

# Patua Geothermal Project Baseline Wildlife Surveys Churchill County, Nevada

## Final Report



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# 1. INTRODUCTION

## 1.1 *Purpose and Need*

Gradient Resources contracted with Wildlife Resource Consultants (WRC) to conduct a wildlife baseline study of the 848 acre Patua II Geothermal Project. Gradient Resources is proposing to design, construct, and operate geothermal well pads and wells, geothermal fluid pipelines, and their associated access roads, on lands managed by the Bureau of Land Management (BLM) and the Bureau of Reclamation (BOR).

The purpose of the wildlife study is to establish baseline data for the survey area and to identify potential wildlife-related issues that could affect future permitting and development of the 848 acre Patua II Geothermal Project. This report presents the results of the field surveys of the survey area.

The wildlife field surveys included the following:

- Focused surveys for special status wildlife species;
- Focused surveys for raptors and raptor nests;
- Focused surveys for potential bat roosting habitat and acoustic surveys for bats; and
- An inventory of all vertebrate species encountered during the surveys.

### 1.1.1 **Special Status Species**

As defined by the federal Endangered Species Act (ESA) of 1973, a threatened species is any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. An endangered species is any species that is in danger of extinction throughout all or a significant portion of its range. Proposed species are those that are proposed in the Federal Register by the United States Fish and Wildlife Service (USFWS) to be listed as threatened or endangered. Candidate species could be listed as threatened or endangered and are actively under review by the USFWS. Species of Concern are taxa for which existing information indicated may warrant listing, but for which substantial biological information to support a proposed rule is lacking.

Section 7 of the ESA directs federal departments and agencies to ensure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitat. The ESA requires federal agencies to ensure that all actions are not likely to jeopardize the continued existence of any threatened or endangered (or proposed or candidate) species.

Special status wildlife species are also defined as those protected by Nevada Revised Statute (NRS) 501, those designated as sensitive by the Bureau of Land Management (BLM), and those ranked by the State of Nevada as imperiled. Special status wildlife species that could occur within the survey area are listed in Table 1.

Table 1. Special status wildlife species that could occur in the 848 acre Patua II survey area.

Common Name	Scientific Name	Status
Golden eagle	<i>Aquila chrysaetos</i>	BLM-state sensitive, Nevada State Protected
Prairie falcon	<i>Falco mexicanus</i>	BLM-state sensitive, Nevada State Protected
Swainson's hawk	<i>Buteo swainsoni</i>	Nevada State Protected
Brewer's sparrow	<i>Spizella breweri</i>	Nevada State Protected
Loggerhead shrike	<i>Lanius ludovicianus</i>	BLM-state sensitive, Nevada State Protected
Vesper sparrow	<i>Pooecetes gramineus</i>	BLM-state sensitive, Nevada State Protected
Western burrowing owl	<i>Athene cunicularia hypugaea</i>	BLM-state sensitive
Pallid bat	<i>Antrozous pallidus</i>	BLM-state sensitive, Nevada State Protected
California myotis	<i>Myotis californicus</i>	BLM-state sensitive
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	BLM-state sensitive
Big brown bat	<i>Eptesicus fuscus</i>	BLM-state sensitive
Spotted bat	<i>Enderma maculatum</i>	BLM-state sensitive
Silver-haired bat	<i>Lasiorycteris noctivagans</i>	BLM-state sensitive
Small-footed myotis	<i>Myotis ciliolabrum</i>	BLM-state sensitive
Long-eared myotis	<i>Myotis evotis</i>	BLM-state sensitive
Little brown myotis	<i>Myotis lucifugus</i>	BLM-state sensitive
Long-legged myotis	<i>Myotis volans</i>	BLM-state sensitive
Yuma myotis	<i>Myotis yumanensis</i>	BLM-state sensitive
Fringed myotis	<i>Myotis thysanodes</i>	BLM-state sensitive, Nevada State Protected
Western pipistrelle bat	<i>Pipistrellus hesperus</i>	BLM-state sensitive
Kit fox	<i>Vulpes macrotis</i>	Nevada State Protected
Nevada viceroy	<i>Limenitis archippus</i>	Nevada state-ranked

## 1.2 Project Location and Setting

At its closest point, the Patua II Geothermal Project is located approximately two miles northwest of Hazen and approximately six miles east of Fernley in Churchill and Lyon Counties, Nevada. Interstate 80 is approximately six miles northwest of the survey area. At its closest point, State Route 50 is situated approximately 200 feet north of the survey area. The Fernley Wildlife Management Area (FWMA) is located approximately two miles northwest of the survey area. The survey area consists of approximately 848 acres of Bureau of Land Management (BLM) and Bureau of Reclamation (BOR) lands within the area legally described as part of Sections 21, 30, and 31, Township 20 North, Range 26 East, and part of Section 6, Township 19 North, Range 26 East, Mount Diablo Base and Meridian.

The elevation in the survey area ranges from approximately 4,055 to 4,533 feet above mean sea level. Most of the survey area is located in a valley north of the Virginia Range and south of the Hot Springs Mountains, but a small portion is situated in the foothills of the Virginia Range in Section 6. The most notable drainages are two broad washes bordered by occasional small rock outcrops (less than 15 feet in height) in Section 6. Other drainages in the survey area are low relief without rock outcrops.

Vegetation in the survey area is described using the Nevada Department of Wildlife's (NDOW) Nevada Wildlife Action Plan (2006). Three terrestrial wildlife habitats, Intermountain Basins Mixed Salt Desert Scrub, Barren, and Intermountain Rivers and Streams, are present.

The majority of the survey area consists of Intermountain Basins Mixed Salt Desert Scrub, which is dominated by greasewood (*Sarcobates vermiculatus*), four-wing saltbush (*Atriplex canescens*), and shadscale (*Atriplex confertifolia*). Additional species in the foothills of the Virginia range (i.e., Section 6) include Nevada ephedra (*Ephedra nevadensis*), budsage (*Artemisia spinescens*), and winterfat (*Krascheninnikovia lanata*). Most of the undisturbed portions of the survey area had a dense understory of cheat grass (*Bromus tectorum*), likely in response to the very wet winter and spring.

The Barren landscape is in Section 30 and consists of an inactive gravel quarry. The site is highly disturbed with numerous roads, pits, piles of gravel, and barren ground with a sparse covering of cheat grass and weedy forbs. A wooden power pole line traverses through part of the quarry.

Although not a naturally occurring river or stream, portions of the survey area are adjacent to and cross the Truckee Canal. (The NDOW classification Intermountain Rivers and Streams is the closest category that fits the Truckee Canal and associated cottonwood groves.) The canal contained no water during the April and May surveys as it was being repaired. In Section 32, an unnamed irrigation canal parallels the Truckee Canal for approximately 100 feet before turning northeast and heading toward Ragtown Pass. The irrigation canal contained no water during the survey. No other potential sources of water (i.e., permanent or ephemeral) were present in the survey area.

