" refers to the unique flame colored appearance of the pelage. Geographical variations include the amount of red pigment in the plumage and wing length. The red pigment increases among the southern populations and relates to the pine-dominated habitats of that region. Furthermore, populations in the northern regions which have more Douglas fir are grayer in appearance. This color adaptation appears to provide the flammulated owl with a significant camouflage advantage when it is within its home habitat (delHoyo, Elliott, & Sargatal, 1999).

No recent or historical observations of flammulated owls have been made in or around the study area. The owl was observed in 1963 outside of the study area in the Spring Range and the Sheep Range, usually in ponderosa pine, white fir, or gambel oak at elevations of 7,200 ft. to 8,900 ft. MSL (Johnson N. K., 1965). A flammulated owl was observed in 1993 on the Spring Range in Lee Canyon in a stand of ponderosa pine (Dunham, Butcher, Charlet, & Reed, 1996).

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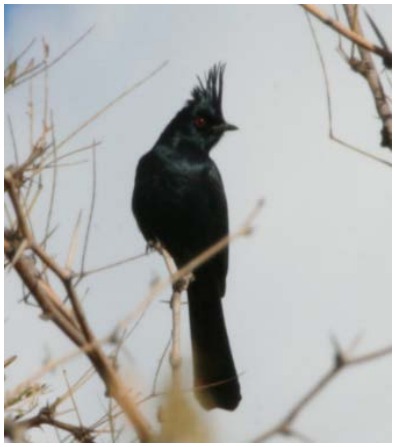


Phainopepla

Phainopepla (*Phainopepla nitens*) is Greek for "silky robe", which refers to the shiny, black plumage of this songbird. The phainopepla is a long-tailed, crested flycatcher. The bird is not a true waxwing, but is closely related, as observed with its similar crest (Griggs, 1997). Adult males have a dark crest and shiny black plumage, while females and immature birds are grayish-brown. During flight, white patches on the underside of the wing are diagnostic for identification. On average, the phainopepla reaches a length of 7.5 in. (Griggs, 1997). Phainopeplas have short, thin bills and bright red eyes. The bird imitates the vocalizations of at least 12 other bird species rendering it difficult to identify by song (Chu, 2001). However, the single note whistle-like call is distinct for the species.

The phainopepla's diet is comprised of small insects and mistletoe (*Phoradendron californicum*) berries found on catclaw acacia and honey mesquite (Griggs, 1997). Phainopeplas have a specialized digestive tract which extracts the inner seed and viscous pulp from the berry and then moves the more fibrous berry covering into the intestines for more efficient digestion (Walsberg, 1975). The moisture in mistletoe berries allow phainopeplas to not require free water, a valuable adaption for arid lands (Chu & Walsberg, 1999). In the desert, the phainopepla's preferred habitat is riparian corridors, washes and other habitats that support mistletoe infested stands of honey mesquite, catclaw acacia, ironwood, and palo verde (RECON, 2000). A clear association of phainopepla with mesquite bosque habitats is evident and is likely due to the abundance

of mistletoe found there. Clumps of mistletoe generally accumulate under sites where phainopeplas perch, making them good indicators of an extended residence of the phainopepla (Crouch, 1943).

The phainopepla is generally found below 4,000 ft. MSL, but it has been recorded between 6,200 ft. and 5,500 ft. MSL (Hoffman L. , 1933; Stevenson, 1933). Within Nevada, it ranges throughout the southern region of the state. In general, the number of phainopepla in the coastal regions and the northern parts of the range are reduced during the winter, while in the deserts it is increased (Crouch, 1943).

Studies have indicated that breeding phainopeplas in southern Nevada prefer to nest in the tallest mesquite or acacia trees available that also have the heaviest mistletoe infestation. Many of these trees also displayed less branching than average. This characteristic indicates that the trees preferred for nesting have not been subjected to stress factors such as woodcutting, fire, and the trampling that causes multi-branching in mesquite trees (Krueger, 2000). Threats to the phainopepla typically include threats to the mesquite bosque. Examples of some of the threats include fire, wood cutting, and the invasion of tamarisk which is known to out-compete the native mesquite trees.

A large number of phainopepla have been observed on NAFB and the Well Annex of NAFB. Some of the birds have been observed on the mesquite bosques of the South Range Study Area. A population of the birds are residents around the visitor's center for the DNWR at Corn Creek. Two sightings of the species were made in 2011 on the south end of the Spotted Range, northwest of CAFB. In 2014, another sighting was made in the same general area. In 2016, five sightings of phainopepla were made on the northeast corner of the South Range Study Area in the basins around the Pahranagat Range during breeding bird surveys in the spring (Figure 42).

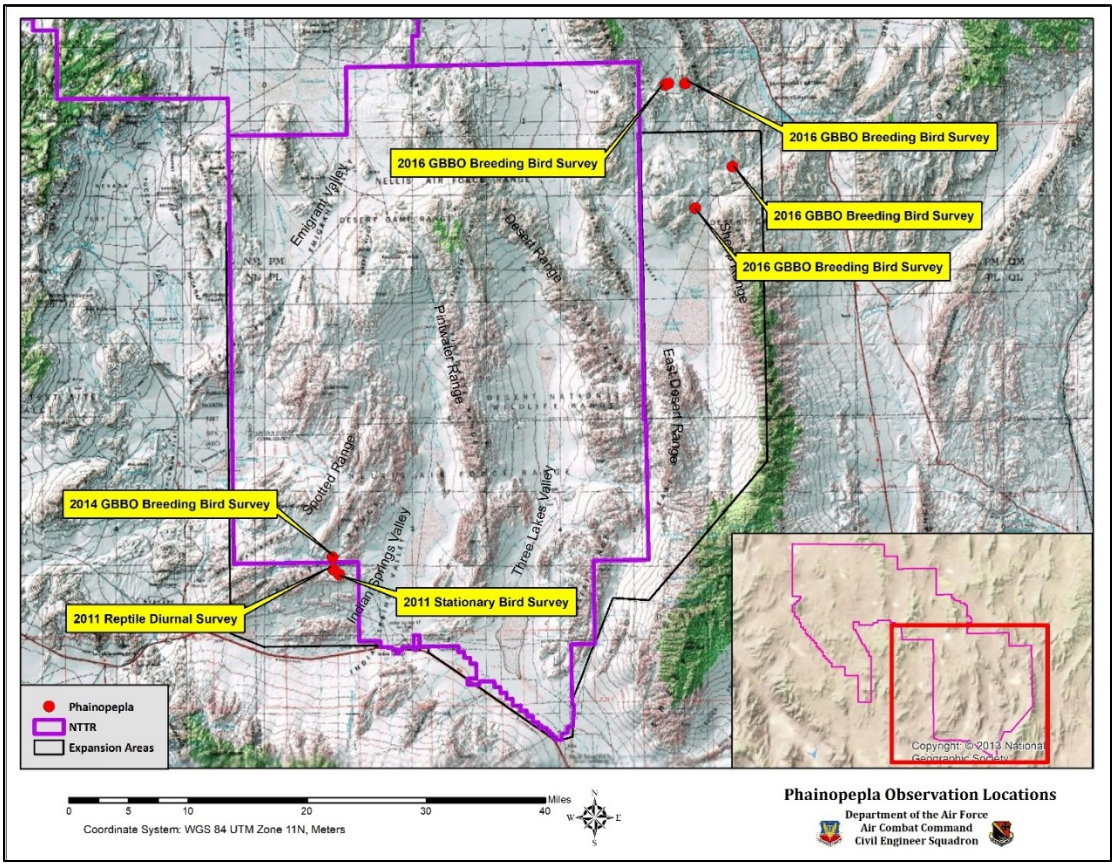


Figure 42. Locations where phainopepla have been observed in and around the study area

BLACK-CHINNED SPARROW

Black-chinned sparrow (Photo by Brian Small)

The black-chinned sparrow (*Spizella atrogularis*) is a small songbird approximately 5.75 in. long with a 7.75 in. wingspan and weighing approximately 0.42 oz. (Tenney C. , 1997). The males and females are gray or blue-gray with a striped brown back and a pink bill. The males exhibit a black patch on the face and throat. According to the GBBO (Great Basin Bird Observatory, 2010), habitats used by the Nevada black-chinned sparrow include pinyon-juniper (92%), montane shrubland (75%), montane riparian (44%), and Joshua tree (15%) ecotones. Other plants associated with the species are sagebrush, antelope bush, and Mormon tea (Tenney C. R., 1997). They are especially numerous where pinyon-juniper and Mojave scrub habitats are both present, apparently preferring the "edge" areas between lower elevation scrublands and high elevation woodlands.

This species primarily feeds on insects and insect larvae, or to a lesser extent (usually outside of the breeding season) seeds (Weathers, 1983). In summer, it appears that black-chinned sparrows may obtain sufficient water from their food. However, in the winter season, they often fly considerable distances to water sources (Tenney C. , 1997). The bird is known to forage in pinyon-juniper habitats within the vicinity of sagebrush and ephedra (Newman, 1968).

Threats to the black-chinned sparrow outside of improper fire management may include extensive grazing by livestock or feral horses, mining, and recreational use (Tenney C. R., 1997). These anthropomorphic disturbances attribute to nest abandonment by females during the breeding season (Dawson, 1923). Habitat destruction by grazing is a concern within the winter grounds because of the bird's preference for native seed and forb vegetation during this season (Wildlife Action Plan Team, 2006). Within the study area, upland habitat for this species is located on rugged slopes not used for military infrastructure or development.

Six sightings of the bird have been made on the study area. In 2007, two black-chinned sparrows were observed in Civet Cat Canyon and one near Cactus Spring in the Cactus Range. In 2009, one of the birds was observed at a construction pond near Antelope Lake in Cactus Flats. On the South Range Study Area in 2007, one sighting was made on the southwest end of the the Spotted Range and another in the north end of Indian Springs Valley (Figure 43).

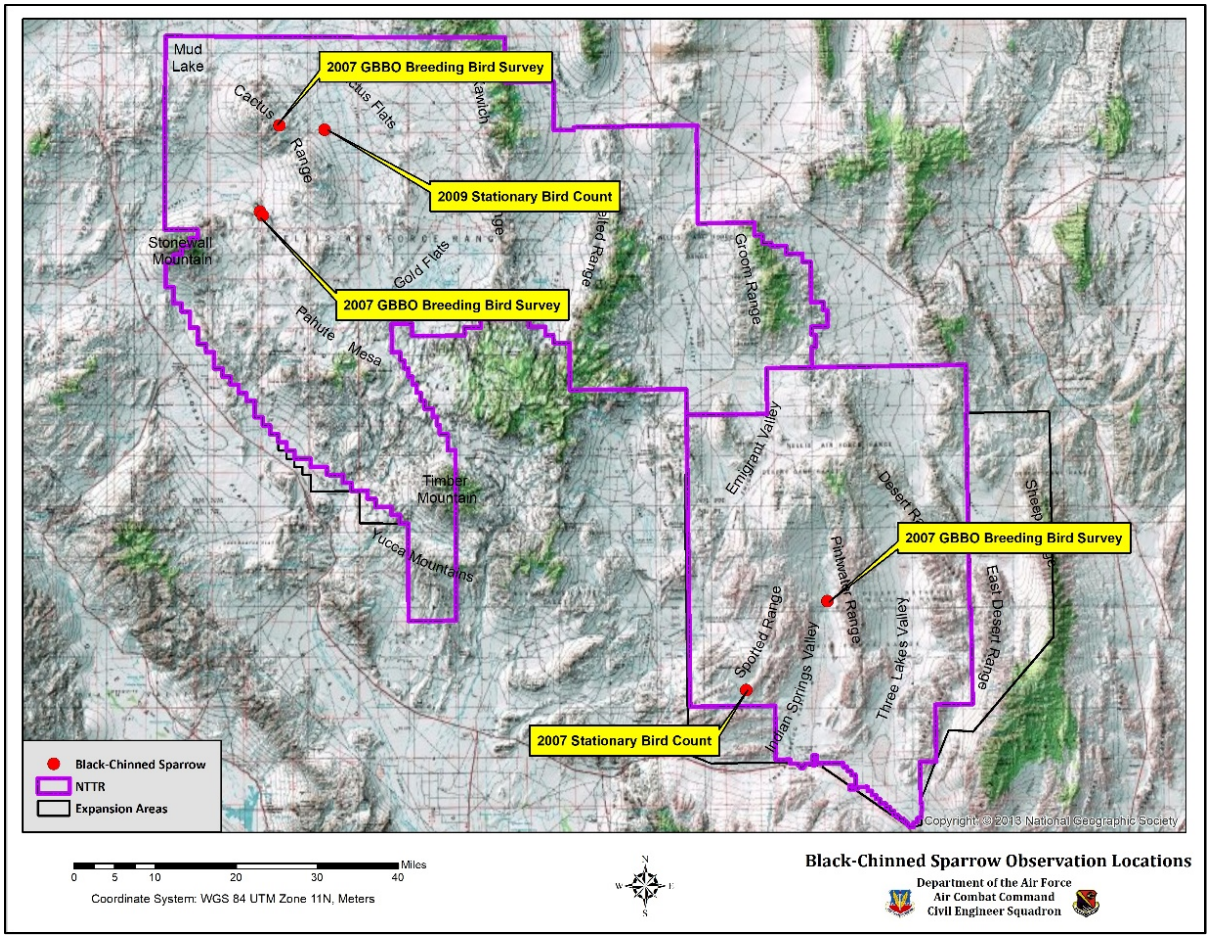


Figure 43. Locations where the black-chinned sparrow has been observed in and around the study area

CRISSAL THRASHER

The crissal thrasher (*Toxostoma crissale*) is a medium-sized songbird that is overall gray with rufous under tail coverts (Sibley, 2009). The bird is approximately 11.5 in. long with a wingspan of 13.5 in. (Alsop, 2002). Thrashers are distinguished by their long, curved bill and this species is similar in coloration to both the California thrasher (*Toxostoma redivivum*) and the Le Conte's thrasher (*Toxostoma lecontei*). The crissal thrasher is more gray above with a paler eye than the California thrasher, but not as pale and lacking the black tail of the Le-Conte's thrasher (Griggs, 1997).

Crissal thrasher
(Photo by E.J. Peiker)

The crissal thrasher is mostly a riparian brush species found in desert environments, typical habitats are slightly variable within its range. Within the Mojave Desert, the crissal thrasher is found in the upper reaches of arroyos at elevations from 3,900 ft.-6,000 ft. MSL. The preferred vegetation in washes include desert apricot, bitterbrush, and desert-thorn, often mixed with scattered catclaw acacias or desert willows (Cody, 1999). Crissal thrashers are also found in sagebrush and scattered juniper trees (Johnson, Bryant, & Miller, 1948).

Crissal thrashers are mostly permanent, non-migratory residents throughout their range in Nevada (Gullion, Pulich, & Evenden, 1959). Otherwise, the crissal thrasher is not recorded outside of its breeding range, but may occur in atypical habitat within its range during non-breeding season (Brown, Carothers, & Johnson, 1986). The crissal thrasher is mostly insectivorous, but also eats seeds, fruits, and berries. It locates insects and other arthropods by digging, picking, and probing leaf litter and plant detritus with its bill (Hoffman R. , 1927).

