App 3-4

# UtahAmerican Energy, Inc.

This is being written to help clarify some confusion between the Biological Assessment ("BA") prepared by EIS Environmental & Engineering Consulting done in August of 2000 and the various T&E inventories contained within Appendix 3-4 of the Horse Canyon Permit -Lila Canyon Extension.

The BA states that "The area affected by the proposed action (Lila Canyon Mine) does contain suitable habitat for Winkler cactus (Pedioractus winkleri) and Wright Fish Hook cactus. The July 29, 1999 letter written by EIS states that "both the Despain Foot cactus and the Wright Fishhook cactus have been observed in Emery County, however, it would be an anomaly to find in this habitat and or this far north (Lila Canyon). Based on previous studies, the occurrence of either species within the Lila Canyon Area is highly unlikely."

The Utah Heritage Program agrees with the 1999 EIS letter and states that "Utah Heritage Program considers that there is very little chance that Barneby reed-mustard, Jones cycladenia, Last Chance townsendia, Maguire daisy, Winkler cactus, or Wright fishhook cactus will occur near the Lila facilities area (Division communications with Ben Franklin May 2004)."

Regardless if Lila Canyon Area is potential habitat or not doesn't matter since inventories for both the Despain Foot Cactus and the Wright Fishhook Cactus were performed in 1999, 2000, and 2002 with negative results.

It appears that the BA was in error and that the Lila Canyon Area does not contain suitable habitat and there is very little chance that either the Winkler cactus or the Wright fishhook cactus will occur near the Lila facilities area.

R. Jay Marshall

R. Jay Marshall
Project Manager
Lila Canyon Mine the Despain Foot Cactus and the Wright Fishhook Cactus

P.O. Box 986 Price, Utah 84501 Telephone (435) 637 5032 x 724 Fax (435) 613 0805 email: jmarshall@coalsource.com

# APPENDIX 3-4

# THREATENED AND ENDANGERED SPECIES INVENTORIES

Information for Appendix 3-4 is all hard copies no electronic copies exist.

July 17, 2003

R. Jay Marshall
Project Manager
UtahAmerican Energy, Inc.

Dear Jay:

As we discussed according to DOGM, the various TES inventories need clarification on who did what. The following should help.

The TES inventory conducted **May 21st, 22nd, and 26th of 1999** was planned and directed by Mel Coonrod. The data was collected by Mel Coonrod and David Steed. The report was written by Mel Coonrod and David Steed.

The **August 2000** Biological Assessment was prepared by David Steed. Mel Coonrod reviewed and approved the BA. No data collection was directly involved for the preparation of the BA.

The TES inventory conducted on **April 30th, 2002** was planned and directed by Mel Coonrod. The actual inventory was performed by Mel Coonrod and David Varner. The report was written by David Varner and approved by Mel Coonrod.

The **May 30, 2002** Follow Up TES inventory was planned and directed by Mel Coonrod. The individuals who participated are included in the Results section of the report include Mel Coonrod EIS, Dean Stacy EIS, Denise Chavez EIS, Wayne Ludington BLM, Mike Kaminski BLM, Mike Tweddell BLM. The report was written by Dean Stacy, M.S.

Should you have any questions or if DOGM has any concerns please let me know.

Sincerely,

Mel Coonrod
President and Owner
EIS Environmental Consulting

**Appendix 3-4**

# CANYON SWEETVETCH, CREUTZFELDT-FLOWER, LOGGERHEAD SHRIKE, AND BURROWING OWL INVENTORIES FOR THE LILA CANYON MINE PROPOSAL

**CONDUCTED BY**

**EIS ENVIRONMENTAL CONSULTING**

**MAY 21st, 22nd, AND 26th (1999)**

## Introduction

UtahAmerican Energy, Price Utah, has proposed to build a mine facility located within Lila Canyon of the Book Cliffs/Roan Cliffs Plateau Physiographic Region. The proposed mine facility includes a transportation/utility corridor and a mining surface facility. The transportation/utility corridor will consist of an access road, rail line, power line, and utility line. Other proposed actions are a permit area and two borrow areas.

A ground inventory for loggerhead shrike, (*Lanius ludovicianus)*, creutzfeldt-flower, *(Cryptantha creutzfeldtii,)* burrowing owls, (*Athene cunicularia,*) and Canyon sweetvetch, *(Hedysarum occidentale* variety *canone),* dispain footcactus, (*Pediocactus despainii),* and Wright fishhook cactus *(Sclerocatus wrightiae),* was conducted on May 21, 22, and 26 by employees of EIS. The proposed access/utility corridor and surface facility were inventoried by walking linear transects over the entire area of concern.