Within and near the survey area, patches of mature cottonwood trees (*Populus fremontia*) grow along the Truckee Canal. Along the lateral in Section 32, a continuous band of smaller cottonwood trees and tamarisk (*Tamarix spp*) extend southwest and northeast of the survey area from the main Truckee Canal to the houses in Ragtown Pass. An extensive patch (approximately 23 acres) of tamarisk and a few cottonwood and Russian olive (*Elaeagnus angustifolia*) trees is located in the survey area in Section 29. No snags were noted either in or near the survey area.

Numerous dirt roads traverse the survey area, including a well-developed two-lane road on the south side of the Truckee Canal. Two-trailer haul trucks regularly used this road as well as local vehicle traffic. Less frequently traveled roads are present throughout the survey area, including the drainages in Section 6. A steel tower transmission line crosses several locations within the survey area. No abandoned mine workings or buildings are present in the survey area.

## 2. METHODS

### 2.1 *Agency Coordination*

Wildlife Resource Consultants contacted the USFWS for a list of federally listed threatened and endangered species that could occur in or near the survey area. This list fulfills the requirements of the USFWS to provide a current species list pursuant to section 7 of the ESA.

Database queries were conducted with the Nevada Natural Heritage Program (NNHP) and the Nevada Division of Wildlife (NDOW) for special status wildlife species known to occur in or with the potential to occur in the survey area.

### 2.2 *General Survey Method*

Systematic wildlife surveys were performed April 1, May 2-4, and June 5, 2011. The May 3 survey continued until approximately 30 minutes after sunset while the May 4 survey began approximately 30 minutes before sunrise. Surveys were conducted on foot as well as by vehicle on all roads in and within one mile of the survey area. Roads from which surveys were performed are depicted on the Hazen United States Geographical Survey (USGS) 7.5 minute series topographic map. Unmapped roads were also driven.

Potential high-diversity habitat (e.g., cottonwood trees, Truckee Canal) and topographic features (e.g., rock outcrops, drainages) were intensively searched for wildlife and their sign (e.g., scat, feathers, tracks). Because wildlife are mobile and could be indirectly affected by project activities, the survey extended outside the survey area to patches of high-diversity habitat within one mile of the survey area. Binoculars were used to search for raptors, raptor nests, and to assess habitat use by raptors. Locations within the survey area that were judged to be attractive to various nesting raptor species were intensively searched for active and inactive nests. Woodrat nests were examined for evidence of other vertebrate species (e.g., bones, scat). The habitat within the survey area was evaluated to determine whether it could support any of the special status wildlife species listed in the agency letters.

A list of all wildlife species directly observed or detected by sign (e.g., tracks, scat, burrows) was compiled. A Garmin 60CSx GPS unit was used to record the locations of special status wildlife species and/or their sign (e.g., tracks, scat, burrows). All UTM coordinates are in NAD 83.

### 2.3 *Golden Eagle Survey*

The USFWS letter also recommends the following, which is excerpted from the April 1, 2011 response.

If bald and/or golden eagles occur in the project area or within 4 miles of the proposed project area boundary, we recommend you analyze project impact to the affected individuals, their habitats and regional populations. While the bald eagle has been removed from the Federal list of threatened and endangered species (August 8, 2007; 72 FR 37346), it remains classified as endangered by the States of Nevada and California. Further, the bald eagle along with the golden eagle continues to be protected under the Bald and Golden Eagle Protection Act (BGEPA) of 1940, as amended (16 U.S.C. 668-668d) and the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. 703 *et seq.*). Both the MBTA and the BGEPA prohibit take as defined as pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, disturb, or otherwise harm eagles, their nests, or their eggs. Under the BGEPA, “disturb” means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior. On September 11, 2009 (74 FR 43686), the Service set in place rules establishing two new permit types, 1) authorize take of bald and golden eagles that is associated with, but not the purpose of, the activity; and 2) authorize purposeful take of eagle nests that pose a threat to human or eagle safety. We recommend you coordinate with State and Federal wildlife officials early in the planning process to develop a survey protocol and to evaluate the extent of potential take of eagles. If take is reasonably anticipated to occur, we recommend you develop an Avian Protection Plan (APP) in coordination with State wildlife agencies and the Service. An APP is intended to avoid, minimize, or mitigate impacts to these species. Please also coordinate with State wildlife agencies to ensure compliance with state regulations regarding the bald eagle.

Potentially suitable foraging habitat for bald eagles is present along the Truckee Canal. However, the NDOW has no records for bald eagles in or within four miles of the survey area.

Potentially suitable foraging and nesting habitat for golden eagles is present in and within four miles of the survey area. Therefore, vehicle surveys for golden eagles and/or their nests were performed from all mapped and unmapped roads within a four mile radius of the survey area on public lands managed by the BLM. Rock outcrops were scanned with binoculars for visual evidence of any nesting activity such as white wash and stick nests. Any sites with sign suggestive of nesting activity (e.g., stick structure, perched raptors, white wash) were examined more closely on foot to look for pellets, feathers, prey remains, or other evidence suggestive of nesting activity. A site’s potential suitability for nesting golden eagles was also evaluated (e.g., structure relief, height). Because the NDOW has a record for a golden eagle nest on Black Butte, which is situated less than ¼ mile east of the survey area (i.e., Section 21), this site was intensively surveyed on foot.

## 2.4 Acoustic Bat Surveys

Acoustic surveys for bats were performed in 2009 and 2010 within ½ mile of the survey area in similar habitat types (e.g., Intermountain Basins Mixed Salt Desert Scrub). It can be expected that the same species would occur in the Patua II survey area. Therefore, the acoustic detectors were placed in habitat unique to the Patua II survey area including the cottonwood groves and the patch of tamarisk, Russian olive, and cottonwood (Table 2, Figure 1).

Acoustic surveys were conducted for bat species using Pettersson ultrasonic detectors (Model D240X). The acoustic surveys were performed May 2-3, 2011. Detectors were turned on around 1900 hours and operated throughout the night to sample the temporal activity of bats. Calls were recorded onto 60-minute length tapes.

Echolocation calls were downloaded and analyzed using SonoBat software (DNDesign, Arcata, CA). Recorded calls were compared to reference calls available within the SonoBat software. Characteristics of echolocation calls can be used to distinguish between even closely related species. While intraspecific variation in call characteristics is large relative to interspecific variation, separation of some species can be problematic, especially when only a few call samples are available.