Only five sightings have been made of the crissal thrasher, two of which were on the South Range Study Area. In 2014, two birds were observed in Spotted Canyon, located on the south end of the Spotted Range. Three sightings were made in 2016 in Badger Valley outside of the northern boundary of the study area (Figure 44).

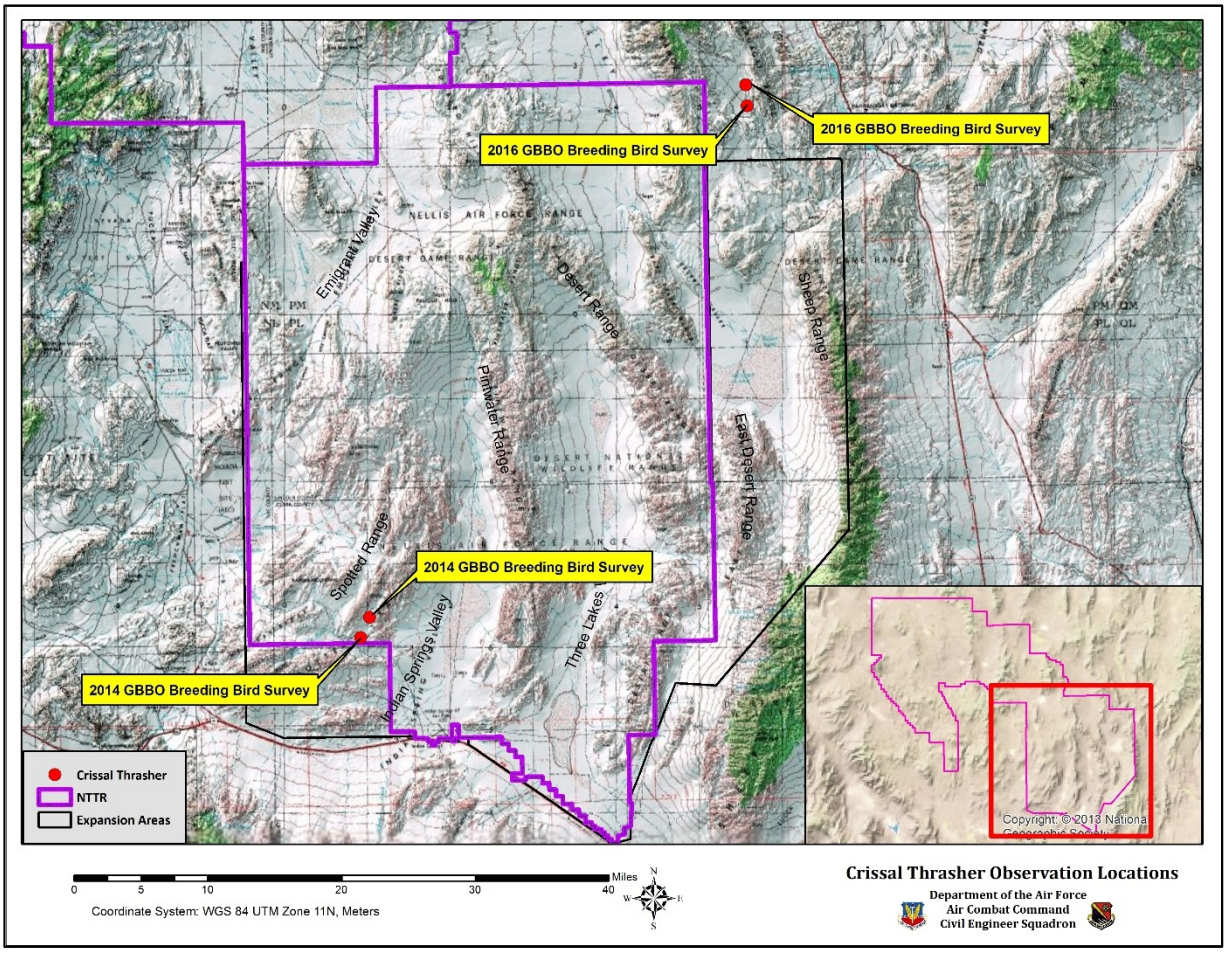


Figure 44. Locations where crissal thrashers have been observed in and around the study area

LE CONTE'S THRASHER

Le Conte's thrasher (www.seatosierrabirds.com)

The Le Conte's thrasher (*Toxostoma lecontei*) is similar to the crissal thrasher with a pale gray-brown back, head, and tail and pale buff colored underparts. The tail is long and dark brown to black, sharply contrasting with the body colors. The wings are short and rounded. The species is not dimorphic, with sexes appearing similar. The bird weighs 19-26 oz. and is 10-11 in. long (Prescott, 1998). Le Conte's thrasher is monogamous, and both sexes build the nest and care for the young. Nests are typically found on cactus, thorny shrubs, or small trees and placed in a manner to provide protection from predators and sun (Sheppard, 1996). The bird's range includes southern Nevada to the Beaver Dam Mountains in southwestern Utah and southeastward to central and southern Arizona. The bird prefers desert flats, washes, alluvial fans, and scattered shrubs (Prescott, 1998). Only one observation of Le Conte's thrasher has been made on the study area. The bird was seen on Spotted Range Road on the southwest side of Indian Springs Valley in 2015 during a GBBO breeding bird survey (Figure 45).

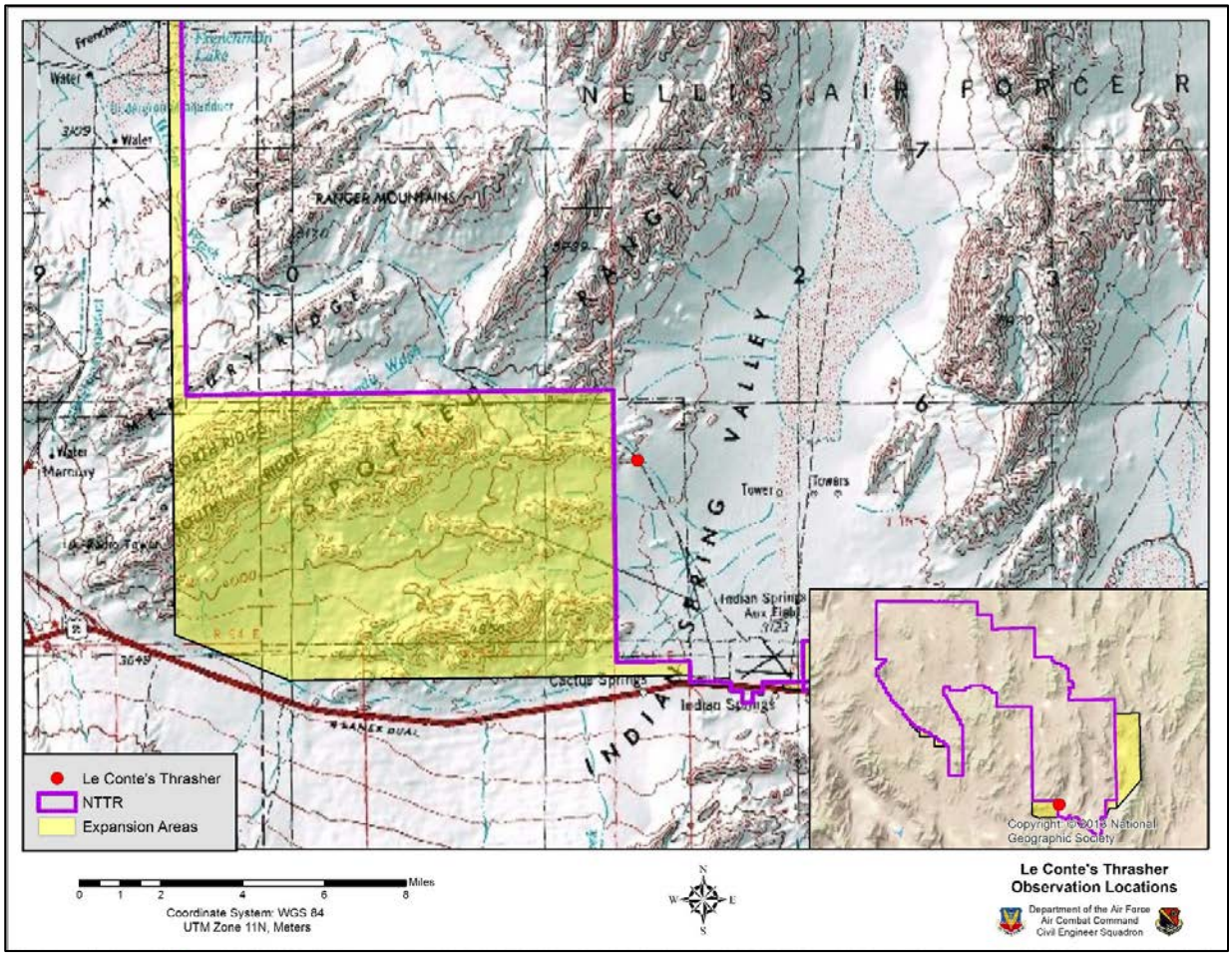


Figure 45. Location where Le Conte's thrasher was observed on the study area

GRAY VIREO

The gray vireo (*Vireo vicinior*) is a medium-sized vireo with some differences in size and plumage color between males and females. These birds are 5-6 in. in total length (males slightly larger) and weigh 0.41-0.48 oz. (Barlow, Leckie, & Baril, 1999). The bird is plain gray with a narrow white eye ring and two subtle, light gray wing bars. Sometimes, only one wing bar is visible from a distance. This species can also be identified by the unique tendency among vireos to flick their long tail (Alsop, 2002).

Gray vireo
(Photo by C. Quiner)

Diet of the gray vireo appears to vary regionally, but is primarily dominated by insects and berries (Barlow, Leckie, & Baril, 1999). In Nevada, gray vireos remove prey from leaves, twigs, branches, and trunks of small trees or shrubby vegetation (Barlow, James, & Williams, 1970).

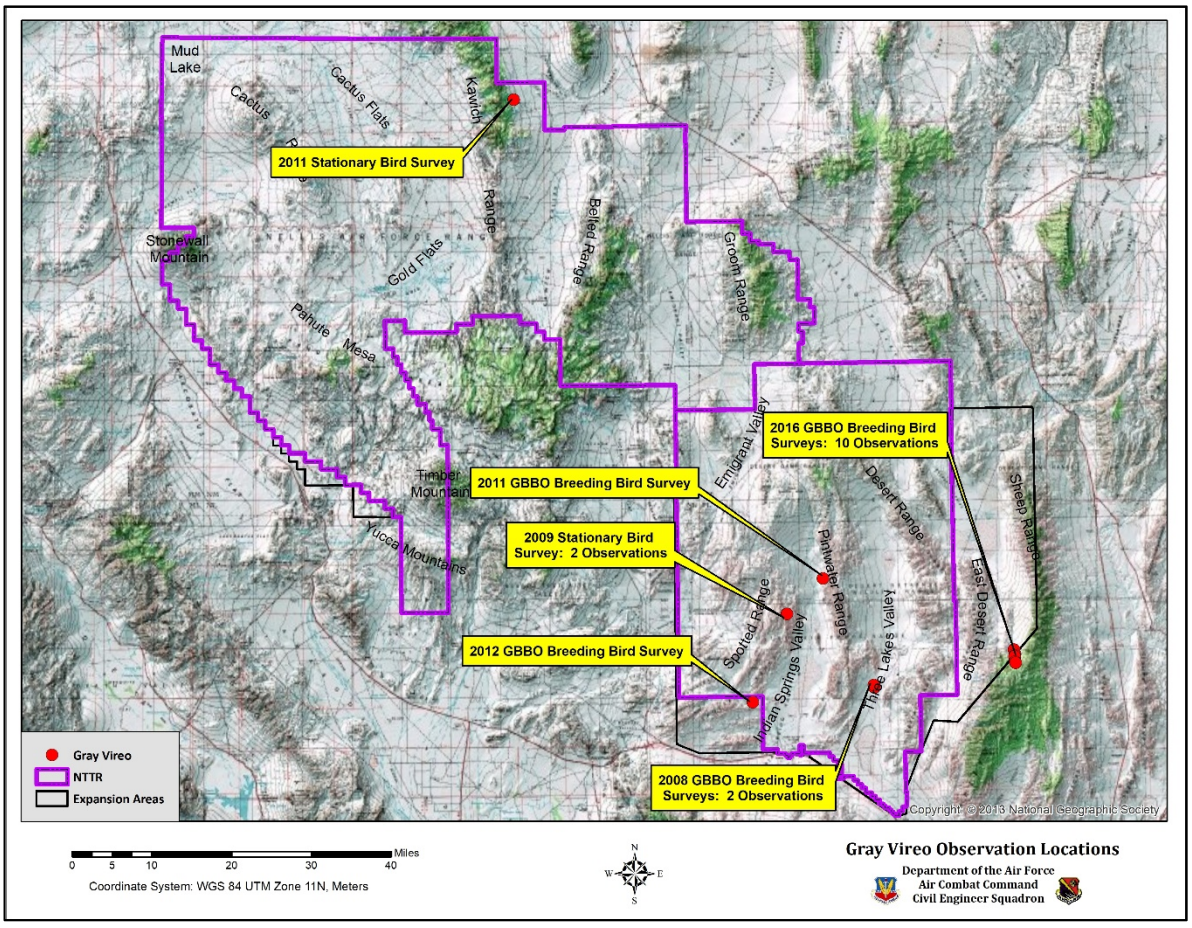


Figure 46. Locations where gray vireo has been observed in and around the study area

Gray vireos are found in hot, arid regions most often associated with juniper, pinyon pine, or oak trees. They have been observed between 5,400 ft. and 6,000 ft. MSL (Nevada Partners in Flight, 1999). In Nevada, its preferred habitat appears to be mature or mixed-age pinyon-juniper woodlands with scattered trees and open canopies, preferably where juniper is dominant (Schlossberg, 2006; Walker & Doster, 2009). They also favor sites with a mature and often diverse shrub understory for foraging. As might be

expected, gray vireos in the Mojave regions usually occupy higher elevations than those further to the north in Nevada (Great Basin Bird Observatory, 2010).

The gray vireo has been observed at several locations on the study area (Figure 46). Only one sighting was made on the North Range Study Area at Sumner Spring on the east side of the Kawich Range in 2011. All other sightings occurred on the South Range Study Area.

DESERT KANGAROO RAT

The desert kangaroo rat (*Dipodomys deserti*) is a nocturnal rodent that measures approximately 15 in. in length and weighs nearly 5 oz. (Best, Hildreth, & Jones, 1989). The females remain close to the burrow while pregnant to ensure that the burrow is ready for birthing. Gestation lasts 29-32 days and litters are 1 to 6 young (Best, Hildreth, & Jones, 1989).

Desert kangaroo rat

The desert kangaroo rat's preferred habitats include dry, low elevation deserts with sandy soils and sparse vegetation. Stabilized dunes with scattered vegetation are considered optimal (Álvarez-Castañeda, Castro-Arellano, & Lacher, 2016). The desert kangaroo rat feeds on seeds and prefers dried vegetation over green, succulent vegetation. It will store massive amounts of seed within its burrows when possible (Burt & Grossenheider, 1964). The main threat to this species is the destruction of habitat by recreational vehicles, especially on dune areas.