## Methodology

Loggerhead shrike - Burrowing owl

Inventories were conducted between sunrise and 10:00A.M., the period of highest bird activity, on May 21, 22, and 26th. Binoculars and spotting scopes were used to note shrike activities and the entire proposed area was searched for white-tailed prairie dog, (Cynomys leucurus) towns. Prairie dog towns are the preferred habitat of borrowing owls. If shrikes were observed, a thorough search of the site was conducted to identify the presence of a nest. Field personnel would also conduct a thorough search of identified prairie dog towns to reveal the presence of on-going or historic burrowing owl activities (scratchings, droppings, tracks, ect.). Habitat present in the proposed area was noted, as was the general topography, weather conditions and general mitigation suggestions.

Canyon sweetvetch - creutzfeldt-flower-despain footcactus-Wright fishhook cactus.

Inventories were conducted from 7:30 A.M.to 3:00P.M. on May 21, 22, and 26th 1999. The areas were searched by walking linear transects over the entire area of concern. If target taxa were located field personnel flagged the location, collected voucher specimens, marked the location on a quad-map, and took a photograph of the plant and habitat. Habitat present in the proposed area was noted, as was the general topography, weather conditions, and general mitigation suggestions.

**Results**

Loggerhead shrike

A thorough search of the area did not reveal the presence of Loggerhead shrikes, though the proposed surface facility area contains suitable shrike habitat.

Burrowing owl

No burrowing owls were located within any of the proposed area. A thorough search of the area revealed no prairie dog towns and therefor no on-going or historic burrowing owl activity.

Creutzfeldt-flower

No creutzfeldt-flower was identified in the proposed area although there were several areas of suitable habitat ( Mancos Shale substrate).

Canyon sweetvetch

Canyon sweetvetch was located in a dry wash located in the south west corner of section 21, Township 16 East, Range 14 East, found on the Lila Point USGS quad. Approximately 20 plants occurred in this area. The voucher sample was positively identified by qualified BLM staff. This was the only occurrence of *Hedysarum occidentale* in the proposed area.

Recommendations: It is recommended that construction of the transportation/utility corridor minimize sediment loading to the ephemeral stream mentioned. Increased erosion and subsequent sedimentation could possibly impact existing plants or alter future establishment of Canyon sweetvetch. Sediment traps should be employed during road construction. The population of sweetvetch should be monitored annually to assess effects of road, rail line, power line, and utility line construction on Canyon sweetvetch population dynamics.

Appendix 3-4

ENVIRONMENTAL INDUSTRIAL SERVICES
435-472-3814 • 800-641-2927 • FAX 435-472-8780 • eisec@sisna.com • 91 NORTH MAIN STREET HELPER, UTAH 84526

October 19, 2004

Mr. Jay Marshall
UtahAmerican Energy, Inc.
P.O. Box 986
Price, Utah 84501

Dear Mr. Marshall,

I apologize about any confusion resulting from either the Lila Canyon BA or the 1999 T & E Survey.

T & E Surveys are conducted relative to the direction of the BLM Resource managers. The species specifically surveyed for are by his or her direction. However, we routinely survey for all T & E and sensitive species listed by USFW, BLM and the State for the area in question and normally adjacent areas. In this manner we can make a definitive declaration as to their presence or absence if a BA (Biological Assessment) is later required.

Since the 1999 survey a number of follow-up surveys were conducted in direct association with the BLM. No T&E candidate, BLM or State sensitive species have been located within the Lila Canyon areas of potential disturbance.

Sincerely,

Melvin A. Coonrod
President/Owner
Environmental Industrial Services (EIS)
Engineering & Consulting

# Lila Canyon
# Biological Assessment

## Prepared by

## EIS Environmental & Engineering Consulting

## August 2000

### I. Introduction

The purpose of this biological assessment is to evaluate the potential impacts of construction, maintenance, and operation of a coal mine in Lila Canyon to those plant and animal species and their habitats. Federally listed or proposed as threatened and endangered.

The Endangered Species Act of 1973 (PL 93-205), as amended, require federal agencies to insure that any activities the authorize, fund, or carry out, do not jeopardize the continued existence of any wildlife species federally listed as threatened or endangered (Section 7). The biological assessment is an analysis of which threatened and endangered species may occur in the project area and whether any impacts to those species are anticipated. This biological assessment has been prepared using direction from the BLM manual 6840, Special Status Species Management.