Good call sequences contained >1 and usually many (>10) calls in which the signal was clearly distinguishable from noise, appeared fully formed (i.e., no missing call components), and might display harmonics that indicated that calls were well recorded. Poor quality recordings had poor signal-to-noise ratios and were of short duration (<2.5ms), reduced bandwidth, or oversimplified shapes. Poor quality recordings are reported in the results as possible identifications.

Table 2. Bat detector locations for the Patua II Geothermal Survey area (NAD 83).

<b>SITE NUMBER</b>	<b>EASTING</b>	<b>NORTHING</b>	<b>Description</b>
1	320097	4380430	Cottonwood tamarisk grove
2	320646	4380705	Cottonwood tamarisk grove
3	319945	4381642	Patch tamarisk, cottonwood, Russian olive
4	319770	4381464	Patch tamarisk, cottonwood, Russian olive

### 3. RESULTS

#### 3.1 *Special Status Species*

##### 3.1.1 Agency Coordination

The USFWS letter dated April 1, 2011 (File No. 2011-SL-0178) indicated that no federally listed, proposed, or candidate species occur in the survey area.

The March 17, 2011 NNHP query showed four records for Nevada viceroy (a butterfly) near the railroad tracks west of Hazen. The records are from 31 to 43 years old. The NNHP also has a 1949 record for snowy plover several miles northwest of the survey area near the northernmost portion of the FWMA.

The results of an NDOW query dated March 21, 2011 indicated various species of raptors are known to reside in the vicinity of the survey area. Burrowing owl, golden eagle, prairie falcon, Swainson's hawk, barn owl, and Cooper's hawk have been directly observed in the vicinity of the survey area. The first four species have been documented nesting in the vicinity of the survey area. Five raptor nests are recorded within a three mile radius of the survey area (Table 3).

Per the Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols, and Other Recommendations in Support of Golden Eagle Management and Permit Issuance (USFWS 2010), NDOW also analyzed their raptor nest database for bald and golden eagle nest site locations within ten miles of the survey area (see Table 3). No known bald eagle nests are documented within ten miles of the survey area. One additional golden eagle nest occurs within ten miles of the survey area. This nest is located in Township 19 north, Range 24 east, Section 34.

Table 3. Raptor nests identified by NDOW within a three mile radius of the Patua II survey area.

Common Name	Township/Range/Section
Burrowing owl	21/25/12
Golden eagle	21/26/27
Prairie falcon	21/26/27
Prairie falcon	21/26/27
Swainson's hawk ( <i>Buteo swainsoni</i> )	21/26/28

According to the March 21, 2011 NDOW letter, there are no known bighorn sheep, elk, mule deer, or pronghorn antelope distributions in the vicinity of the Patua II survey area; and there are no known greater sage-grouse distributions or lek sites in the vicinity of the Patua II project.

Copies of all agency correspondence are in Appendix A.

### 3.2 General Survey Results

A total of 31 bird, five mammal, and two reptile species were directly observed, detected by sign (e.g., tracks, burrows, scat), or recorded via the bat detectors in the survey area (Table 3). Four of the bird species and three of the mammal species are designated special status species.

#### 3.2.1 Small- and Medium-Sized Mammals

Although infrequently observed, the most commonly recorded species of small mammals were the white-tailed antelope ground squirrel and the black tailed hare. Kangaroo rat burrows were common in the valley portions of the survey area. In addition, the remains of kangaroo rats (e.g., feet, tails, skull) were noted at the base of a long-eared owl roost and nest. Woodrat nests were relatively uncommon in the survey area. They were recorded in the rocky outcrops in Section 6 and at the base of cottonwood trees in Section 32.

Coyote scat was noted throughout the survey area. No active or inactive den sites were found. No kit fox (*Vulpes velox*) or kit fox sign (e.g., scat, burrows, tracks) or badger (*Taxidea taxus*) or badger sign (e.g., scat, burrows, tracks) were found.

#### 3.2.2 Big Game Mammals

No big game mammals, including mule deer (*Odocoileus hemionus*), pronghorn antelope (*Antilocapra americana*), or bighorn sheep (*Ovis canadensis*) were observed in the survey area. Nor were any sign (e.g., scat, tracks, shed antlers, disarticulated skeletal remains, beds, or evidence of browsing) of big game mammals found in the survey area.

#### 3.2.3 Bats

The following two species of bats were identified in the acoustic surveys: Yuma myotis and Brazilian free-tailed bat (Table 4). The western pipistrelle was potentially detected, but the quality of the recordings was not sufficient for positive identification. All three species are considered Nevada Special Status Species protected by NRS 501. Bats were detected at all four detector locations (Figure 1). The detectors were placed in the vicinity of trees, which can be used as both roost sites and foraging habitat.

While potentially detected in the 2011 surveys, the western pipistrelle was positively identified during the 2009 and 2010 acoustic surveys. The Brazilian free-tailed bat was potentially detected during the previous two years' acoustic surveys, but was positively identified in the 2011 surveys. The Yuma myotis was not detected during the 2009 and 2010 surveys. This species occurs in a wide variety of upland and lowland habitats, including riparian, desert scrub, moist woodlands, and forests. It is typically associated with open water, although no open water was present during the May surveys.

Species that could occur in the Intermountain Basins Mixed Salt Desert Scrub are likely similar to those detected in the same habitat type in the 2009 and 2010 acoustic surveys and include small-footed myotis (*Myotis ciliolabrum*), little brown bat (*Myotis lucifugus*), and western pipistrelle (*Pipistrellus hesperus*). Although bats forage over the shrubs found in the Mixed Salt Desert Scrub habitat, the plants in this habitat type do not provide suitable long-term night and day roosting sites. Potential day-roosting habitat in the survey area is found in the isolated small rock outcrops in Section 6, the cottonwood trees along the Truckee Canal, and the cottonwood and tamarisk

groves in Sections 29 and 32. Bats that day-roost outside the survey area (e.g., in the cottonwood trees along the Truckee canal) likely forage in the survey area.

Table 4. Bat species identified via acoustic recordings from Petterson Bat Detectors at the Patua Geothermal Survey area.

Location Number	Site	Date	Species Detected	Notes
1		May 2, 2011	Yum myotis ( <i>Myotis yumanensis</i> )	- Several
2		May 2, 2011	Myotis sp?	- 2 files, too faint for identification
3		May 3, 2011	Brazilian free-tailed bat ( <i>Tadarida brasiliensis</i> )	- Several
			Yum myotis ( <i>Myotis yumanensis</i> )	- Several
4		May 3, 2011	Brazilian free-tailed bat ( <i>Tadarida brasiliensis</i> )	- Possible, poor recording
			Western pipistrelle ( <i>Pipistrellus hesperus</i> )	- Possible, poor recording

### 3.2.4 Reptiles

Two species of lizard were recorded (Table 5). Additional species probably occur in the survey area but were not recorded due to relatively low temperatures and the time of year (e.g., early spring). None of the reptiles that could occupy the survey area are special status species.