Desert kangaroo rats have been captured on the North Range Study Area and South Range Study Area (Table 18; Figure 47). Several have been captured outside of the study area around the Corn Creek Visitor

Table 18. Year and type of survey and the agency conducting the survey in which desert kangaroo rates were observed

No. Observed	Survey Year	Type of survey	Agency
16	1929	Unknown-Historical	Unknown
1	1930	Unknown-Historical	Unknown
12	1931	Unknown-Historical	Unknown
2	1945	Unknown-Historical	Unknown
2	1968	Unknown-Historical	Unknown
2	1997	Unknown-Historical	Unknown
4	1999	Unknown-Historical	DNWR
5	2007	Small Mammal Trapping Survey	NNRP
4	2008	Small Mammal Trapping Survey	NNRP
8	2009	Small Mammal Trapping Survey	NNRP
2	2010	Small Mammal Trapping Survey	NNRP
1	2011	Small Mammal Trapping Survey	NNRP
12	2013	Small Mammal Trapping Survey	NNRP
2	2014	Small Mammal Trapping Survey	NNRP
1	2014	Rabbit Prey-Base Night Drive Survey	NNRP
1	2016	Vegetation Survey	AEI

Center for the DNWR. Most of the observations on the study area were recorded on dunes and stabilized dunes or sandy soils.

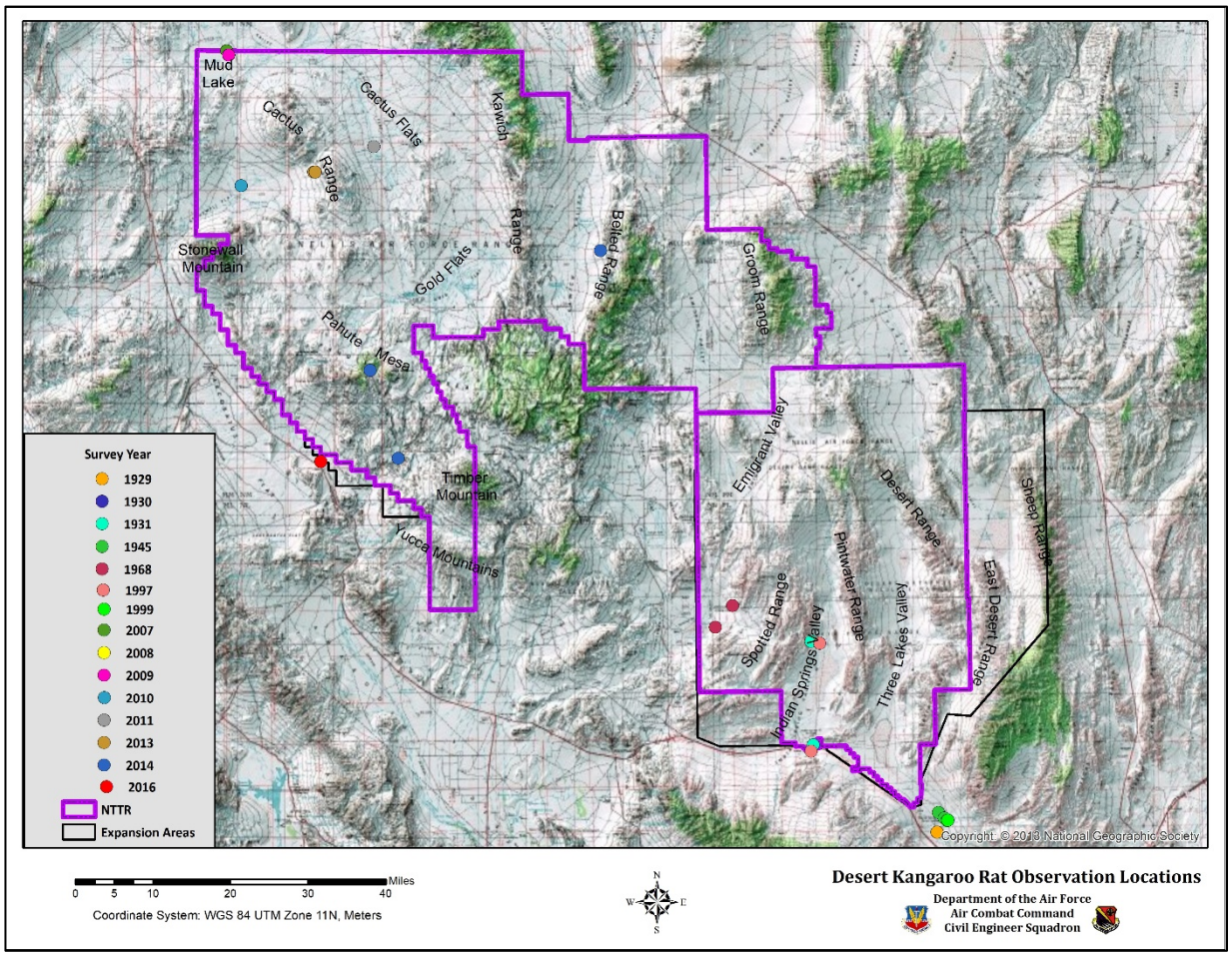


Figure 47. Locations where the desert kangaroo rat has been observed in and around the study area

BIG BROWN BAT

Big brown bat
(Photo by Juan Cruzado)

The big brown bat (*Eptesicus fuscus*) is found from southern Canada through the United States to extreme northern South America (Miller B. R.-C., 2016). The population is widely distributed and does not appear to be declining. The big brown bat appears to have adapted well to humans with most populations increasing with the increase in anthropogenic development. Most big brown bats live as long as 19 years in the wild, if they store sufficient fat during the warm months to sustain them through winter hibernations (Miller B. R.-C., 2016). Many big brown bats die their first winter due to the lack of fat storage. Males and females only roost together during the summer breeding season. The female bats form colonies to raise their young while the male bats roost alone (Miller B. R.-C., 2016).

The diet of this species of bat is predominantly beetles, but also includes other flying insects such as moths, wasps, flying ants, lacewings, and dragonflies. Much of its favorite foods are common in cities, towns and rural areas. The big brown bat does not require a warm, highly insulated environment in which to hibernate and may be found roosting in tree cavities and caves (Miller B. R.-C., 2016).

Two sightings of the big brown bat occurred on the North Range Study Area (Figure 48). Both observations were recorded from acoustic monitoring. Two more sightings were made in the northern part of the NNSS. One historical sighting was recorded just in the South Range Study Area occurring within Indian Springs in 1934. Two more sightings were made on the southern part of the Sheep Range.

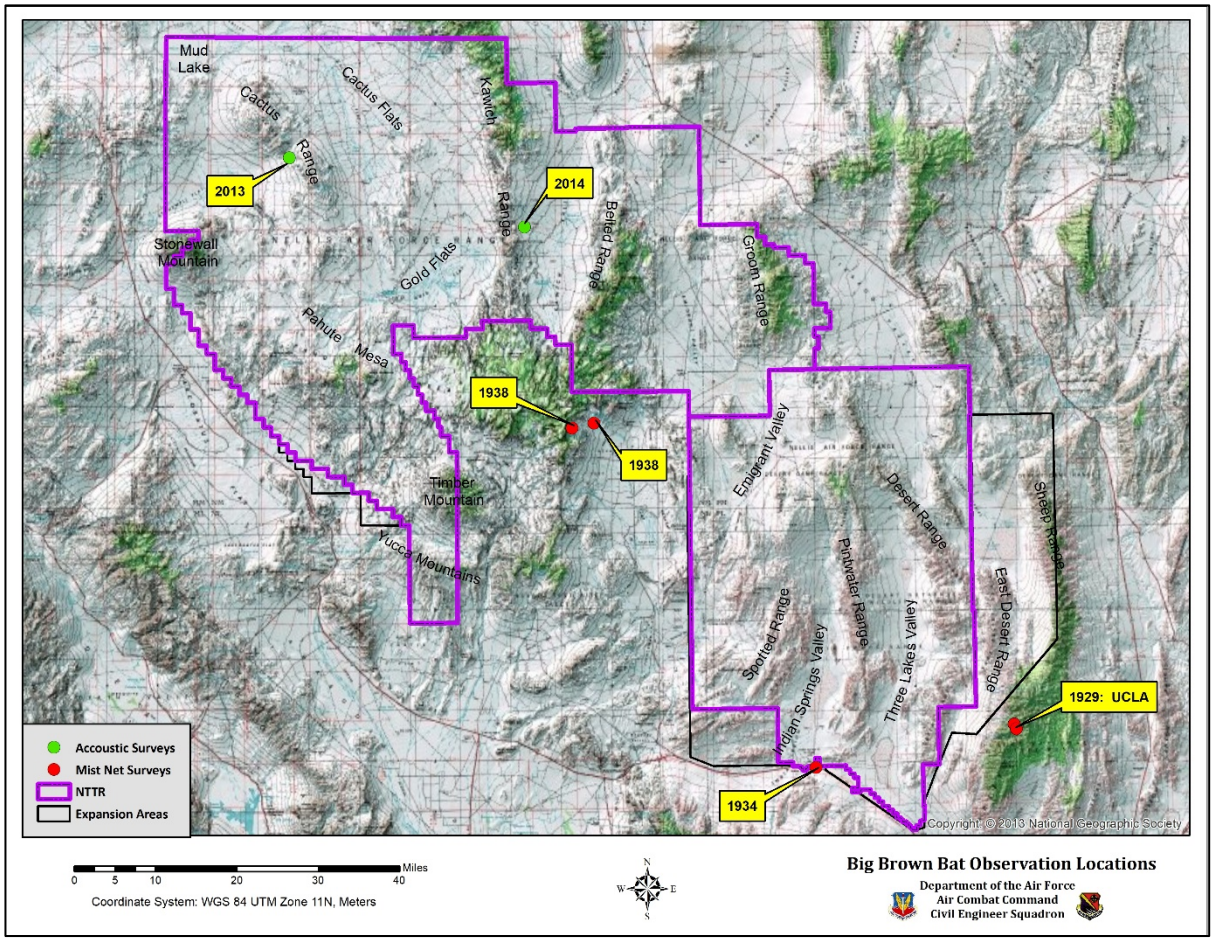


Figure 48. Locations where the big brown bat has been observed in and around the study area

SPOTTED BAT

Spotted bat
(Photo by Progressive Animal Welfare Society - PAWS)

The spotted bat (*Euderma maculatum*) is a fairly large bat about 4 in. long with a wingspan of 14 in. and weighing 0.71 oz. (Watkins L. C., 1977; Luce B. , 1998) The bat has large ears and a color pattern comprised of three large white spots, one on each shoulder and one on the rump. It also has a small white patch at the base of each ear and white-tipped, black-based hairs on the under parts (Schmidly D. , 2004). The spotted bat is easily discernable from other species by this distinct spotted pelage. Along with a distinct coat pattern, it also has the largest ears of any North American bat species. The ears are pink, about 1.5 inches in length, and comprised of a single tragus. The ears stand erect in active individuals, but are folded and curled back against the body in a state of rest or torpor (Luce, Bogan, J.O'Farrell, & Keinath, 2004).

Early records indicate that the spotted bat prefers forested areas, but more recent research indicates that habitat can range from desert shrub to coniferous forests (Luce & Keinath, 2007). It has been suggested that females give birth in forested habitat and later move to low elevations (Findley & Jones, 1965). Other studies indicate that the bat is a near obligate cliff-dweller and roosts in cracks and crevices of canyon walls (Pierson & Rainey, 1998). These bats have been categorized as late night flyers due to a history of early morning captures (Schmidly D. , 2004).

One sighting of the spotted bat occurred on the North Range Study Area and was an acoustic monitoring survey performed by the NNRP personnel in 2014, near Antelope Mine in the Cactus Range (Figure 49).

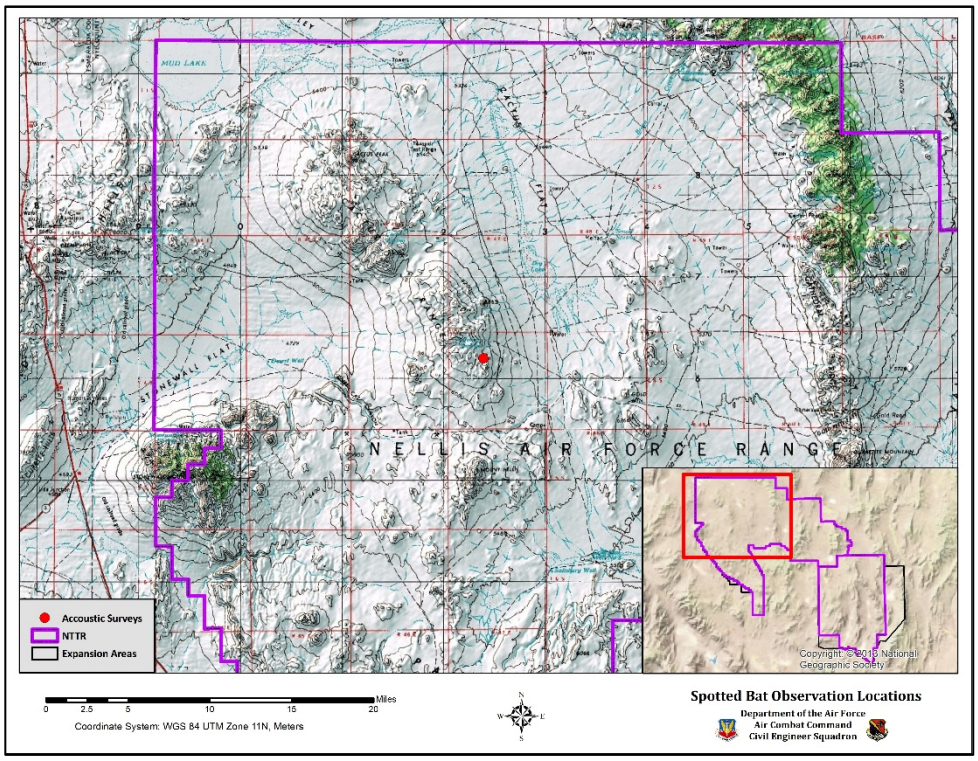


Figure 49. Location where the spotted bat has been observed in and around the study area

HOARY BAT

Hoary bat
(Photo by Ray Eaton)

The hoary bat (Lasiurus cinereus) is considered to be one of the larger bats in North America with an adult length of 4.5-5.8 in. The fur on the bat is yellowish-brown to dark brown, with white tips (Hall E. R., 1981). This bat is solitary, except when raising young and during migration. Migration will occur in groups of large numbers. In the spring, the females generally migrate before the males (Valdez & Cryan, 2009). Some males are resident, remaining in the same area over the summer and winter (Schmidly D. J., 1991).