### II. Proposed Action

The proposed action to be taken by Utah American Energy would be the construction, operation, and maintenance of Lila Canyon Mine as well as the construction and operation of all associated surface facilities, utilities, and transportation routes. To facilitate the development and operation of the proposed mine, the existing Lila Canyon Road that ties into Emery County Road (CR) 125 at the existing Horse Canyon Mine Site would be upgraded to accommodate personnel and construction equipment travel. Concurrent with upgrading the existing access road, a separate operational coal haul road would also be constructed. A 46 kV power line that ties to the existing Moab/Price/Green River line approximately one mile south of the proposed mine facilities would be constructed to provide the necessary power requirements.

A more detailed account of Lila Canyon Mine and it's associated facilities can be found in the BLM Environmental Assessment for the Development of the Lila Canyon Project, Emery County Utah, Document (EA No. UT-070-99-22).

### III. Species Potentially Impacted by the Project

Currently the following threatened, endangered, proposed endangered, and candidate species and habitat are found in Emery County. Candidate species have no legal protection under the Endangered Species Act (ESA).

| Species | Scientific Name | Status |
|---|---|---|
| Bald Eagle | *Haliaeetus leucocephalus* | Threatened |
| Barneby Reed Mustard | *Schoenocrambe barnebyi* | Endangered |
| Black- footed Ferret | *Mustela nigripes* | Endangered |
| Bonytail Chub | *Gila elegans* | Endangered |
| Colorado Squawfish | *Ptychocheilus lucius* | Endangered |
| Humpback Chub | *Gila cypha* | Endangered |
| Jones Cycladenia | *Cycladenia humilis* var. *jonesii* | Threatened |
| Last Chance Townsendia | *Townsendia aprica* | Threatened |
| Maguire Daisy | *Erigeron maguirei* | Endangered |
| Razorback Sucker | *Xyrauchen texanus* | Endangered |
| San Rafael Cactus | *Pediocactus despainii* | Endangered |
| Winkler Cactus | *Pediocactus winkleri* | Proposed Endangered |
| Wright Fishhook Cactus | *Sclerocactus wrightiae* | Endangered |

## IV. Species Occurrences and Habitat Needs

**Bald Eagle (*Haliaeetus leucocephalus)*** During the breeding season bald eagles are closely associated with water, along coasts, lake shores, or river banks. During the winter bald eagles tend to concentrate wherever food is available. This usually means open water where fish and waterfowl can be caught. They also winter on more upland areas feeding on small mammals and deer carrion. At winter areas, bald eagles commonly roost in large groups. These communal roosts are located in forested stands that provide protection from harsh weather (Stalmaster, 1987).

Bald eagles can often be found near lakes and reservoirs, as well as within upland areas on the Manti National Forest during the late fall and early winter. When lakes and reservoirs freeze over in early winter, most eagles will leave these upland feeding sites. No bald eagles are known to nest in the area.

**Barneby Reed Mustard (*Schoenocrambe barnebyi)*** Barneby Reed Mustard grows on steep, northfacing slopes of the Moenkopi Formation. Elevation ranges between 1646- 1753 m (5400- 5750 ft). This species grows in the salt desert shrub zone and is commonly found with Ephedra and Erigonum. The TES inventory done May 21, 22, and 26 1999 did not locate this species within the project area though not specifically noted in the inventory report.

**Black-footed Ferret *(Mustela nigripes)*** The relationship between black-footed ferrets and prairie dogs has long been known. Black- footed ferrets live in the burrows made by prairie dogs and probably exploit these rodents as their major food source. The high biomass of potential prey species and the abundance of burrows are equally important factors in attracting black-footed ferrets to this habitat. The Black- footed ferret is unlikely to occur in the proposed project area because of the lack of its major prey species, prairie dogs.

**Bonytail Chub (*Gila elegans)*** Historically bonytail chubs exists thoughout the Colorado River drainage. Recently, isolated captures of bonytail chubs have been made in the Colorado River basin but recruitment to the population is extremely low or nonexistent. The decline of the bonytail chub is attributed to dam construction and associated water temperature changes. Other factors contributing to the reduced numbers include flow depletion, hybridization, stream alterations associated with dam construction, and the introduction of non- native fish species. The bonytail chub is an omnivore, feeding mostly on terrestrial insects, plant debris and algae and begins to spawn at five to seven years of age (Behnke and Benson 1980). No bonytail chubs have been located in the project area primarily due to the lack of perennial stream flows.