### 3.2.5 Amphibians

No amphibians were observed and no aquatic habitat is present in or adjacent to the survey area. When the Truckee Canal contains water it is possible that some species of amphibians, such as the nonnative bullfrog (*Rana catesbeiana*), could occur in the canal.

### 3.2.6 Raptors

#### Within Survey area

Three species of raptors, red-tailed hawk, Swainson's hawk, and turkey vulture, were observed flying over the survey area. The red-tailed hawk and Swainson's hawk are nesting near the survey area (UTM coordinates: 320222, 4380514; 319746, 4381546). The red-tailed hawk was observed incubating in a stick nest in a cottonwood tree or perched nearby during all survey days. During the May surveys, a pair of Swainson's hawks was observed in a cottonwood tree that contained a stick nest (see photograph 1 in Figure 2). Some white-wash was present below the nest. No incubating behavior or prey remains were observed, but this species typically begins nesting activity later than other Buteos.

A long-eared owl nest is present in the 23 acre tamarisk patch in Section 29 (UTM coordinate: 319770, 4381630). Five dead fledglings, two fledged owlets, and a single adult owl were observed in the vicinity of the platform nest (see photograph 2 in Figure 2). During a botanical survey conducted June 1, 2011, the botanist reported flushing a barn owl (*Tyto alba*) from this patch of tamarisk.

Burrowing owls roost and nest in the abandoned burrows of ground dwelling animals such as badgers, coyotes, and ground squirrels. Even if this diurnal owl is not directly observed, evidence of its nesting activity, including scats, pellets, feathers, insect prey remains, tracks, and burrows lined with other animals' scat, is readily detected. While no burrowing owls or sign of their presence was noted in the survey area, suitable foraging and nesting habitat is present in the survey area.

#### Four-Mile Radius of Survey area Golden Eagle Survey

Within the four-mile survey radius of the survey area, no adult or immature golden eagles were detected.

While foraging habitat is present throughout the four-mile survey radius, no suitable nesting habitat of large rock outcrops or cliffs are present south of State Route 50. North of State Route 50, suitable nesting habitat is present only at Black Butte. Black Butte, a prominent hill at 4,700 feet in elevation, is approximately ¼ mile east of the survey area. Black Butte has large rock outcrops and bands of rimrock near its summit. The NDOW has a record for a golden eagle nest on Black Butte. This nest site was located and observed in 2010 (UTM coordinate: 323245, 4382942), but was inactive.

Per the USFWS 2010 Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols; and Other Recommendations in Support of Golden Eagle Management and Permit Issuance, this nest site was observed twice for two four-hour periods on April 1 and May 4, 2011. No adult or immature golden eagles were observed. White-wash was present in the nest vicinity (see photograph 3 in Figure 2), but no pellets, prey remains, or feathers were present below the nest. The observed white wash could be from other raptor species or from ravens. The interior of the nest could not be readily viewed from above due to the steep rock, but could be partially seen from a position slightly above and to the east of the nest. No green vegetation or eggs were observed in the nest. This nest is inactive.

No other golden eagle nests were found on Black Butte or found from the roads within a four-mile radius of the survey area. As in 2010, several locations on the rimrock of Black Butte were marked with raptor white-wash. Three of these locations had extensive white wash, which indicated roosting/perching over a long period of time. No golden eagle feathers or pellets were found at these locations.

Prairie falcons do not construct stick nests but evidence of their nesting can be found by white wash and during food delivery to nestlings. None of the patches of white-wash found on Black Butte were associated with possible nest sites for prairie falcons (i.e., sparse distribution of white-wash, not concentrated as would be found at/below a nest site; the size of the splatters and their location on tops of rocks, not on preferred nesting sites of flat protected surfaces; and no feathers or prey remains found with the white-wash).

#### **3.2.7 Upland Game Birds**

Suitable habitat for greater sage-grouse (*Centrocercus urophasianus*) is not present in the survey area. The March 21, 2011 NDOW letter states that there are no sage-grouse leks in the vicinity of the

survey area. In addition, the survey area is not recognized as part of NDOW's sage-grouse habitat distribution.

### 3.2.8 Passerines

Sixteen of the 30 species recorded in the survey area were documented only in the cottonwood and/or cottonwood and tamarisk groves. High species diversity is typically associated with riparian vegetation. Species observed included those that were transient such as the black-throated gray warbler. Because riparian shrubs are removed as part of the Truckee Canal maintenance, it is unlikely any additional undetected passerine species would use the survey area when water is present in the canal.

### 3.2.9 Waterfowl

No waterfowl species were detected and no aquatic habitat is present in or adjacent to the survey area. When the Truckee Canal contains water it is possible that some species of waterfowl, such as mallards (*Anas platyrhynchos*), might use the canal. Because riparian shrubs are removed as part of the canal maintenance, it is unlikely any waterfowl species nest along the canal.

### 3.2.10 Shorebirds and Colony Nesting Birds

No shorebirds and/or colony nesting bird species were detected and no aquatic habitat is present in or adjacent to the survey area. When the Truckee Canal contains water it is possible that some species of shorebirds, such as killdeer (*Charadrius vociferus*), might use the habitat immediately adjacent to the canal.

No habitat for the western snowy plover (*Charadrius alexandrinus nivosus*) is located in or near the survey area. Breeding habitat for this species includes beaches, dry mud or salt flats, and sand margins of rivers, lakes, and ponds.

### 3.2.11 Invertebrates

The Nevada viceroy, a butterfly, is restricted to areas that contain willows, which are the host plant for its larvae. Suitable habitat of willows is present in the understory of the cottonwood and tamarisk grove in Section 32. No Nevada viceroy butterflies, larvae, or eggs were observed. Although the high temperature during the surveys was 70 degrees Fahrenheit, the survey might have been performed too early in the season to detect this species.

Table 5. WILDLIFE SPECIES OBSERVED IN THE PATUA II GEOTHERMAL SURVEY AREA.