The hoary bat prefers deciduous and coniferous forest and woodland habitat (Furlonger, Dewar, & Fenton, 1987). Unlike many other bats, these bats rarely roost in caves and only sometimes use rock crevices for roosting. Due to its migratory habits, this bat is widely distributed across North America (Furlonger, Dewar, & Fenton, 1987). Hoary bats prefer to forage over water courses in pinyon-juniper and mixed coniferous forests, especially below the tree canopy along streams and waterways. The diet of the hoary bat is predominantly moths (Valdez & Cryan, 2009). However, hoary bats will feed on any insects if moths are not present.

Three sightings of the hoary bat have been recorded on the study area using acoustic monitoring. One recording was in 2010 at Pillar Springs, southwest of Black Mountain, while the other two recordings were in 2014 near Lamb's Pond in Kawich Valley (Figure 50).

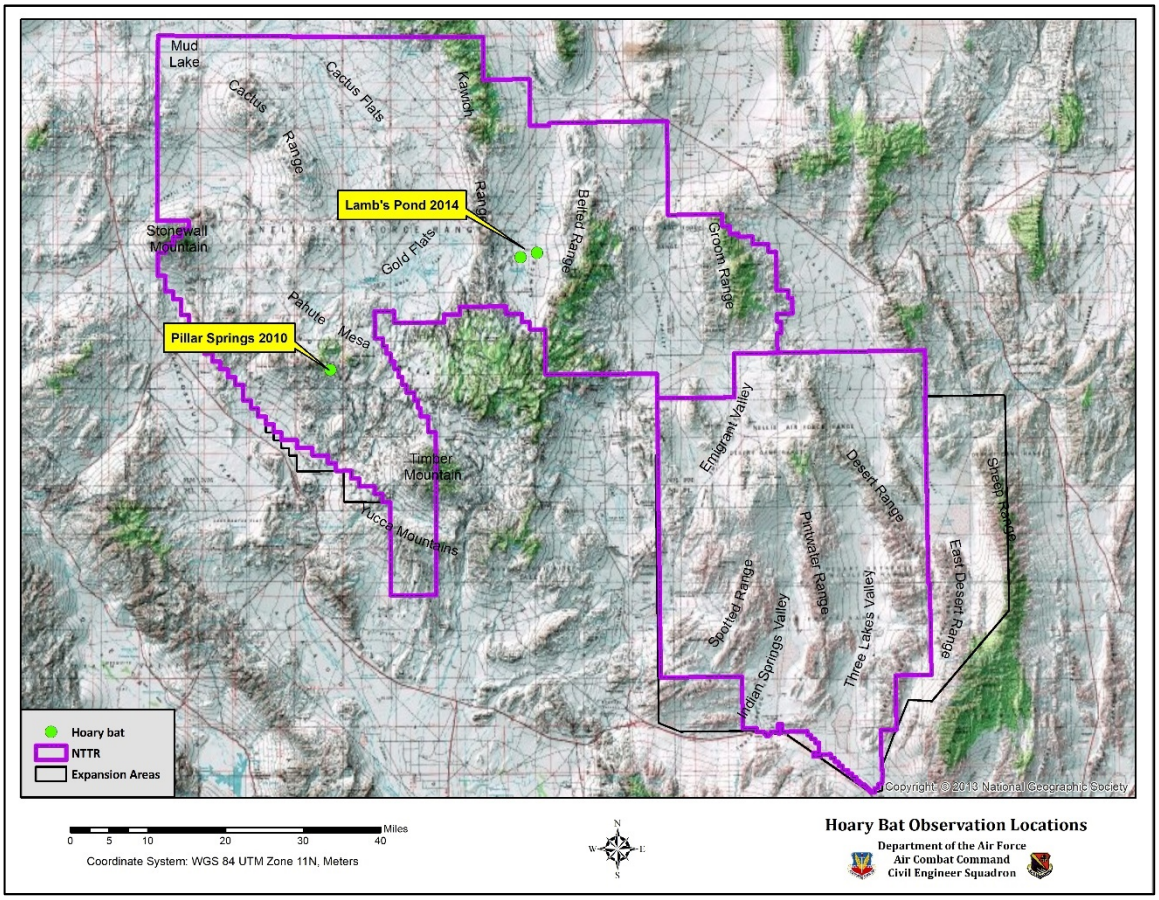


Figure 50. Locations where the hoary bat has been observed in and around the study area

SILVER HAIRED BAT

Silver haired bat
(Photo by R.W. Van Devender)

The silver haired bat (*Lasionycteris noctivagans*) is a medium sized bat with silver tipped black or dark brown fur. The silver haired bat's diet is mostly comprised of small to medium sized flying insects (Kunz, 1982). Most of their foraging takes place over small bodies of water within forested areas. The silver haired bat prefers temperate, forested areas with bodies of water nearby (Campbell, 1996). It has been observed across the United States and along the west coast of Canada and into Alaska (Campbell, 1996).

Silver haired bats migrate in the spring and fall (Bentley, 2017). The bats typically roost in densely vegetated forests and tree cavities during spring migration (Bentley, 2017). In the winter, the bats roost in mines, caves, houses, rock crevices and hollow trees (Bentley, 2017). Due to the importance of woodlands and forests to the silver haired bat, destruction of these areas by logging and deforestation presents a major threat to populations.

Only two observations of this bat have been made on the study area and they were acoustic recordings on the North Range Study Area (Figure 51). One bat was recorded in 2009 at Pillar Springs, while the other was near Lamb's Pond in 2014. Two additional observations were recorded in 1929, just outside of the South Range Study Area along the Sheep Mountains. In 1940, a silver haired bat was captured at the Corn Creek Ranch.

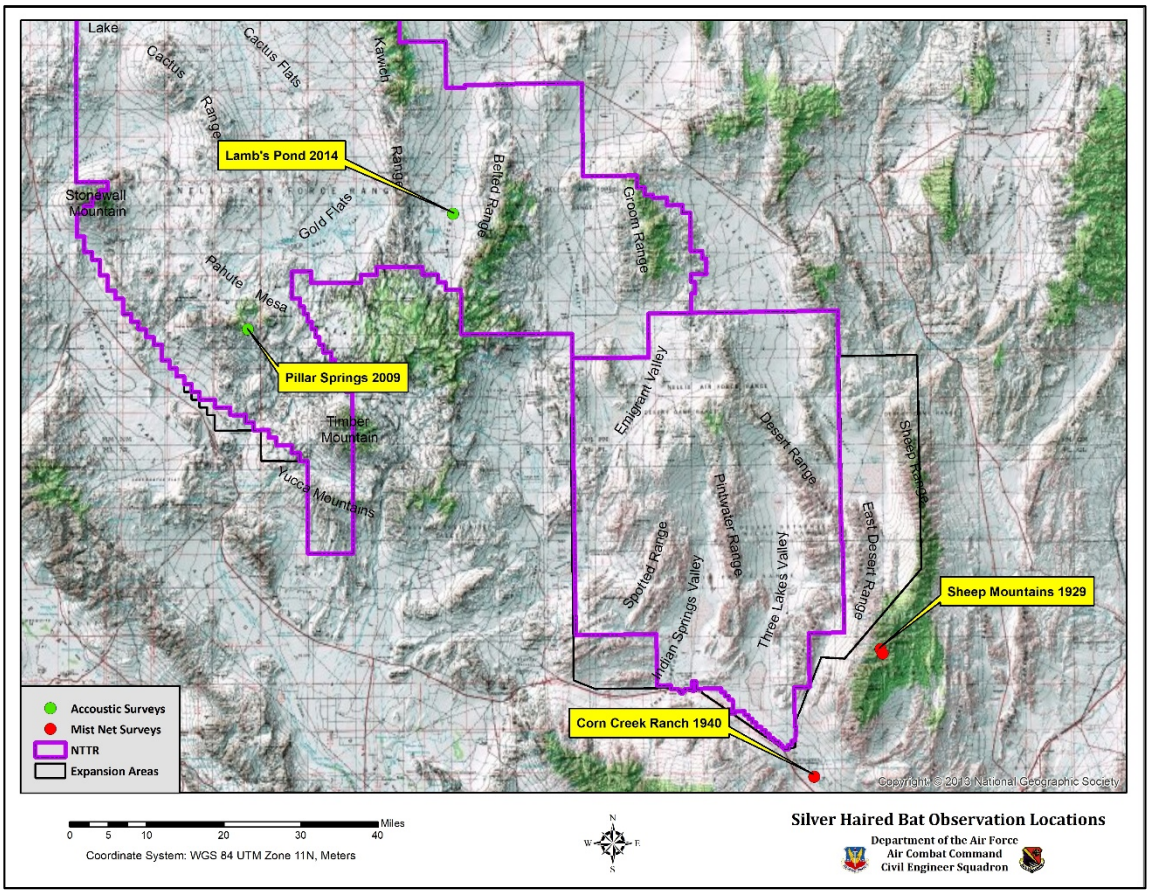


Figure 51. Locations where the silver haired bat has been observed in and around the study area

CALIFORNIA MYOTIS

The California myotis (*Myotis californicus*) is found throughout the west coast from Canada to Central America. The species has a high tolerance for different habitats, including coasts, desert scrub, woodlands, forests, meadows, canyons, rural areas, and grasslands (Barbour R. W., 1969). Roosting sites for this bat are also variable and include tree cavities, rock crevices, shrubs, mines, caves, and nooks in man-made buildings or structures (Barbour R. W., 1969). Most California myotis bats will roost alone, except when breeding or rearing young. Females form maternity flocks for birthing and nursing young bats (Barbour R. W., 1969).

California myotis (Photo by NNRP)

Like many other bats, California myotis bats are insectivorous. Their diet is predominantly flies, moths, and beetles. They typically forage while in flight using slow, erratic flight patterns along the edges of tree canopies, over bodies of water, and above open country. The California myotis bat will wake during hibernation to forage for food (Simpson, 1993).

A total of 21 acoustic recordings of the California myotis bat were made on the study area (Table 19; Figure 52). Three of these occurred on the South Range Study Area, while the remaining recordings occurred on the North Range Study Area. Two of the bats were trapped in mist nets at Cactus Springs on the North Range Project Area, one in 2008 and one in 2011. Two were captured in mist nets in 1929 and 1988 in the Sheep Range and one in 1929 in Indian Springs. Five more observations of this bat were recorded in 2001 and 2004 on the NNSS.

Table 19. Year and type of survey and the agency conducting the survey in which California myotis were observed. Note that acoustic observations are number of calls and not number of individual bats

No. Observed	Survey Year	Type of survey	Agency
2	1929	Mist Net Survey	UCLA
1	1988	Mist Net Survey	Gannon
1	2004	Mist Net Survey	Bechtel
13	2001	Mist Net Survey	Bechtel
1	2008	Mist Net Survey	NNRP
74	2009	Acoustic Survey	NNRP
3	2010	Acoustic Survey	NNRP
1	2011	Mist Net Survey	NNRP
164	2012	Acoustic Survey	NNRP
2	2013	Acoustic Survey	NNRP
77	2014	Acoustic Survey	NNRP
2,114	2015	Acoustic Survey	NNRP

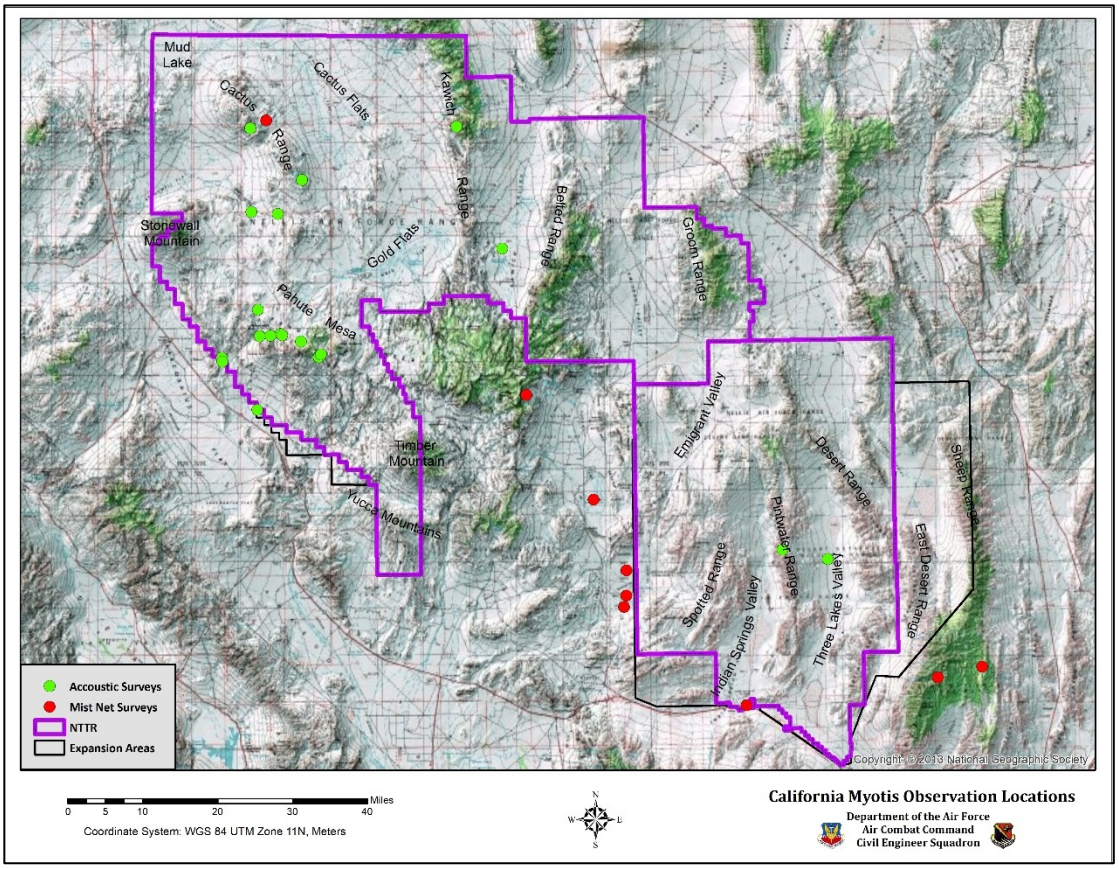


Figure 52. Locations of where the California myotis has been observed in and around the study area

WESTERN SMALL-FOOTED MYOTIS

The western small-footed myotis (*Myotis ciliolabrum*) is a small pale-yellow bat with a black mask across its eyes and mouth. The bat is difficult to distinguish from the California myotis without acoustic monitoring (Nevada Natural Heritage Program, 2016). Both species of Myotis appear similar and they even coexist with the availability of food separating them. The California myotis prefers to forage over bodies of water while the western small-footed myotis will primarily forage over rocks and shrubs (Woodsworth, 1981). This bat initiates foraging very shortly after sunset. Unlike the California myotis, the western small-footed myotis will hibernate for winter without waking to feed (Schmidly D. J., 1991).

Western small-footed myotis (Photo by NNRP)

The western small-footed myotis is found on the west coast and in parts of the central U.S. (Holloway, 2001). The bat inhabits desert and badlands to mesic areas and forests. Due to the variation in habitats, the western small-footed myotis will roost in many different sites including caves, mines, rock crevices, tree cavities, and human dwellings (Holloway, 2001).