**Colorado Squawfish *(Ptychocheilus lucius)*** The Colorado squawfish had a historic range from Green River, Wyoming, to the Gulf of California, but the species is now confined to the upper Colorado River Basin mainstream and larger tributaries. The lower Green River between the Price and San Rafael rivers contain abundant Colorado squawfish. The species decline can be attributed to direct loss of habitat, changes in water flow and temperature, blockage of migrations, and interactions with introduced fish species. Colorado squawfish adults are thought to prefer deepwater eddies and pools or other areas adjacent to the main water current, whereas the young inhabit shallow, quiet backwaters adjacent to high flow areas. Colorado squawfish feed on invertebrates while young but gradually become piscivorous after one year. No Colorado squawfish have been located within the proposed project area because of the lack of perennial stream flows.

**Humpback Chub *(Gila cypha)*** The humpback chub is believed to have inhabited all of the large rivers of the upper Colorado River basin and canyons of the lower Colorado River basin. Presently the humpback chub can be located in and above the Grand Canyon, Arizona, and the major tributaries to the Colorado River. The states stream alteration, including dewatering, dams and channelization, as factors causing the decline of the species. The humpback chub normally lives adjacent to high velocity flows, where they consume plankton and small invertebrates. The humpback chub has not been located in the proposed project area due to the lack of perennial stream flows.

**Jones Cycladenia *(Cycladenia humilis* var. *jonesii)*** Jones Cycladenia is found on the Cutler, Summerville, and Chinle Formations in the salt desert shrub, mixed desert shrub and juniper zones. Elevation ranges from 4400- 5970 ft. The plant occurs on the eroded slopes of the Summerville Formation, just east of the San Rafael Reef. This habitat species is not known to occur within the proposed project area, and was not located during the TES inventory conducted on May 21, 22, and 26, 1999.

**Last Chance Townsendia *(Townsendia aprica)*** Last Chance Townsendia occurs on the Ferron

Sandstone and Carmel Formations. The plant apparently grows on several formations, but prefers fine-textured substrates and shallow soils close to sandstone bedrock. Elevation ranges from 6000-7400 ft. It is commonly found growing in the pinyon-juniper zone associated with grasses and mixed desert shrubs. Aspect is variable and slope does not exceed 10 degrees. There were no populations of this species found in the proposed project area during the May 21, 22, and 26, 1999 TES inventory.

**Maguire Daisy *(Erigeron maquirei)*** Maguire daisy occurs in the canyon bottoms of the Wingate and Chinle Formations at approximately 5600 ft. It has been found growing atop mesas and shaded canyon bottoms of the Navaho Sandstone Formation at approximately 6,800 ft. The daisy prefers cool, shaded, moist, mesic, wash bottoms and dry, partially shaded, slopes of eroded sandstone cliffs. Aspects is usually north, east, or northeast and slopes do not exceed 25 degrees. The daisy grows within the lower limits of the pinyon-juniper zone but seems to attain optimal growth conditions in the mountain shrub zone. This species was not found during the TES inventory conducted on May 21, 22, and 26, 1999.

**Razorback Sucker *(Xyrauchen texanus)*** Historic distribution of the razorback sucker was mainly along the mainstream of the Colorado, Green and San Juan Rivers. They presently only occur in a portion of their former range in these rivers and are normally found in water four to ten feet deep with area of strong currents and backwaters. The razorback sucker feeds on small invertebrates, and animals and organic debris on the river bottom. Behnke and Benson (1980) link the decline of the razorback sucker to the land and water uses, particularly dam construction and the associated change in flow regimes and river channel characteristics. Razorback Sucker are not present in the proposed project area due to the lack of perennial stream flows

**San Rafael Cactus *(Pediocactus despainii)*** San Rafael cactus is found on gray to white limestone of the Carmel Formation. Elevations range between 6,000- 6,300 ft. The cactus grows in a pinyon-juniper-grassland community. It grows flat on rolling terrain in full sunlight and the aspect is variable. No species were located during the inventory on May 21, 22, and 26, 1999.

**Winkler Cactus *(Pediocactus winkleri)*** Winkler cactus grows on clay subsoil normally associated with the salt desert shrub communties. The elevation ranges between 4,790 to 5,210 feet and can normally be located and identified between March and mid May. No Winkler cactus are known to be in the proposed project area. The TES inventory conducted on May 21, 22, 26, 1999 did not locate any species.

**Wright Fishhook Cactus *(Sclerocactus wrightiae)*** Wright Fishhook cactus is known to be found from Wayne County, southwestern Emery County, and southeastern Sevier County. The cactus has been found occupying a variety of geologic substrata. Throughout its distribution, the cactus does not favor one particular geologic substrate but it does seem to favor specific edaphic and geochemical conditions. The cactus occurs in salt desert shrub and mixed desert shrub zones between elevations of 4,550- 6,200 ft. Associated plant cover rarely exceeds 15 percent. Slope is usually between 0 to 10 degrees and aspect is variable. This habitat species is not known to occur within the proposed project area. The TES inventory conducted on May 21, 22, 26, 1999 did not locate any

species.