<b>Birds</b>	<b>Mammals</b>	<b>Reptiles</b>
American robin * ( <i>Turdus migratorius</i> )	Black-tailed jackrabbit ( <i>Lepus californicus</i> )	Side-blotched lizard ( <i>Uta stansburiana</i> )
Barn owl ( <i>Tyto alba</i> )	Coyote ( <i>Canis latrans</i> )	Western fence lizard ( <i>Sceloporus occidentalis</i> )
Black-throated gray warbler * ( <i>Dendroica nigrescens</i> )	Kangaroo rat ( <i>Dipodomys sp.</i> )	
Black-throated sparrow ( <i>Amphispiza bilineata</i> )	White-tailed antelope ground squirrel ( <i>Ammospermophilus leucurus</i> )	

<u>Birds</u>	<u>Mammals</u>	<u>Reptiles</u>
Brewer's sparrow 1 ( <i>Spizella breweri</i> )	Woodrat ** ( <i>Neotoma</i> spp.)	
Brewer's blackbird * ( <i>Euphagus cyanocephalus</i> )		
Brown-headed cowbird * ( <i>Molothrus ater</i> )		
Bullock's oriole * ( <i>Icterus bullockii</i> )		
California gull (fly-over) ( <i>Larus californicus</i> )		
California quail * ( <i>Callipepla californica</i> )		
Canadian goose (fly-over) ( <i>Branta Canadensis</i> )		
Common poorwill ( <i>Phalaenoptilus nuttallii</i> )		
Common raven ( <i>Corvus corax</i> )		
Dark-eyed junco * ( <i>Junco hyemalis</i> )		
House finch * ( <i>Carpodacus mexicanus</i> )		
House wren * ( <i>Troglodytes aedon</i> )		
Lesser nighthawk ( <i>Chordeiles minor</i> )		
Long-eared owl ***, 1 ( <i>Asio otus</i> )		
MacGillivray's warbler * ( <i>Oporornis tolmiei</i> )		
Mourning dove * ( <i>Zenaida macroura</i> )		
Northern flicker * ( <i>Colaptes auratus</i> )		

<u>Birds</u>	<u>Mammals</u>	<u>Reptiles</u>
Red-tailed hawk ( <i>Buteo jamaicensis</i> )		
Rock wren ( <i>Salpinctes obsoletus</i> )		
Spotted towhee * ( <i>Pipilo maculatus</i> )		
Swaison's hawk 1 ( <i>Buteo swainsoni</i> )		
Turkey vulture ( <i>Cathartes aura</i> )		
Vesper sparrow 1 ( <i>Pooecetes gramineus</i> )		
Western kingbird * ( <i>Tyrannus verticalis</i> )		
Western meadowlark ( <i>Sturnella neglecta</i> )		
Yellow warbler * ( <i>Dendroica petechia</i> )		
Yellow-rumped warbler * ( <i>Dendroica coronata</i> )		

\* Species detected only in the cottonwood and/or cottonwood tamarisk habitat

\*\* Detected by tracks, scat, carcass, prey remains, feathers, burrow, etc.

\*\* \*Detected nesting within 500 feet of survey area and thus likely to forage in survey area

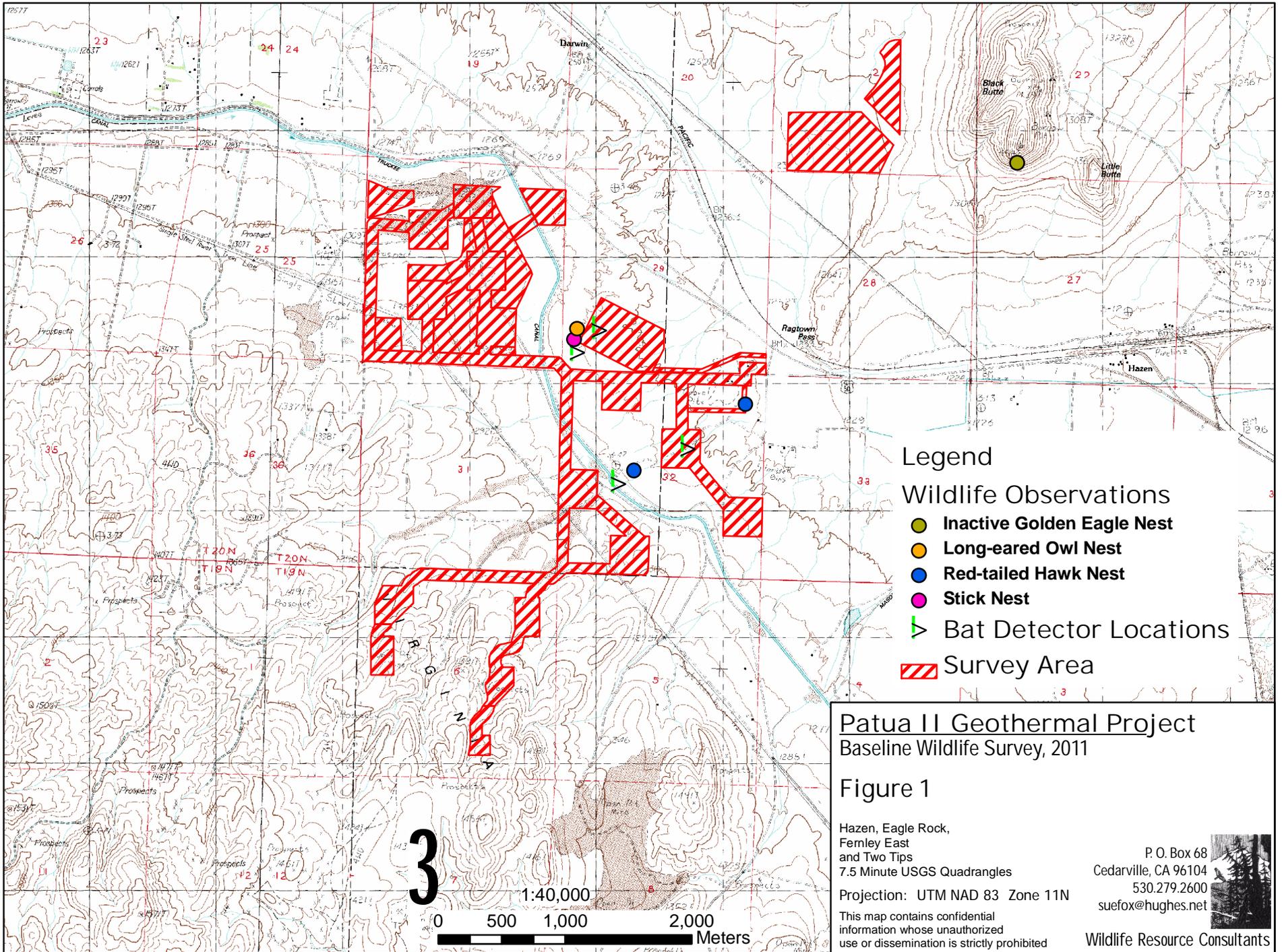
<sup>1</sup> Nevada Special Status Species protected by NRS 501

<sup>2</sup> Proposed Nevada Special Status Species - designated proposed Sensitive by BLM State Office