The western small-footed myotis has been trapped in mist nets in Kawich Valley, Cactus Range, Pahute Mesa and on the NNSS. The species has been acoustically detected on the Belted Range, Kawich Valley,

Cactus Range, Stonewall Flats, Tolicha Peak, and Pahute Mesa on the North Range Study area. No observations of the species have been made on the South Range Study Area (Table 20; Figure 53).

Table 20. Year and type of survey and the agency conducting the survey in which western small-footed myotis were observed. Note that acoustic observations are number of calls and not number of individual bats.

No. Observed	Survey Year	Type of survey	Agency
10	1996	Unknown-Historical	Unknown
18	1998	Unknown-Historical	Unknown
1	2004	Unknown-Historical	Unknown
34	2008	Mist Net Surveys	NNRP
27	2009	Acoustic Surveys	NNRP
982	2010	Acoustic Surveys	NNRP
27	2010	Mist Net Surveys	NNRP
5	2011	Mist Net Surveys	NNRP
81	2013	Acoustic Surveys	NNRP
9	2013	Mist Net Surveys	NNRP
92	2014	Acoustic Surveys	NNRP
150	2015	Acoustic Surveys	NNRP
73	2015	Mist Net Surveys	NNRP

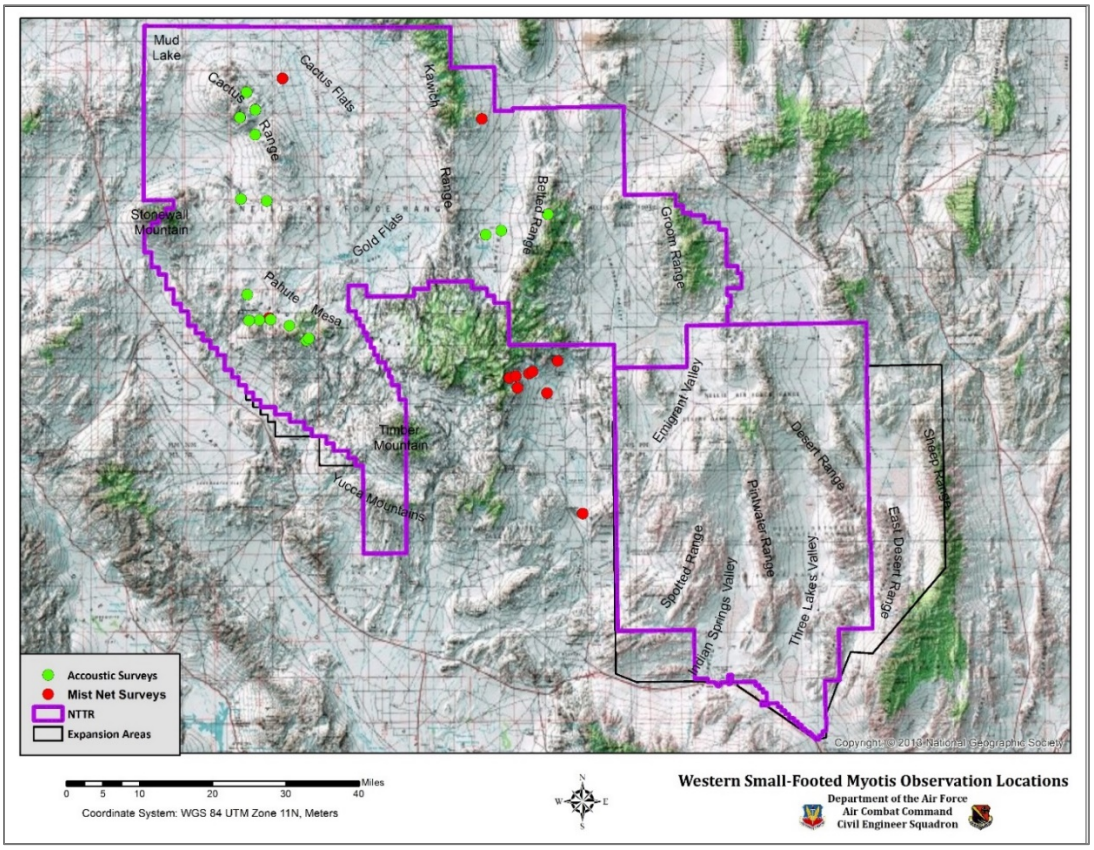


Figure 53. Locations where the western small-footed myotis has been observed or detected acoustically

LONG-EARED MYOTIS

The long-eared myotis (*Myotis evotis*) is distinguishable from other myotis species by its long (1.0-3.5 in.), glossy black ears. This bat generally roosts singly or in very small groups and may live as long as 22 years (Tuttle, 1982). Reproductive females will form a colony and remain with the colony until their young are weaned. Most females only give birth to one young bat in the summer season (Tuttle, 1982). Little is known on the mobility and migration patterns of the long-eared myotis, but it is believed to be a migratory bat (Manning, 1989).

Long-eared myotis
(Photo by SCBats)

The long-eared myotis is like other myotis because it occupies a wide range of habitats, including grasslands, woodlands, forests, meadows, streams and other bodies of water. The preferred roost areas include human dwellings, tree crevices, mines, caves, rock crevices, and channels in the ground (Manning, 1989). The long-eared myotis is insectivorous, preferring flying insects, but may also feed on non-flying insects on the ground and shrubs (Manning, 1989).

On the North Range Study Area, five observations of the long-eared myotis have been recorded by the NNRP (Figure 54). One long-eared bat was captured on a mist net and recorded acoustically at Pillar Springs in 2010. Three other bats were captured on mist nets at Yellow Gold Mine (2014), Monte Cristo

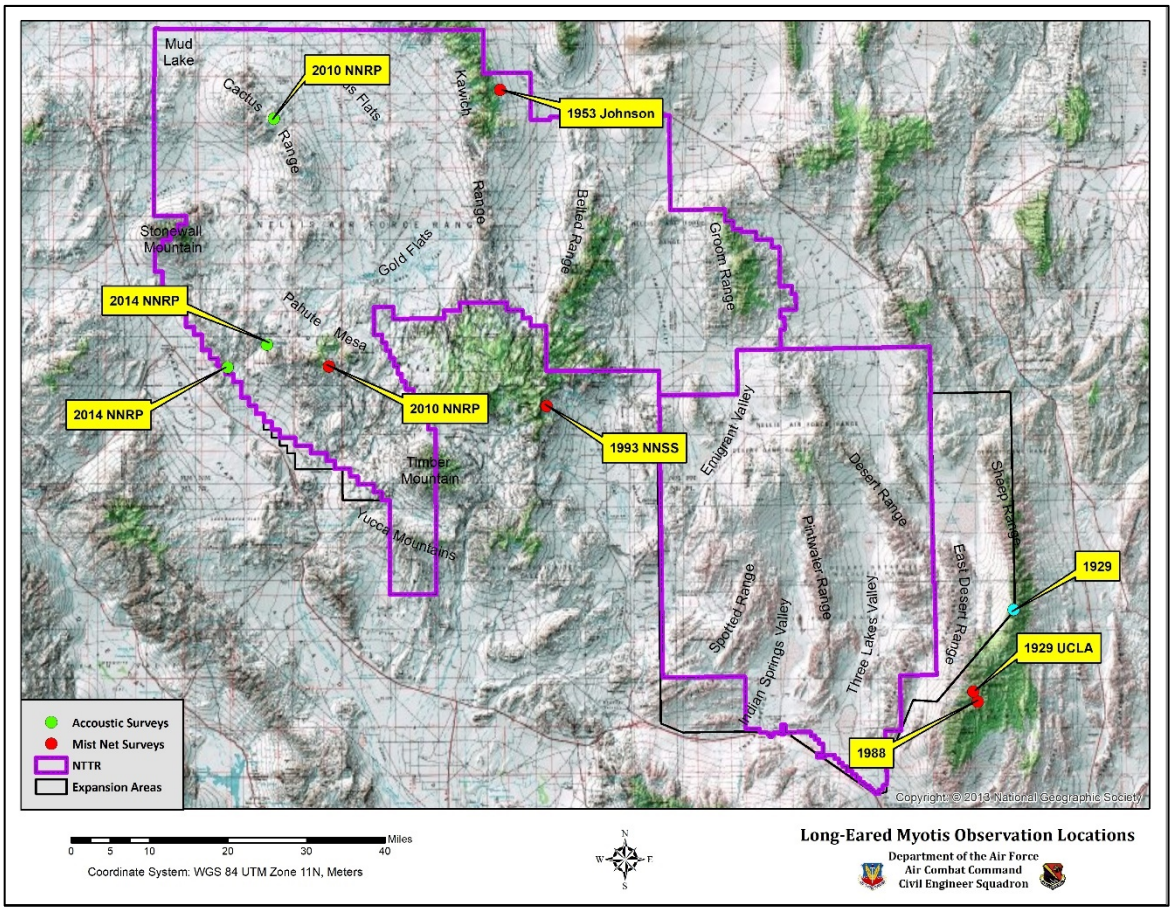


Figure 54. Locations where the long-eared myotis has been observed in and around the study area

Spring (2014), and Cactus Spring (2010). The NNHP database documented one male and two females in the Kawich Range in 1953 captured by N. K. Johnson and one male and one female on the NNSS in 1993. Another mist net capture was made on the eastern boundary of the South Range Study Area in 2009. Three other captures were made in 1988 and 2009 on the Sheep Range outside of the study area.

LONG-LEGGED MYOTIS

The long-legged myotis (*Myotis volans*) gets its name from its long tibia bone. It has short ears and long, dense, dark brown fur on the underside of the wings (Nevada Natural Heritage Program, 2016). This is the most common *Myotis* species that occurs in the western U.S. from the most southern tip of Alaska, along the west coast of Canada to the northern half of Central America (Warner & Czaplewski, 1984).

Long-legged myotis (Photo by Roger W. Barbour)

Mobility and migration patterns are not well known for the long-legged myotis, but it hibernates in most northern parts of their range (Warner & Czaplewski, 1984). This species forages during the few hours after sunset, primarily feeding on moths but may also eat beetles, flies, and grasshoppers (Warner & Czaplewski, 1984). The variety in food choices is a reflection of the wide range of habitats in which the long-legged myotis bat resides ranging from mountainous areas to riparian and desert habitats (Warner & Czaplewski, 1984). The preferred roosts are tree crevices, mines, and caves.

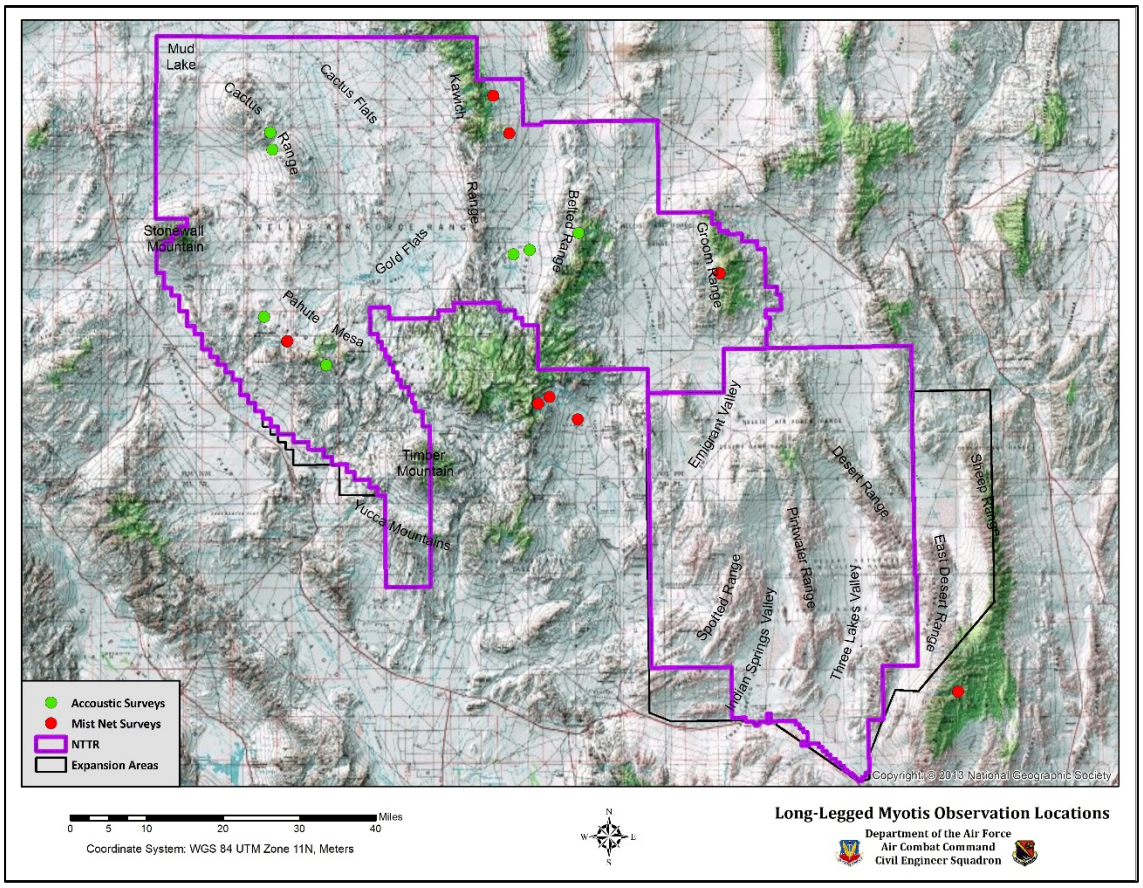


Figure 55. Locations where the long-legged myotis has been observed in and around the study area

On the North Range Study Area, 20 observations of the long-legged myotis have been recorded (Figure 55). Eleven of these observations were trapped at Tolicha Pond near Tolicha Peak and one at Cedar Well. The remaining eight bats were acoustically detected at various locations on the North Range Study Area. An additional three observations were recorded in 1996 and 1998 on the northern end of the NNSS. Two observations were made in 1931 and 1953 on the Groom Range. One female was observed on the Sheep Range in 1988.

YUMA MYOTIS

The Yuma myotis (*Myotis yumanensis*) is a small bat (4 in. long) with small round ears. Compared to other bats, the Yuma myotis is found most closely near water sources (Barbour R. W., 1969). It is found within a wide range of habitats, as long as water is present (Ammerman, Hice, & Schmidly, 2012). These habitats include riparian, desert scrub, woodlands, and forests. The diet of the Yuma myotis bat is primarily moths, beetles, and various other insects (Easterla, 1973).