## V. Determination of Effects

**Suitable Habitat** The area affected by the proposed action does not contain suitable habitat (i.e. elevation, vegetation, and/or geology) and known home ranges for many of the species in the above lists. Therefore, it is determined that there will be no effect upon them. These species (as listed below) are therefore eliminated from further analysis.

- **Bald Eagle (*Haliaeetus leucocephalus)*** - the proposed action is outside the range of this species.

- **Barneby Reed Mustard (*Schoenocrambe barnebyi)***- The area affected by the proposed action does not contain suitable habitat for this endangered plant. The proposed action would not affect this plant.

- **Black-footed Ferret *(Mustela nigripes)***- The area affected by the proposed action does not contain any prairie dog towns which provide black- footed ferret habitat. The proposed action would not affect this species.

- **Bonytail Chub (*Gila elegans)***-The area affected does not contain any of the endangered fish. All disturbed waters will be contained by sediments ponds thereby not affecting the amount or quality of the waters draining into the Colorado River Drainage.

- **Colorado Squawfish *(Ptychocheilus lucius)***-The area affected does not contain any of the endangered fish. All disturbed waters will be contained by sediments ponds thereby not affecting the amount or quality of the waters draining into the Colorado River Drainage.

- **Humpback Chub *(Gila cypha)***-The area affected does not contain any of the endangered fish. All disturbed waters will be contained by sediments ponds thereby not affecting the amount or quality of the waters draining into the Colorado River Drainage.

- **Jones Cycladenia *(Cycladenia humilis* var. *jonesii)***- The area affected by the proposed action does not contain suitable habitat for this endangered plant. The proposed action would not affect this plant.

- **Last Chance Townsendia *(Townsendia aprica)***- The area affected by the proposed action does not contain suitable habitat for this endangered plant. The proposed action would not affect this plant.

- **Maguire Daisy *(Erigeron maquirei)***- The area affected by the proposed action does

not contain suitable habitat for this endangered plant. The proposed action would not affect this plant.

- **Razorback Sucker** ***(Xyrauchen texanus)***-The area affected does not contain any of the endangered fish. All disturbed waters will be contained by sediments ponds thereby not affecting the amount or quality of the waters draining into the Colorado River Drainage.

- **San Rafael Cactus** ***(Pediocactus despainii)***- The area affected by the proposed action does contain suitable habitat for this endangered plant. However, none have been identified within the area, and therefore, would not be affected by the proposed action.

- **Winkler Cactus** ***(Pediocactus winkleri)***- The area affected by the proposed action does contain suitable habitat for this endangered plant. However, none have been identified within the area, and therefore, would not be affected by the proposed action.

- **Wright Fishhook Cactus** ***(Sclerocactus wrightiae)***- The area affected by the proposed action does contain suitable habitat for this endangered plant. However, none have been identified within the area, and therefore, would not be affected by the proposed action.

## VI. Listed Species Biological Assessment Summary of Conclusions of Effects

Project Name: BA for Lila Canyon Coal Mine and Associated Facilities

Proposed Action

| Species | No Effect | May Effect- Not Likely to Adversely Affect | Likely to Adversely Affect | Beneficial Effect |
|---|---|---|---|---|
| Bald Eagle | X | | | |
| Barneby Reed Mustard | X | | | |
| Black- footed Ferret | X | | | |
| Bonytail Chub | X | | | |
| Colorado Squawfish | X | | | |
| Humpback Chub | X | | | |
| Jones Cycladenia | X | | | |
| Last Chance Townsendia | X | | | |
| Maguire Daisy | X | | | |
| Peregrine Falcon | X | | | |
| Razorback Sucker | X | | | |
| San Rafael Cactus | X | | | |
| Winkler Cactus | X | | | |
| Wright Fishhook Cactus | X | | | |

## VI. Mitigation

As there were no direct impacts on any of the species no mitigation is recommended at this time.

## VII. Cumulative Impacts

The proposed action as delineated in this BA is exclusive to the potential impacts associated with the construction, operation, and maintenance of the Lila Canyon Coal Mine.

## VIII. Documentation

Reference used to determine the presence (or absence) of Threatened, Endangered, Proposed and Sensitive as well as species characteristics and habitat information include.

Behnke, R.J. and D.E. Benson. 1980. Endangered and Threatened Fishes of the Upper Colorado River Basin Coop. Ext. Serv., Colorado State univ., Fort Collins, Bull. 503A. 34pp.