#### 4. CONCLUSION

The greatest diversity of bird species was detected in the cottonwood and/or cottonwood and tamarisk groves. Few of the species that occur in these habitat types would be expected to use the Intermountain Basins Mixed Salt Desert Scrub habitat type. Exceptions are the red-tailed hawk, Swainson's hawk, and long-eared owl, which forage in this habitat type. It is possible that when the Truckee Canal contains water, additional bird species, as well as amphibians, might be detected. All the bat species detected in the survey area are considered special status species. Potential bat roosting habitat in the survey area consists of trees and small isolated rock outcrops

## 5. FIGURE 1



**Legend**

- Wildlife Observations**
- Inactive Golden Eagle Nest
- Long-eared Owl Nest
- Red-tailed Hawk Nest
- Stick Nest
- ▶ Bat Detector Locations
- Survey Area

**Patua II Geothermal Project  
Baseline Wildlife Survey, 2011**

**Figure 1**

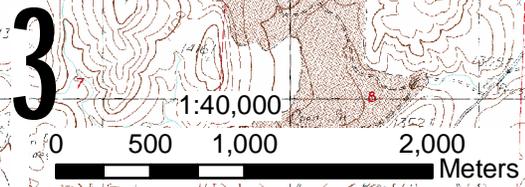
Hazen, Eagle Rock,  
Femley East  
and Two Tips  
7.5 Minute USGS Quadrangles  
Projection: UTM NAD 83 Zone 11N

This map contains confidential  
information whose unauthorized  
use or dissemination is strictly prohibited

P. O. Box 68  
Cedarville, CA 96104  
530.279.2600  
suefox@hughes.net



**Wildlife Resource Consultants**



6. FIGURE 2



Photograph 1. Swainson's hawk nest.



Photograph 2. Long-eared owl fledgling.

## 7. APPENDIX A – AGENCY CORRESPONDENCE



# United States Department of the Interior

## Pacific Southwest Region FISH AND WILDLIFE SERVICE

Nevada Fish and Wildlife Office

1340 Financial Blvd., Suite 234

Reno, Nevada 89502

Ph: (775) 861-6300 ~ Fax: (775) 861-6301



April 1, 2011

File No. 2011-SL-0178

Ms. Sue Fox  
Wildlife Resource Consultants  
Post Office Box 68  
Cedarville, California 96104

Dear Ms. Fox:

Subject: Species List Request for the Patua II Project, Lyon and Churchill Counties,  
Nevada

This responds to your letter received on March 15, 2011, requesting a species list for the Patua II Project in Lyon and Churchill Counties, Nevada. To the best of our knowledge, no listed, proposed, or candidate species occur in the subject project area. This response fulfills the requirements of the Fish and Wildlife Service (Service) to provide a list of species pursuant to section 7(c) of the Endangered Species Act of 1973 (ESA), as amended, for projects that are authorized, funded, or carried out by a Federal agency.

The Nevada Fish and Wildlife Office no longer provides species of concern lists. Most of these species for which we have concern are also on the Animal and Plant At-Risk Tracking List for Nevada (At-Risk list) maintained by the State of Nevada's Natural Heritage Program (Heritage). Instead of maintaining our own list, we adopted Heritage's At-Risk list and are partnering with them to provide distribution data and information on the conservation needs for at-risk species to agencies or project proponents. As you may know, the mission of Heritage is to continually evaluate the conservation priorities of native plants, animals, and their habitats, particularly those most vulnerable to extinction or in serious decline. In addition, in order to avoid future conflicts, we ask that you consider these at-risk species early in your project planning and explore management alternatives that provide for their long-term conservation.

For a list of at-risk species by county, visit Heritage's website (<http://heritage.nv.gov>). For a specific list of at-risk species that may occur in the project area, you can obtain a data request form from the website (<http://heritage.nv.gov/forms.htm>) or by contacting the Administrator of Heritage at 901 South Stewart Street, Suite 5002, Carson City, Nevada 89701-5245, (775) 684-2900. Please indicate on the form that your request is being obtained as part of your

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coordination with the Service under the ESA. During your project analysis, if you obtain new information or data for any Nevada sensitive species, we request that you provide the information to Heritage at the above address.

Furthermore, certain species of fish and wildlife are classified as protected by the State of Nevada (<http://www.leg.state.nv.us/NAC/NAC-503.html>). You must first obtain the appropriate license, permit, or written authorization from the Nevada Department of Wildlife to take, or possess any parts of protected wildlife species. Please visit <http://www.ndow.org> or contact the Nevada Department of Wildlife at (775) 688-1500.

If bald eagles (*Haliaeetus leucocephalus*) and/or golden eagles (*Aquila chrysaetos*) occur in the project area or within 10 miles of the proposed project area boundary, we recommend you analyze project impacts to the affected individuals, their habitats, and regional populations. While the bald eagle has been removed from the Federal list of threatened and endangered species (August 8, 2007; 72 FR 37346), it remains classified as endangered by the States of Nevada and California. Further, the bald eagle along with the golden eagle continues to be protected under the Bald and Golden Eagle Protection Act (BGEPA) of 1940, as amended (16 U.S.C. 668-668d) and the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. 703 *et seq.*). Both the BGEPA and the MBTA prohibit take as defined as pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, disturb, or otherwise harm eagles, their nests, or their eggs. Under the BGEPA, "disturb" means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available: 1) injury to an eagle, 2) decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior. On September 11, 2009 (74 FR 46836), the Service set in place rules establishing two new permit types: 1) take of bald and golden eagles that is associated with, but not the purpose of, the activity; and 2) purposeful take of eagle nests that pose a threat to human or eagle safety. We recommend you coordinate with State and Federal wildlife officials early in the planning process to ensure compliance with State and Federal regulations and to develop a survey protocol to evaluate the potential risk and the likelihood of take of eagles. If take is reasonably anticipated to occur, we recommend you develop an Avian Protection Plan (APP) in coordination with State wildlife agencies and the Service. An APP is intended to avoid, minimize, or mitigate impacts to these species.

Based on the Service's conservation responsibilities and management authority for migratory birds under the MBTA, we are concerned about potential impacts the proposed project may have on migratory birds in the area. Given these concerns, we recommend that any land clearing or other surface disturbance associated with proposed actions within the project area be timed to avoid potential destruction of bird nests or young, or birds that breed in the area. Such destruction may be in violation of the MBTA. Under the MBTA, nests with eggs or young of migratory birds may not be harmed, nor may migratory birds be killed. Therefore, we recommend land clearing be conducted outside the avian breeding season. If this is not feasible, we recommend a qualified biologist survey the area prior to land clearing. If nests are located, or

Sue Fox

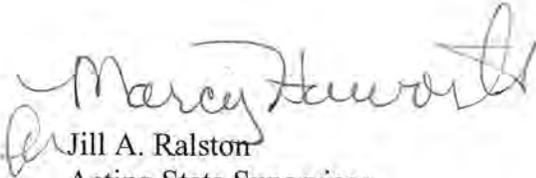
File No. 2011-SL-0178

if other evidence of nesting (*i.e.*, mated pairs, territorial defense, carrying nesting material, transporting food) is observed, a protective buffer (the size depending on the habitat requirements of the species) should be delineated and the entire area avoided to prevent destruction or disturbance to nests until they are no longer active.