Yuma myotis
(Photo by Kirk Navo)

Very little is known about the winter habits of this bat (Ammerman, Hice, & Schmidly, 2012). During summer, it roosts in caves, cliff crevices, human dwellings,

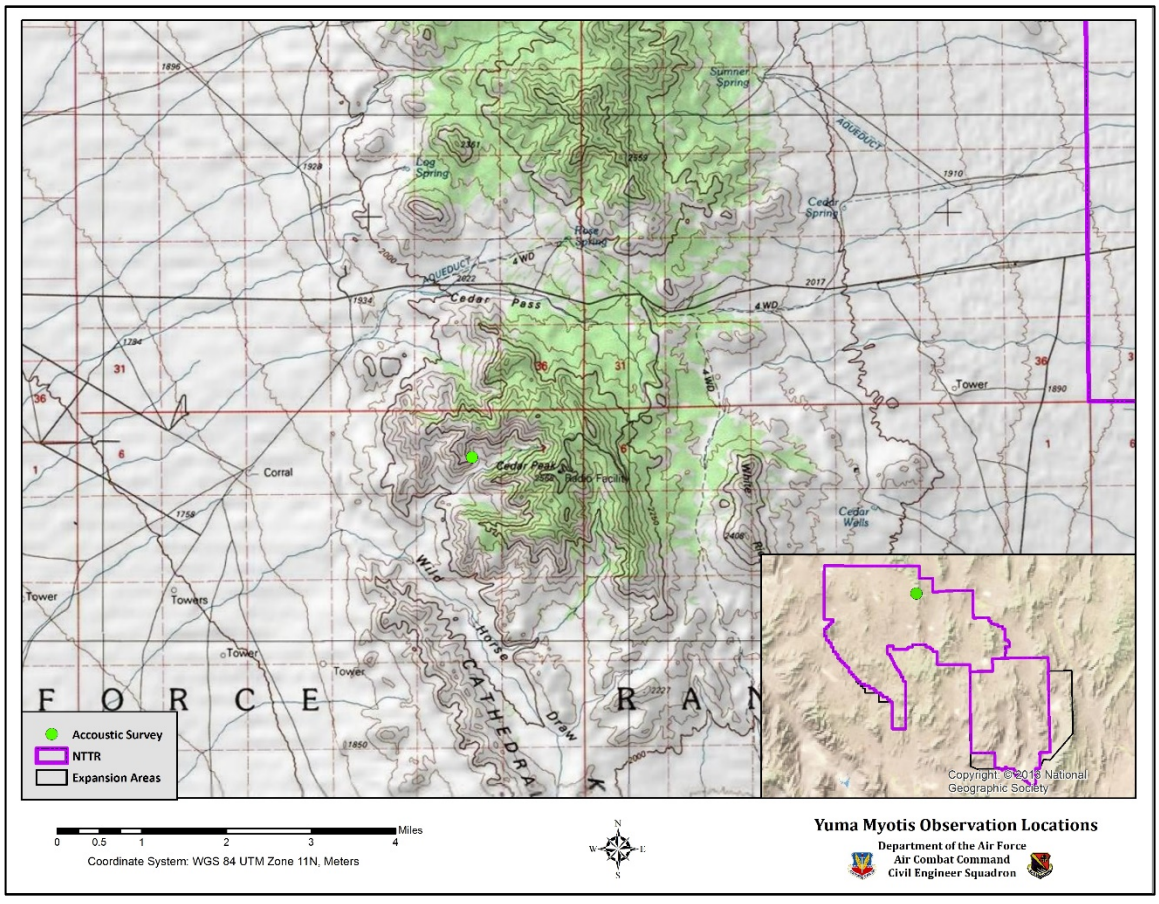


Figure 56. Locations where the Yuma myotis has been observed in and around the study area

and tree crevices (Barbour R. W., 1969). The range of the Yuma myotis bat is from the middle of the west coast of Canada, to the west coast of the U.S., and just into Central America (Barbour R. W., 1969). In the state of Nevada, the Yuma myotis as only been found in Churchill, Clark, Douglas, Elko, Lincoln, Lyon, Storey, and Washoe Counties.

One observation of the Yuma myotis has been made on the North Range Study Area (Figure 56). It was from an acoustic monitoring survey in 2012 on the Kawich Range.

CANYON BAT

The canyon bat (*Parastrellus hesperus*) ranges across the western United States and Mexico. It is one of the smallest bats in the United States with a length of 2.5-3.0 in. and a wingspan of 7.5-8.5 in. (Barbour & Davis, 1969). Its fur coat ranges in color from reddish brown to golden brown on top with a buff to white underside. The face and ears are black.

Canyon Bat
(Photo by Carson Brown)

The bat is considered one of the most common North American bats found in deserts, but may also be found at higher elevations in arid brush lands, grasslands, and even some forests (Arroyo-Cabrales & Ticul Alvarez Castaneda, 2008). Although this bat is common in the desert, its diverse habitat also includes the higher elevations of brushlands, grasslands, and forests. Its maximum elevation remains relatively constant at over 6,500 ft. MSL (Barbour & Davis, 1969). The bat forages about 6 to 50 ft. above ground preying on a variety of small insects, but typically those insects that swarm (Wilson & Ruff, 1999).

It is typical for the canyon bat to roost alone or in small groups in rock crevices, beneath rocks, in burrows, mines, or buildings (Barbour R. W., 1969). It appears that canyon bats use burrows made by kangaroo rats (*Dipodomys spp.)* and other rodents (Arroyo-Cabrales & Ticul Alvarez Castaneda, 2008). This bat hibernates but can also be sporadically active during winter in Nevada, although the extents of the hibernation range is not certain (O'Farrell & Bradley, 1970) (Geluso, 2007) (Ammerman, Hice, & Schmidly, 2012). The bat is known to spend more time active during the day than other bats. The canyon bat is most active during the early evening, rests at night, and forages again from early dawn to late morning (Peters, 2003).

Table 21. Year and type of survey and the agency conducting the survey in which canyon bat were observed. Note that acoustic observations are number of calls and not number of individual bats.

No. Observed	Survey Year	Type of survey	Agency
1	1928	Unknown-Historical	Burt
1	1929	Unknown-Historical	Burt
1	1945	Mist Net Survey	DNWR
7	1996	Unknown-Historical	Bechtel
2	2001	Mist Net Survey	NTS
20	2001	Mist Net Survey	Bechtel
1	2003	Mist Net Survey	NTS
8	2004	Mist Net Survey	Bechtel
9	2004	Mist Net Survey	Bechtel
158	2009	Acoustic Survey	NNRP
36	2010	Acoustic Survey	NNRP
531	2012	Acoustic Survey	NNRP
5	2013	Acoustic Survey	NNRP
18	2013	Unknown-Historical	NNSS
85	2014	Acoustic Survey	NNRP
365	2015	Acoustic Survey	NNRP

This bat has been observed at several locations on the North Range Study Area and NNSS (Table 21; Figure 57). Four sightings have been made on the South Range Study Area.

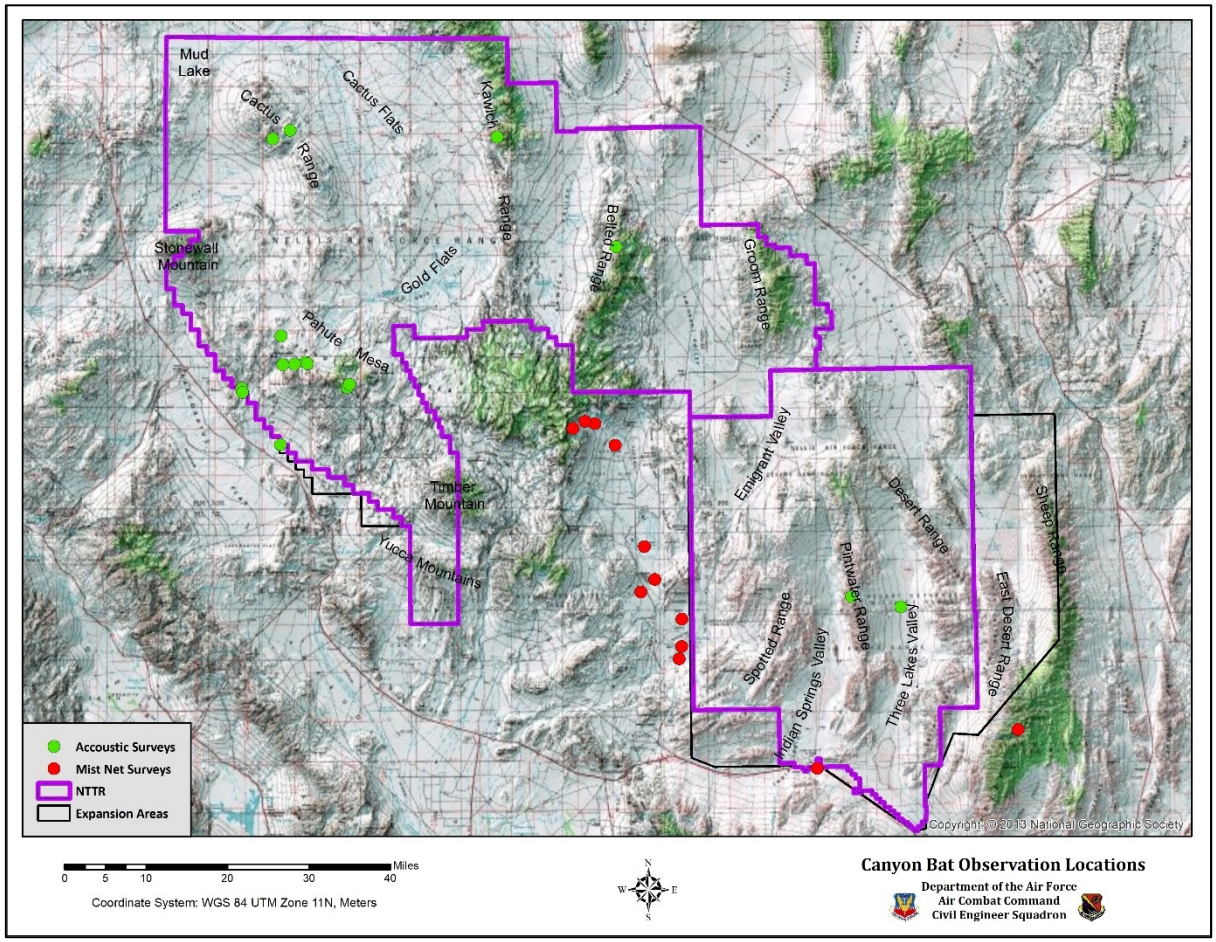


Figure 57. Locations where the canyon bat has been observed in and around the study area

CRAWFORD'S DESERT SHREW

Crawford's desert shrew (Photo by R. Matlack)

The Crawford's desert shrew (*Notiosorex crawfordi*) is a brownish-gray, shrew only weighing 0.1-0.2 oz. This mammal has a minimum of two litters per year with six young per litter (Hoffmeister D. F., 1986). Both adults and young are frequently hunted by owls. This desert shrew predominantly eats insects, spiders, and centipedes. It also can paralyze its prey by biting it on the head or neck and then storing it for later consumption (Hoffmeister D. F., 1986; Ingles L. , 1965). This species of shrew does not have venomous saliva like some of the other species of shrews. The typical habitat for the Crawford's desert shrew includes areas that have adequate cover for nesting and gathering food such as deserts, grasslands with scattered cactus, sagebrush, woodlands, and chaparral slopes (Wilson & Ruff, 1999).

One observation of Crawford's desert shrew has been recorded within the South Range Study Area and occurred in 1961 on the west slope of the Ranger Mountains (Figure 58).

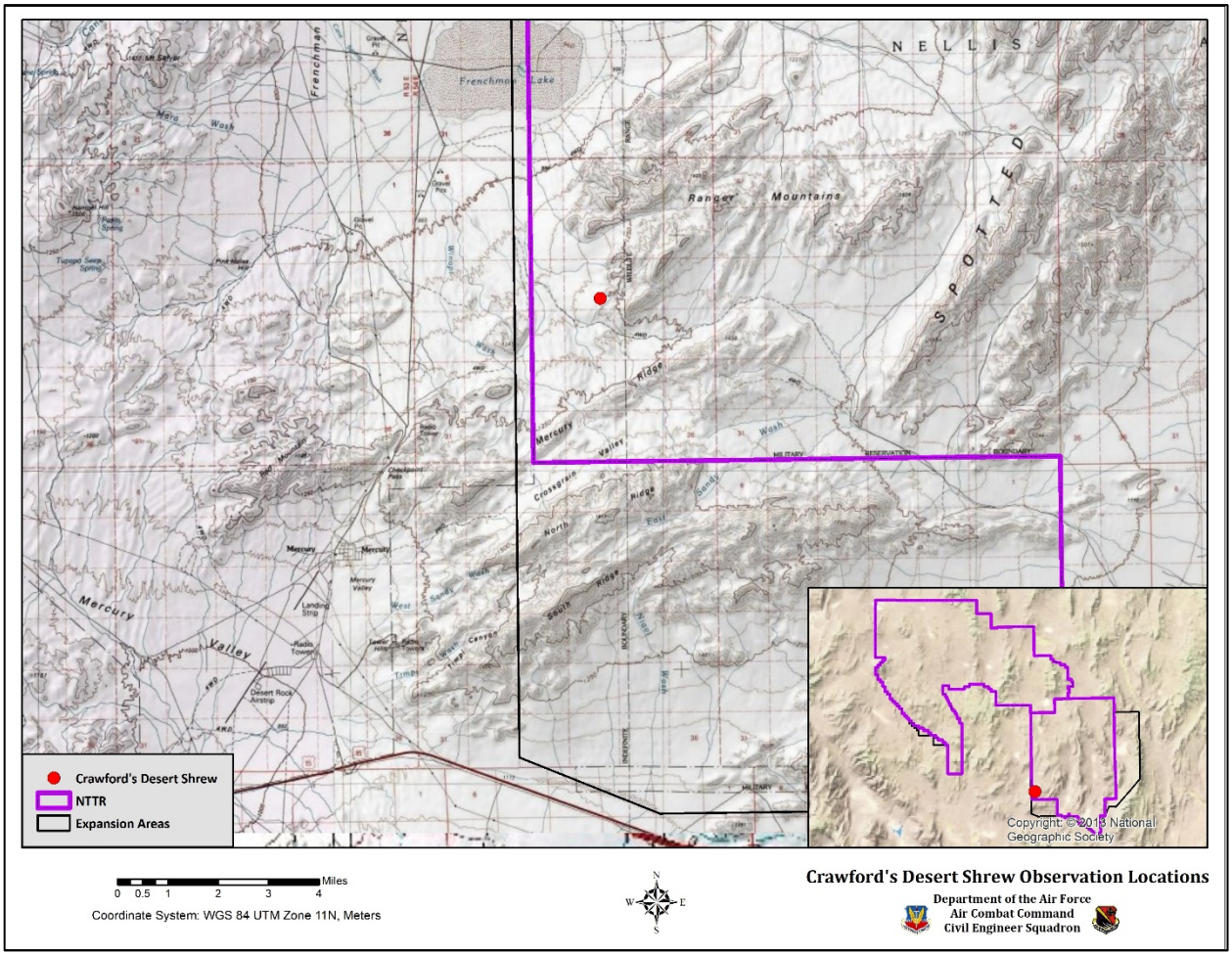


Figure 58. Locations where the Crawford's desert shrew has been observed in and around the study area

INYO SHREW

The Inyo shrew (*Sorex tenellus*) is also known as the Great Basin dwarf shrew. This animal is about 3-4 inches in length and weighs about 0.1 oz. Like most shrews, it is pale gray and slightly larger than the dwarf shrew. This shrew molts twice a year, having a summer coat in July and a winter coat (Merriam, 1895).