Boschen, Nelson. 1995. Bald Eagle in Southeastern Utah:1994 Nesting Season

Cade, T.J., J.H. Enderson, C.G. Thelander, and C. M. White. 1988. Peregrine Falcon Populations: Their Management and Recovery. The Peregrine Fund, Inc., Boise. 949 pp.

Kass, Ron 1990. Final Report of Habitat Inventory of Threatened, Endangered and Candidate Plant Species in the San Rafael Swell, Utah. 87 pp.

Ratcliffe, D.A. 1980. The Peregrine Falcon. Buteo Books, Vermillion, SD. 416 pp.

Sigler, W.F. and R.R. Miller. 1963. Fishes in Utah. Utah State Dept. of Fish and Game, Salt Lake City. 203 pp.

Stalmaster, M.V. 1987. The Bald Eagle, Universe Books, New York. 227 pp.

**Bureau of Land Management References**

Resource area wildlife and plant observation and location area records.

USDI BLM manual 6840, Special Status Species Management.

# UTAH AMERICAN ENERGY
# LILA CANYON MINE SURFACE FACILITY AREA

## THREATENED, ENDANGERED, AND SENSITIVE FLORAL SPECIES INVENTORY REPORT

**CONDUCTED**
**April 30th, 2002**

**BY**
**EIS ENVIRONMENTAL AND ENGINEERING CONSULTING**

**31 NORTH MAIN STREET**
**HELPER, UTAH 84526**
**(435) 472-3814**
**FAX- (435) 472-8780**
**www.eisenviro.com**

## Introduction

Utah American Energy has contracted EIS Environmental & Engineering Consulting to conduct a follow-up Threatened, Endangered and Sensitive Species (TES) survey of the Lila Canyon Mine surface facility area. The proposed area is located in Emery County south of Price, Utah within Lila Canyon of the Book Cliffs/Roan Cliffs Plateau Physiographic Region on lands administered by the Bureau of Land Management (BLM). Surveys have been on-going since 1998 in association with NEPA analysis and the Utah Division of Oil, Gas and Mining (UDOGM) mine permitting process. The federal surveys and NEPA preparation were between 1998 and present conducted by EIS (the third party contractor for the BLM, Environmental Assessment No. UT-070-99-22). Several TES species have been identified by the U.S. Fish and Wildlife Service (USFWS) and the BLM through past studies as having the potential of occurring within the general area of the disturbance associated with the proposed Lila Canyon Mine. However, during initial TES inventories over the past three years, various vegetation inventories and formal Section 7 consultation (Lila Canyon Biological Assessment (BA), August 2000) no species were located within the area of the proposed surface mine facilities. Furthermore, with the preparation of the BA and under agency consultation between the USFWS and the Price BLM Field Office (November 2000), a finding of no affect on all federally listed species was determined within the project (surface facility area, mining area, access and utility corridors).

Regardless of the recommendations of federal and state agencies (USFWS, BLM and the Utah Division of Wildlife Resources), concerns raised during the UDOGM permitting period has resulted in the need for additional field work. On April 30th, 2002, using established protocols, federally approved Field Biologists of EIS conducted inventories for five federally listed threatened and endangered floral species believed to occur within this portion of Utah, the Uinta Basin hookless cactus *(Sclerocactus glaucus)*, Wright fishhook cactus (*Sclerocactus wrightiae*), Despain footcactus (*Pediocactus despainii*),Winkler footcactus (*Pediocactus winkleri*), and Last Chance townsendia (*Townsendia aprica*). EIS also conducted inventories for five BLM candidate and sensitive species which occur or have the potential of occurring in Emery, Carbon and Duchesne Counties, including; Tufted cryptantha (*Cryptantha caespitosa*), Creutzfeldt-flower (*Cryptantha creutzfeldtii*), Canyon sweetvetch (*Hedysarum occidentale var. canone*), Low hymenoxys (*Hymenoxys depressa*), and Helenium hymenoxys (*Hymenoxys helenioides*).

During this inventory, the area was also recommended for habitat suitability for other TES floral species which have not come into bloom thus far. These species will be inventoried for at a later date during the peak blooming season. The federally listed threatened, endangered and candidate species include; Jones cycladenia (*Cycladenia humilis var. Jonesii*), Graham beardtonque (*Penstemon grahamii*), Maguire daisy (*Erigeron maguirei Cronq. var. maguirei*), Shrubby reed-mustard (*Schoencrambe suffrutescens*), Barneby Ridge-cress (*Lepidium barnebyanum*), Ute Ladies'-tresses (*Spiranthes diluvialis*), and Barneby Reed-mustard (*Schoenocrambe barnebyi*). The BLM candidate and sensitive species that are occur or have the potential of occurring in Emery, Carbon and Duchesne Counties include; Bicknell milkvetch (*Astragalus consobrimus*), Basalt milkvetch

(*Astragalus subcinereus*), Sedge fescue (*Festuca dasyclada*), Mussentuchit Gilia (*Gilia tenuis*), Entrada rushpink (*Lygodesmia entrada*), Book Cliffs blazing star (*Mentzelia multicaulis var. librina*), Jones indigo-bush (*Psorothamnus ploydenius var jonesii*), Psoralea globemallow (*Sphaeralcea psoraloides*), Thompson talinum (*Talinum thompsonii*).