Because wetlands, springs, or streams are present in the vicinity of the project area, we ask that you be aware of potential impacts project activities may have on these habitats. Discharge of fill material into wetlands or waters of the United States is regulated by the U.S. Army Corps of Engineers (ACOE) pursuant to section 404 of the Clean Water Act of 1972, as amended. We recommend you contact the ACOE's Regulatory Section 300 Booth Street, Room 3060, Reno, Nevada 89509, (775) 784-5304 regarding the possible need for a permit.

Please reference File No. 2011-SL-0178 in future correspondence concerning this species list. If you have any questions regarding this correspondence or require additional information, please contact me or James Harter at (775) 861-6300.

Sincerely,



Jill A. Ralston  
Acting State Supervisor



BRIAN SANDOVAL  
*Governor*

STATE OF NEVADA  
**DEPARTMENT OF WILDLIFE**

1100 Valley Road  
Reno, Nevada 89512  
(775) 688-1500 • Fax (775) 688-1595

KENNETH E. MAYER  
*Director*

RICHARD L. HASKINS, II  
*Deputy Director*

PATRICK O. CATES  
*Deputy Director*

March 21, 2011

Sue Fox  
Wildlife Resource Consultants  
P.O. Box 68  
Cedarville, California 96104

Re: Patua II Project

Dear Ms. Fox:

I am responding to your request for information from the Nevada Department of Wildlife (NDOW) on the known or potential occurrence of wildlife resources in the vicinity of the Patua II Project located in Churchill and Lyon Counties, Nevada. In order to fulfill your request an analysis was performed using the best available data from the NDOW's wildlife sight records, commercial reptile collections, scientific collections, raptor nest sites and ranges, greater sage-grouse leks and habitat, and big game distributions databases. No warranty is made by the NDOW as to the accuracy, reliability, or completeness of the data for individual use or aggregate use with other data. These data should be considered **sensitive** and may contain information regarding the location of sensitive wildlife species or resources. All appropriate measures should be taken to ensure that the use of this data is strictly limited to serve the needs of the project described on your GIS Data Request Form. Abuse of this information has the potential to adversely affect the existing ecological status of Nevada's wildlife resources and could be cause for the denial of future data requests.

To adequately provide wildlife resource information in the vicinity of the proposed project the NDOW delineated an area of interest that included a three-mile buffer around the project area provided by you via mail (March 8, 2011) as Public Land Survey System township/range/section locations. Wildlife resource data was queried from the NDOW databases based on this area of interest. The results of this analysis are summarized below.

**Big Game** – There are no known bighorn sheep, elk, mule deer, or pronghorn antelope distributions in the vicinity of the Patua II project area.

**Greater Sage-Grouse** – There are no known greater sage-grouse distributions or lek sites in the vicinity of the Patua II project area.

**Raptors** – Various species of raptors, which use diverse habitat types, are known to reside in the vicinity of the project area. American kestrel, bald eagle, barn owl, burrowing owl, Cooper's hawk, ferruginous hawk, golden eagle, great horned owl, long-eared owl, merlin, northern goshawk, northern harrier, northern saw-whet owl, osprey, peregrine falcon, prairie falcon, red-tailed hawk, rough-legged hawk, sharp-shinned hawk, short-eared owl, Swainson's hawk, turkey vulture, and western screech owl have distribution ranges that include the project area and three-mile buffer area. Furthermore, barn owl, burrowing owl, Cooper's hawk, golden eagle, prairie falcon, and Swainson's hawk have been directly observed in the vicinity of the project area.

Raptor species are protected by State and Federal laws. In addition, bald eagle, burrowing owl, ferruginous hawk, northern goshawk, peregrine falcon, short-eared owl, and Swainson's hawk are NDOW species of special concern and are target species for conservation as outlined by the Nevada Wildlife Action Plan.

Five raptor nest sites have been identified by the NDOW in the vicinity of the project area. These nests exist at the following locations:

Species	Township/Range/Section	Species	Township/Range/Section
burrowing owl	21 0200N 0250E 012	prairie falcon	21 0200N 0260E 027
golden eagle	21 0200N 0260E 027	prairie falcon	21 0200N 0260E 027
		Swainson's hawk	21 0200N 0260E 028

Per the Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols; and Other Recommendations in Support of Golden Eagle Management and Permit Issuance (United States Fish and Wildlife Service 2010) we have also analyzed our raptor nest database for bald and golden eagle nest site locations within ten miles of the proposed project area. No known bald eagle nests and one additional golden eagle nest occurs within ten miles of the project area. This nest is located in Township 19 North, Range 24 East, Section 34.

**Other Wildlife Resources**

The following species have also been observed in the vicinity of the project area:

black phoebe	Great Basin fence lizard	Nevada side-blotched lizard
coachwhip	Great Basin gophersnake	northern desert horned lizard
desert horned lizard	Great Basin rattlesnake	Virginia rail
desert tortoise	Great Basin whiptail	western fence lizard
gophersnake	long-nosed leopard lizard	yellow-backed spiny lizard
Great Basin collared lizard	Mojave patch-nosed snake	zebra-tailed lizard

The above information is based on data stored at our Reno Headquarters Office, and does not necessarily incorporate the most up to date wildlife resource information collected in the field. Please contact the Habitat Division biologist supervisor at our Western Region Reno Office (775.688.1500) to discuss the current environmental conditions for your project area and the interpretation of our analysis.

Mark Freese – Western Region Habitat Biologist Supervisor (775.688.1145).

Federally listed Threatened and Endangered species are also under the jurisdiction of the United States Fish and Wildlife Service. Please contact them for more information regarding these species.

If you have any questions regarding the results or methodology of this analysis please do not hesitate to contact our GIS office at (775) 688-1565.