Inyo shrew
(Drawing by N. Halliday)

Inyo shrews prefer riparian zones, canyon bottoms, sagebrush scrub and red fir communities. This species may be more tolerant of dry habitat than other closely related shrews. In Great Basin National Park, this shrew was found at 9,840 ft. MSL in habitat dominated by spruce. The Inyo shrew's diet is mostly insects and small invertebrates such as worms, mollusks, and centipedes. The shrew is active throughout the year (Cassola, 2016A).

Locally, specimens have been trapped at elevations of 8,000 ft. MSL and higher in alpine zones along small streams in the Charleston Mountains. The shrew has also been trapped in Kyle Canyon in the Spring Mountains (Hoffman & Owen, 1980). Two specimens were collected on the NNSS in August 1961 on Rainier Mesa at 7,600 ft. MSL (Figure 59). At the same location, one shrew was collected in 1962 and three in 1965. No other recent or historic observations of the species have been made in or around the study area.

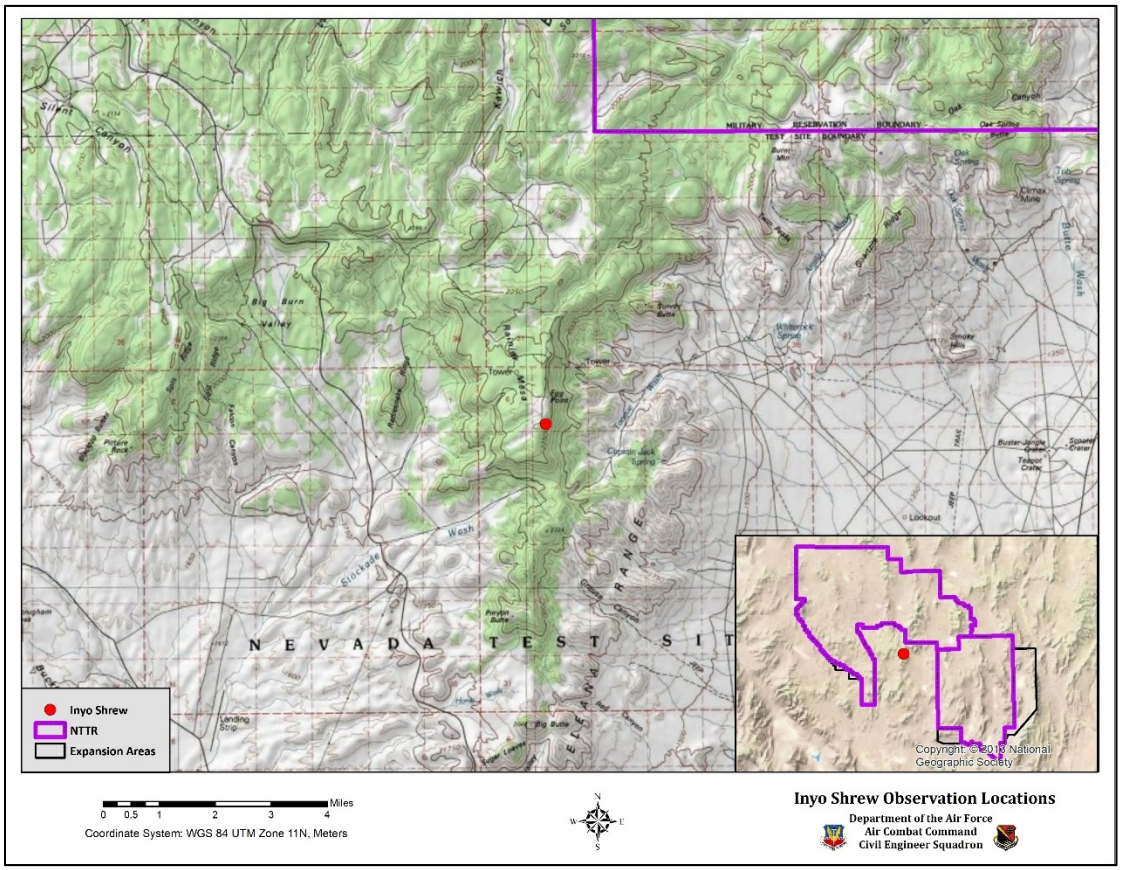


Figure 59. Locations where the Inyo shrew has been observed in and around the study area

MERRIAM'S SHREW

Merriam's Shrew (*Sorex merriami*) is sparsely populated throughout southwestern Canada and most of the western U.S. including the Great Basin at elevations ranging between 650-9,500 ft. MSL (Armstrong & Jones, 1971). It is difficult to clearly determine the population density of this shrew in Nevada habitat because it is very difficult to trap (Verts & Carraway, 1998). The shrew typically uses burrows and runways created by other animals for habitat in grasslands in sagebrush scrub, pinyon-juniper woodland, mountain mahogany shrublands and mixed woodlands.

Merriam's shrew (Photo by Pavluvčík)

The Merriam's shrew diet is comprised of a diverse mix of insects and arthropods including lepidopteran caterpillars, beetles, cave

crickets, ichneumon wasps, and spiders (Johnson & Clanton, 1954; Clark & Stromberg, 1987). Merriam's shrews are 3.8-4.2 in. long and weigh 0.15-0.25 oz. (Wilson & Ruff, 1999).

Three observations of Merriam's shrew have been made in and around the study area (Figure 60). One shrew was identified on Rainier Mesa on the NNSS in 1961. The other observations occurred in 2011 on the Cactus Range and near Breen Creek in the Kawich Range on the North Range Study Area.

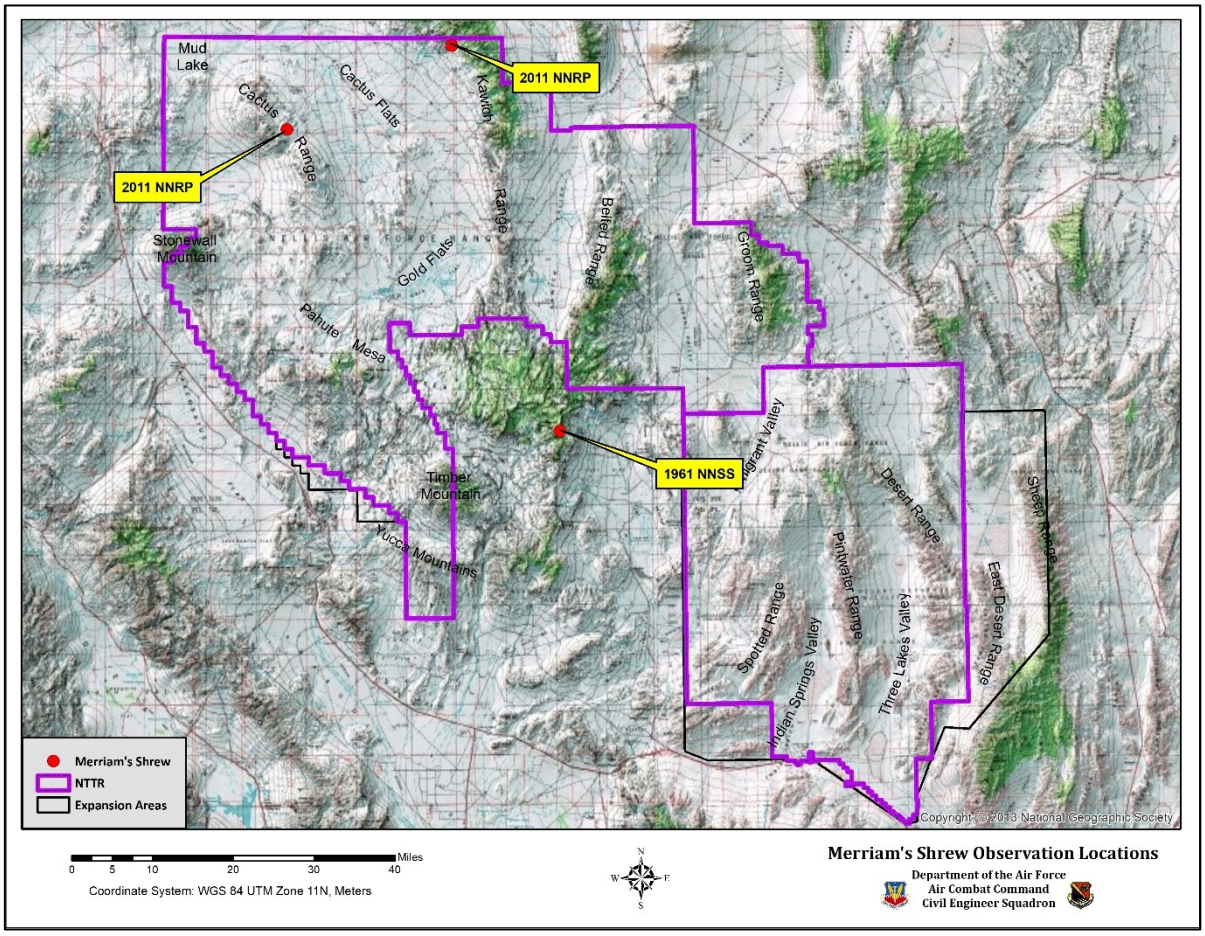


Figure 60. Locations where Merriam's shrew has been observed in and around the study area

PYGMY RABBIT

The pygmy rabbit (*Brachylagus idahoensis*) was considered for federal listing under the ESA. In September 2010, the USFWS determined that listing was unwarranted in Nevada. Due to restructuring within the ESA, the pygmy rabbit's status is under review. It is a Nevada BLM Sensitive Species.

Pygmy Rabbit

The pygmy rabbit is the smallest of all the North American rabbits (Orr R. , 1940). The pygmy rabbit's coat is a buff-grey changing to whitish-grey in the winter. Its ears are short and rounded with dense hairs. The pygmy rabbit is often confused with a young desert cottontail (*Sylvilagus audubonii*), but can be distinguished by its grey-brown tail and an underside that is not white (Utah Division of Wildlife Resources, 2003). Its size ranges

from 9-11 inches long and weighs approximately 8.6-19.5 ounces with females heavier than the males (Utah Division of Wildlife Resources, 2003). The pellets of the pygmy rabbit are round and 2-5 mm in diameter.

This rabbit inhabits shrub-grasslands where suitable sagebrush cover and soils for burrowing are available (Montana Field Guide, 2010). The pygmy rabbit requires dense stands of big sagebrush growing on deep, friable soils (Verts N. T., 1984). The likelihood of pygmy rabbit occupancy at a site increases with the following factors: increasing sagebrush cover, decreasing understory stem density, absence of cottontails, absence of reddish soils, absence of cheatgrass (*Bromus tectorum)*, and absence of rodent burrows (Brussard & Larrucea, 2008).

Pygmy rabbit scat and burrows were observed at George's Water on the east side of the Kawich Range in EC East during surveys conducted between 2005 and 2007. Wildlife cameras have been placed in 23 locations throughout NTTR, since 2009; four of these locations occur in pygmy rabbit habitat. Each location has 2 to 6 cameras. The remote cameras captured multiple photos of potential pygmy rabbits. Additionally, in 2010 a pygmy rabbit was captured and photographed during a survey at George's Water (Figure 61).

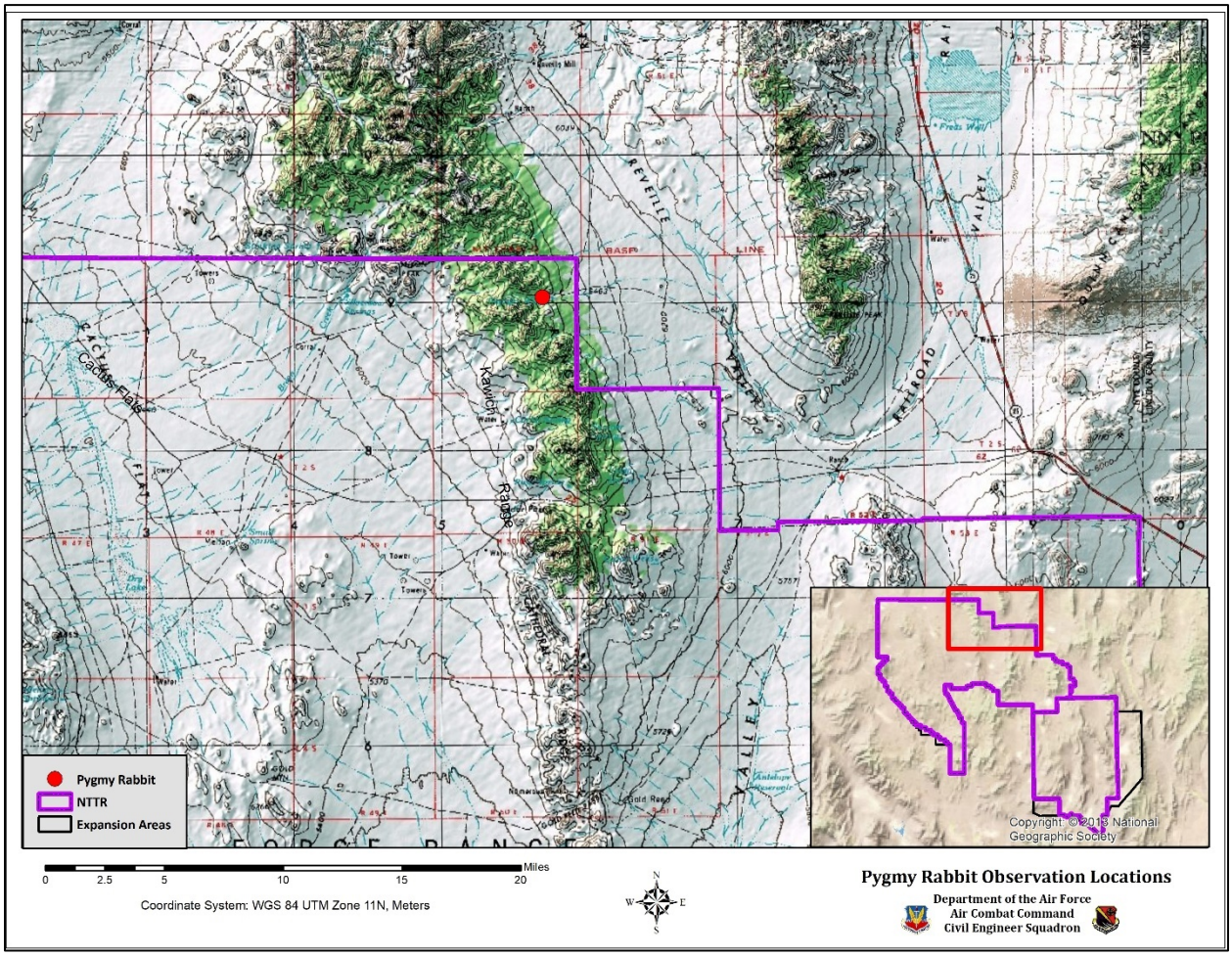
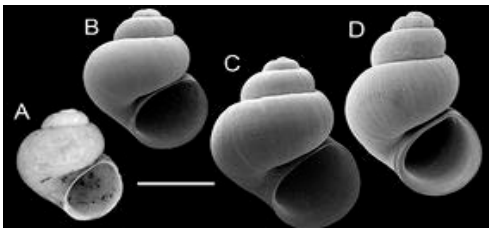


Figure 61. Locations where the pygmy rabbit has been observed in and around the study area

OASIS VALLEY PYRG



Oasis Valley pyrg
(Photo by R. Hershler, H.P. Liu, C. Bradford)

The Oasis Valley pyrg *(Pyrgulopsis micrococcus*) is a freshwater snail native to the United States and found in the wetlands of Nevada and California. The pyrg has been observed 21 to 80 times nationwide with nineteen of those observations in Nevada (Hershler R. H., 2013). The Oasis Valley pyrg is known to inhabit the small streams and the drainages of the Amargosa River, Death Valley, Panamint Valley, and Saline Valley. The lowest elevation where the species has been observed is 2,040 ft. MSL. The gastropod prefers to spend its days on rocks, plant debris, and other minerals found underwater. It can be identified by its shell (Hershler R. H., 2013).