**Methodology**

Uinta Basin Hookless Cactus

Inventory work for all areas of concern was conducted between 09:00 and 17:00 hours. Areas suspected to contain potential habitat for the Uinta Basin hookless cactus consists of openings in scattered pinyon-juniper woodlands, in association with gravelly hills and terraces on Quaternary and Tertiary alluvium soils in cold desert shrub communities between 4,700 to 6,000 feet elevation, flowering from May to June. As with all the TES species mentioned, if target species were located, field personnel would flag the location, collect voucher specimens, mark the location on a quad-map, and take a photograph of the species and habitat.

Wright fishhook cactus

Inventory work for all areas of concern was conducted between 09:00 and 17:00 hours. Areas suspected to contain potential habitat for the Wright fishhook cactus consists of openings in salt desert shrub to the juniper community at 4,790 to 6,120 feet elevation on the Mancos Shale Formation, flowering from April to May. As with all the TES species mentioned, if target species were located, field personnel would flag the location, collect voucher specimens, mark the location on a quad-map, and take a photograph of the species and habitat.

Despain footcactus

Inventory work for all areas of concern was conducted between 09:00 and 17:00 hours. Areas suspected to contain potential habitat for the despain footcactus consists of open pinyon-juniper community on limestone gravels at 6,000 to 6,200 feet elevation, flowering from late April to early May. As with all the TES species mentioned, if target species were located, field personnel would flag the location, collect voucher specimens, mark the location on a quad-map, and take a photograph of the species and habitat.

Winkler footcactus

Inventory work for all areas of concern was conducted between 09:00 and 17:00 hours. Areas suspected to contain potential habitat for the Winkler footcactus consist of salt desert shrub communities between 4,790 and 5,210 feet elevation, flowering from late March to Mid May. As with all the TES species mentioned, if target species were located, field personnel would flag the location,

collect voucher specimens, mark the location on a quad-map, and take a photograph of the species and habitat.

Last Chance townsendia

Inventory work for all areas of concern was conducted between 09:00 and 17:00 hours. Areas suspected to contain potential habitat for the last chance townsendia consist of salt desert shrub and pinyon-junper comunities on clay or clay silt soils of the Arapien and Mancos Shale formations between 6,100 and 8,000 feet elevation, flowering from April to May.

Tufted cryptantha

Inventory work for all areas of concern was conducted between 09:00 and 17:00 hours. Areas suspected to contain potential habitat for the tufted cyptantha consist of forb-grass, pinyon-juniper, mountain brush, limber pine, and spruce-fir communities on clay soils between 4,950 and 10,235 feet elevation, flowering from May to June.

Creutzfeldt cryptantha

Inventory work for all areas of concern was conducted between 09:00 and 17:00 hours. Areas suspected to contain potential habitat for the creutzfeldt cyptantha consist of shadescale and mat atriplex communities on the Mancos Shale Formation between 5,250 and 6,495 feet elevation, flowering from April to June.

Canyon sweetvetch

Inventory work for all areas of concern was conducted between 09:00 and 17:00 hours. Areas suspected to contain potential habitat for the canyon sweetvetch consist of pinyon-juniper, sagebrush, and wash communities between 5,000 and 8,000 feet elevation, flowering from June to mid-August.

Low hymenoxys

Inventory work for all areas of concern was conducted between 09:00 and 17:00 hours. Areas suspected to contain potential habitat for the low hymenoxys consist of ephedra, sagebrush, shadscale and pinyon-juniper communities of fine silty clay to clay loam soils between 4,400 and 7,120 feet elevation, flowering from late May to June.

Helenium hymenoxys

Inventory work for all areas of concern was conducted between 09:00 and 17:00 hours. Areas suspected to contain potential habitat for the helenium hymenoxys consist of mountain brush, sagebrush, aspen, and meadow communities on clay loam soils between 8,800 and 10,700 feet

elevation, flowering from June to late-August.