Sincerely,

Timothy Herrick  
 Conservation Aide III  
 Wildlife Diversity Division

LEO DROZDOFF  
Director

Department of Conservation  
and Natural Resources

JENNIFER E. NEWMARK  
Administrator

BRIAN SANDOVAL  
Governor



Nevada Natural Heritage Program  
Richard H. Bryan Building  
901 S. Stewart Street, suite 5002  
Carson City, Nevada 89701-5245  
U.S.A.

tel: (775) 684-2900  
fax: (775) 684-2909



STATE OF NEVADA  
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES  
**Nevada Natural Heritage Program**  
<http://heritage.nv.gov>

17 March 2011

Joan Reynolds  
Joan Reynolds Botanical Consultants  
PO Box 3476  
Lake City, CA 96110

RE: Data request received 13 March 2011

Dear Ms. Reynolds:

We are pleased to provide the information you requested on endangered, threatened, candidate, and/or At Risk plant and animal taxa recorded within or near the Patua II (Geothermal) Project area. We searched our database and maps for the following, a five kilometer radius around:

Township 19N Range 26E Section 06  
Township 20N Range 26E Sections 21, 30 and 32

The enclosed printout lists the taxa recorded within the given area. The Nevada Department of Wildlife (NDOW) manages, protects, and restores Nevada's wildlife resources and associated habitat. Please contact Chet Van Dellen, NDOW GIS Coordinator (775.688.1565) to obtain further information regarding wildlife resources within and near your area of interest. Removal or destruction of state protected flora species (NAC 527.010) requires a special permit from Nevada Division of Forestry (NRS 527.270).

Please note that our data are dependent on the research and observations of many individuals and organizations, and in most cases are not the result of comprehensive or site-specific field surveys. Natural Heritage reports should never be regarded as final statements on the taxa or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments.

Thank you for checking with our program. Please contact us for additional information or further assistance.

Sincerely,

Eric S. Miskow  
Biologist/Data Manager

**At Risk Taxa Recorded Near the Patua II Project Area**  
 Compiled by the Nevada Natural Heritage Program for Joan Reynolds Botanical Consultants  
 17 March 2011

Scientific name	Common name	Usfws	Blm	Usfs	State	Strank	Crank	Lat	Long	Prec	Last observed
<b>Plants</b>											
<i>Psoralea kingii</i>	Lahontan indigobush					S3	G3	393925N	1190144W	G	1871-08
<b>Invertebrates</b>											
<i>Limeritis archippus lahontan</i>	Nevada viceroy					S1S2	G5T1T2	393450N	1190744W	M	1969-08-10
<i>Limeritis archippus lahontan</i>	Nevada viceroy					S1S2	G5T1T2	393440N	1190640W	S	1978-08-14
<i>Limeritis archippus lahontan</i>	Nevada viceroy					S1S2	G5T1T2	393311N	1190524W	M	1966-08-14
<i>Limeritis archippus lahontan</i>	Nevada viceroy					S1S2	G5T1T2	393346N	1190249W	S	1978-08-14
<b>Birds</b>											
<i>Charadrius alexandrinus nivosus</i>	Western Snowy Plover		N		YES	S3B	G4T3	393824N	1190817W	G	1949-08-30

Bureau of Land Management (Blm) Species Classification:

N Nevada Special Status Species - designated Sensitive by State Office

Nevada State Protected (State) Species Classification:

Fauna:

YES Species protected under NRS 501.

Precision (Prec) of Mapped Occurrence:

Precision, or radius of uncertainty around latitude/longitude coordinates:

- S Seconds: within a three-second radius  
 M Minutes: within a one-minute radius, approximately 2 km or 1.5 miles  
 G General: within about 8 km or 5 miles, or to map quadrangle or place name

Nevada Natural Heritage Program Global (Crank) and State (Strank) Ranks for Threats and/or Vulnerability:

- G Global rank indicator, based on worldwide distribution at the species level  
 T Global trinomial rank indicator, based on worldwide distribution at the infraspecific level  
 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, imminent threats, or other factors
  - 2 Imperiled due to rarity or other demonstrable factors
  - 3 Vulnerable to decline because rare and local throughout its 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 Demonstrably secure, widespread, and abundant
- A Accidental within Nevada  
 B Breeding status within Nevada (excludes resident taxa)  
 H Historical; could be rediscovered  
 N Non-breeding status within Nevada (excludes resident taxa)  
 Q Taxonomic status uncertain  
 U Unrankable  
 Z Enduring occurrences cannot be defined (usually given to migrant or accidental birds)  
 ? Assigned rank uncertain

## Wildlife Resource Consultants

Jason Hefner  
Project Development Analyst  
Gradient Resources  
9670 Gateway Drive, Suite 200  
Reno, NV 89521

July 6, 2011

**RE:** Additional Wildlife Survey Area - Patua Geothermal Project Phase II Township 20 North, Range 26 East, portions of Section 21

Dear Mr. Hefner:

This memo reports the results of Wildlife Resource Consultants' July 1, 2011 survey for special status wildlife species within the additional Patua Geothermal Project Phase II project area. Specifically, Gradient Resources requested in a June 21, 2011 email that the additional area be surveyed if it was not covered in previous surveys. The portions of Section 21, Township 20 North, Range 26 east that were depicted on the map provided in the email was not previously surveyed. Therefore, the red and blue hatched areas shown on the map were surveyed as well as the potential raptor habitat located immediately east of the project area on Black Butte.

Vegetation in the project area is described using the Nevada Department of Wildlife's (NDOW) Nevada Wildlife Action Plan (2006). One terrestrial wildlife habitat types occur within the project area: Intermountain Cold Desert Scrub. Within the project area, there are no rock outcrops that could provide suitable roosting habitat for bats or nesting habitat for cliff-nesting raptors. The species observed during the July 1 survey have been previously recorded and documented in other reports submitted for the Patua Geothermal Project.

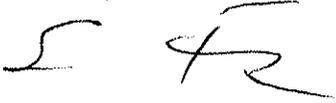
The only notable observations were of golden eagles outside the project area in the vicinity of Black Butte. A golden eagle perch site with pellets, white wash, and feathers is located on the rock out crop outside of and east of the project area at the following approximate utm coordinate: (NAD 83) 322910, 4383285. In addition, an immature golden eagle was observed flying over the west facing slope of Black Butte. Upon leaving the project area and heading below the south-facing slope of Black Butte, two adult golden eagles were observed in the vicinity of the inactive, previously reported golden eagle nest. The birds were observed alternatively soaring and perching near the rock outcrop.

The nest on Black Butte was previously surveyed to protocol in 2011 and is inactive. Vehicle surveys for golden eagles and/or their nests were performed in 2011 from all mapped and unmapped roads within a four mile radius of the survey area on public lands managed by the BLM; no nests were found and no golden eagles were observed.

**Wildlife Resource Consultants**

None of the rock outcrops on the west-facing slope of Black Butte located above the survey area provide suitable nesting habitat for golden eagles (i.e., outcrops are jumbled, lack steep faces, and are low angle).

Sincerely,

A handwritten signature in black ink, appearing to read 'Sue Fox', written in a cursive style.

Sue Fox  
Wildlife Resource Consultants