The Oasis Valley pyrg has been identified outside of the project area in the Amargosa River Valley in Oasis Valley and Cow Spring (Figure 62). The species has not been observed recently or historically in or around the study area. NDOW conducted surveys for the Oasis Valley pyrg in 2016 in areas adjacent to Alternative 3A, but the results were not available for this report.

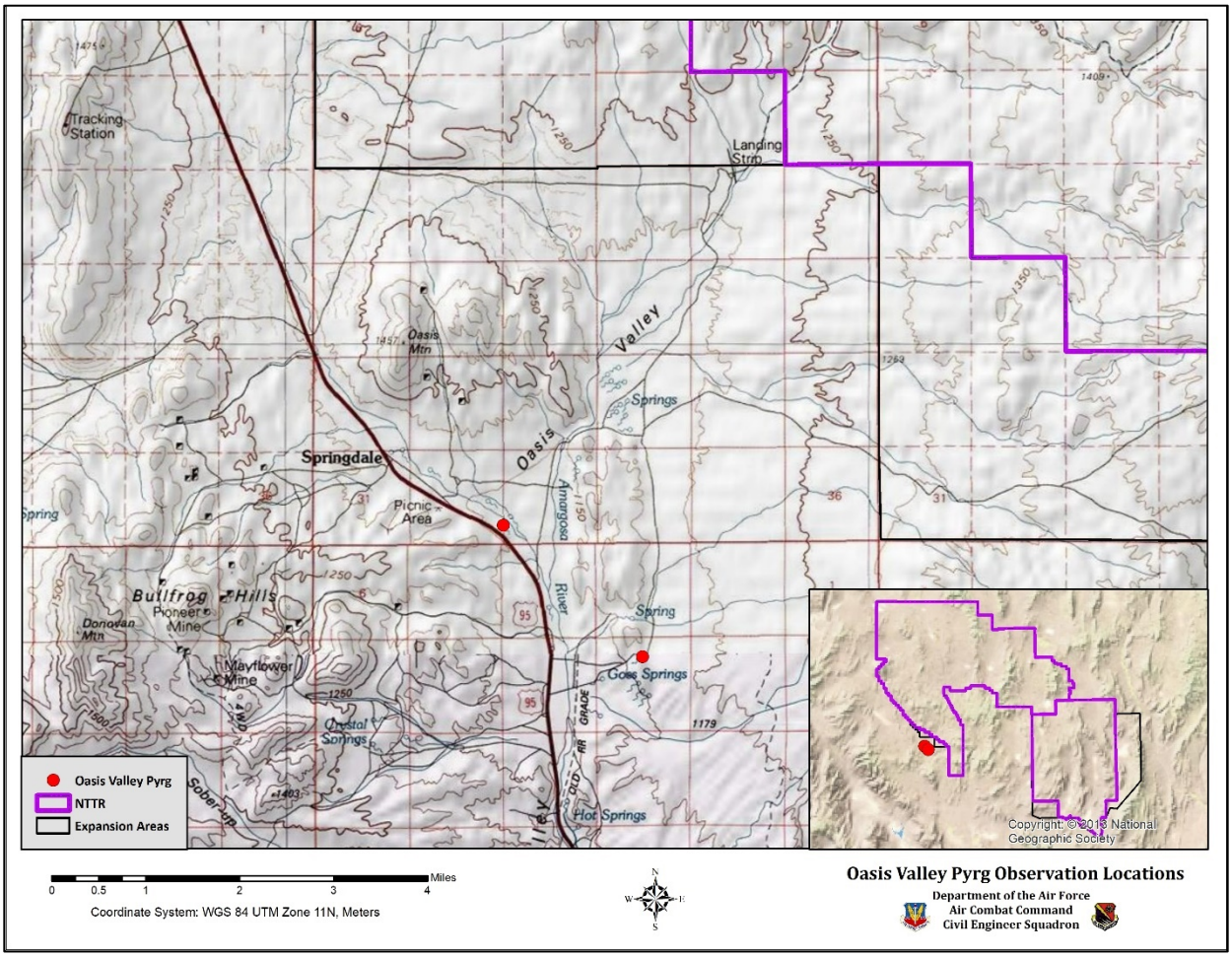


Figure 62. Locations where the Oasis Valley pyrg has been observed in and around the study area

SOUTHEAST NEVADA PYRG

The Southeast Nevada pyrg (*Pyrgulopsis turbatrix*) is native and unique to the isolated basins located in southwestern Nevada. It can be found in the Nye County, Nevada, and the Spring Mountain region between the elevations of 4,039 and 5,840 ft. MSL (Hershler R. H., 2013). This pyrg has been at twelve different locations. Only one sighting has been made of this species in and around the study area. The species was identified in 1986 at Cane Spring on the NNSS (Figure 63).

Southeast Nevada pyrg on a rock.
(Photo by J. Nachlinger)

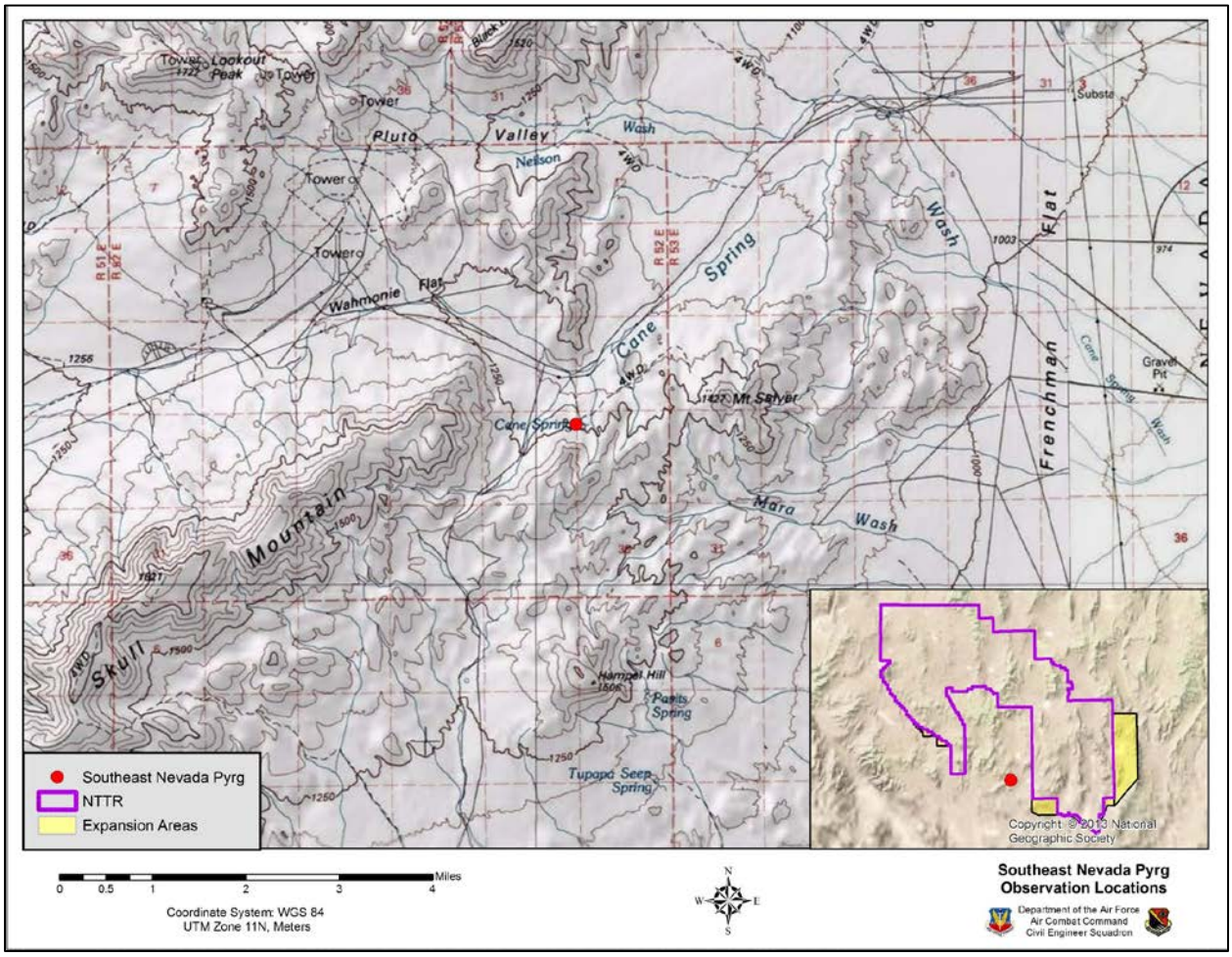


Figure 63. Locations where the southeast Nevada pyrg has been observed in and around the study area

BIG-HEADED PERDITA

The big-headed Perdita (*Perdita cephalotes*) is a rare bee native to Nevada. The insect is about 0.2 in. in length and is in the subgenus *Xeromacrotera*, within which it is the only species. A detailed description of the genus is provided in a 2016 article by Portman, et al. (2016) Three sightings have been reported in Clark County, Nevada, and one in the extreme northwest of Arizona, just south of Lake Mead. The big-headed Perdita appears to be specialized in its habitat, requiring rabbitbrush (*Chrysothamnus spp.*) for food and cover (Miskow & Schwietzer, Perdita cephalotes, 2017).

Male big-headed Perdita (Portman, 2016)

The bee appears to prefer washes with creosote and is active from September to October. This is consistent with its *Chrysothamnus* specialization. Their overall distribution is patchy, though nearly all are in the eastern Mojave. Nesting situations have not been verified, though the genus as a whole builds nests in the ground (Griswold, 2006). This rare bee has not been observed recently or historically in or around the study area and a map of observations is not provided.

RED-TAILED BLAZING STAR BEE

The red-tailed blazing star bee (*Megandrena mentzeliae)* is a bee native to Clark County, Nevada, in the area from the northwest of Las Vegas to near the Arizona border. The bees are quite rare and merit concern. Nesting data has not yet been collected, yet proxy data indicate it nests in the sand and gravel in which its host plant grows. The bee is active outside of the nest from April to May (Griswold, 2006).

Red-tailed blazing star bee (Photo by John Archer)

The red-tailed blazing star bee is overall red with white stripes and is approximately 0.5 in. long. The head is broad, especially for males. While only one other species exists in the genus, the genus does have significant differences from other genera to justify its classification (Michener, 2000). This bee is larger than those of the genus *Andrena.* As indicated by its common and scientific names, this bee specifically uses members of the *Mentzelia* genus, or blazing star, as host flowering plants (Wilson & Carril, 2015). This bee has not been observed recently or historically in or around the study area. A map of observations is therefore not provided.

MOJAVE GYPSUM BEE

The Mojave gypsum bee (*Andrena balsamorhizae*) is a medium-sized, mostly black bee closely related to *A. gardineri* (LaBerge, 1967). The bee tends to inhabit plants associated with gypsum soils where *Enceliopsis argophylla* is their favorite host plant. The specific gypsum soil is found near Lake Mead and in the Las Vegas Basin. These bees are active from March to May, and are believed to nest in soil, a behavior practiced by other members of this insect family. The bee can be differentiated from similar species through the red abdomen on females and short thorax

Mojave gypsum bee (Utah State University Extension photo)

hairs on the males (Griswold, 2006). This bee has not been observed recently or historically in or around the study area. A map of observations is therefore not provided.

MOJAVE POPPY BEE

The Mojave poppy bee (*Perdita meconis*) is found in southeastern California, southern Nevada, southwestern Utah, and northwestern Arizona (Miskow & Schweitzer, 2005). Locally, the Mojave poppy bee is a rare bee in the southern Nevada region around Clark County. They are specialist pollinators which primarily collect pollen from members of the *Arctomecon* or bearpoppy genus. They have been known to sample from closely related poppies, but restrict most pollination to bearpoppies, even if those other poppies are in significantly greater abundance (Buchmann & Nabhan, 2012). The bee is active from April through June and probably nests in the soil based on the genus, though no nests have been found to confirm this. This bee can be identified by the distinct yellow face on the males and red abdomen on both sexes (Griswold, 2006). This bee has not been observed recently or historically in or around the study area. A map of observations is therefore not provided.

Mojave poppy bee on its host plant, bearpoppy. (BLM Photo)

BRET'S BLUE

Bret's blue (*Euphilotes bernardino inyomontana*) is a butterfly native to the U.S. and found in California and Nevada in Kern, Inyo, and Nye Counties. Bret's blue is usually found at elevation greater than 4,888 ft. MSL. The male butterfly possesses a blue back with a black outer lining while the female's upper side is brown with an orange band on the hindwing. The underside of both the female and male is off-white with black spots and an orange band. The host for Bret's blue appears to be eastern Mojave buckwheat. The insect lays its eggs on the host plant and the hatched caterpillars feed on the plant's flowers (Lotts & Naberhaus, 2017). This butterfly has not been observed recently or historically in or around the study area. A map of observations is therefore not provided.

Bret's blue (Harvard University Museum of Comparative Zoology)

NEVADA ADMIRAL

The Nevada admiral (*Limenitis weidemeyerii nevadae*) is a rare butterfly having a black upper side with a white median band on both wings. The sub-marginal areas of the hindwing are black. The underside of the wings is brown with white markings. The base of the hindwing is gray-white with dark crosslines, and the marginal spots on hindwing are gray-white. Females lay single eggs on the tips of host plant leaves and the hatched caterpillars feed on the host plant leaves. Third-stage caterpillars hibernate in shelters made of leaves. This butterfly prefers deciduous forests, streambanks in coniferous forests, and aspen groves. Nevada admirals appear to have adapted to urban areas and housing developments. The range of this butterfly is southern Alberta south to Nebraska and east-central California, southeastern Arizona, and southern New Mexico (Lotts & Naberhaus, 2017A).

Nevada admiral (K. Davis, M. Strangeland, and A. Warren)

Locally, Nevada admirals are found in the Spring Mountains and Sheep Range. Little is known about the Sheep Range population. In the Spring Mountains, the butterfly appears to prefer riparian corridors and other plant communities supporting aspen, willow, and serviceberry at elevations above 6,500 ft. MSL (NatureServe Explorer, 2016). This habitat is not present on the study area and, therefore, the potential of this species being present on the study area is low. This butterfly has not been observed recently or historically in or around the study area. A map of observations is therefore not provided.

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