**Results**

Uinta Basin Hookless Cactus *(Sclerocactus glaucus)*

A thorough search of all the proposed mine surface facilities did not reveal the presence of Uinta Basin hookless cactus.

Wright fishhook cactus (*Sclerocactus wrightiae*)

A thorough search of all the proposed mine surface facilities did not reveal the presence of Wright fishhook cactus.

Despain footcactus (*Pediocactus despanii*)

A thorough search of all the proposed mine surface facilities did not reveal the presence of despain footcactus.

Winkler footcactus (*Pediocactus winkleri*)

A thorough search of all the proposed mine surface facilities did not reveal the presence of Winkler footcactus.

Last Chance townsendia (*Townsendia aprica*)

A thorough search of all the proposed mine surface facilities did not reveal the presence of last chance townsendia.

Tufted cryptantha (*Cryptantha caespitosa*)

A thorough search of all the proposed mine surface facilities did not reveal the presence of tufted cryptantha.

Creutzfeldt cryptantha (*Cryptantha creutzfeldtii*)

A thorough search of all the proposed mine surface facilities did not reveal the presence of creutzfeldt cryptantha.

Canyon sweetvetch (*Hedysarum occidentale var. conone*)

A thorough search of all the proposed mine surface facilities did not reveal the presence of canyon sweetvetch.

Low hymenoxys (*Hymenoxys depressa*)

A thorough search of all the proposed mine surface facilities did not reveal the presence of low hymenoxys.

Helenium hymenoxys (*Hymenoxys helenoides*)

A thorough search of all the proposed mine surface facilities did not reveal the presence of helenium hymenoxys.

Copies of the field data sheets are included in this report (Attachment 1).

# UTAH AMERICAN ENERGY
# LILA CANYON MINE SURFACE FACILITY AREA

## 2002 FOLLOW UP
## THREATENED, ENDANGERED,
## AND SENSITIVE FLORAL SPECIES
## INVENTORY REPORT

**CONDUCTED**
**MAY 30, 2002**

**BY**
**EIS ENVIRONMENTAL AND ENGINEERING CONSULTING**
**31 NORTH MAIN STREET**
**HELPER, UTAH 84526**
**(435) 472-3814**
**FAX (435) 472-8780**
**www.eisenviro.com**

## Introduction

Utah American Energy has contracted EIS Environmental & Engineering Consulting to conduct a follow-up Threatened, Endangered and Sensitive Species (TES) survey of the 1999 and 2000 surveys conducted for the Lila Canyon Mine surface facility area. The proposed area is located in Emery County south of Price, Utah, and within Lila Canyon of the Book Cliffs/Roan Cliffs Plateau Physiographic Region. The project area is on lands administered by the Bureau of Land Management (BLM). Surveys have been on-going since 1998 in association with NEPA analysis and the Utah Division of Oil, Gas and Mining (UDOGM) mine permitting process. The federal surveys and NEPA preparation were conducted between 1998 and the present by EIS (the third party contractor for the BLM, Environmental Assessment No. UT-070-99-22 and UDOGM Mine Reclamation Plan (MRP)). Several TES species have been identified by the U.S. Fish and Wildlife Service (USFWS) and associated agencies through past studies as having the potential of occurring within the general area of the disturbance associated with the proposed Lila Canyon Mine. However, during initial TES inventories over the past three years, various vegetation inventories and formal Section 7 consultation (Lila Canyon Biological Assessment (BA), August 2000), no species were located within the area of the proposed surface mine facilities. Furthermore, with the preparation of the BA and under agency consultation between the USFWS and the Price BLM Field Office (November 2000), a finding of no affect on all federally listed species was determined within the project (surface facility area, mining area, access and utility corridors).

Regardless of the recommendations of federal and state agencies (USFWS, BLM and the Utah Division of Wildlife Resources), concerns raised during the UDOGM permitting period has resulted in the need for additional field work. On April 30th, 2002 EIS conducted TES surveys for those species which flower earlier in the growing season. On May 30th, 2002, using established protocols, federally approved Biologists and TES surveyors of EIS under direction of David Steed, EIS Project Manager, and in cooperation with Wayne Ludington, Biologist with the Price BLM Field Office, conducted follow up inventories for seven federally listed threatened and endangered floral species believed to occur within this portion of Utah. The follow up inventories were conducted in order to increase the likelihood of encountering the species in question during their peak blooming season. These species included; Jones cycladenia (*Cycladenia humilis var. Jonesii*), Graham beardtonque (*Penstemon grahamii*), Maguire daisy (*Erigeron maguirei Cronq. var. maguirei*), Shrubby reed-mustard (*Schoencrambe suffrutescens*), Barneby ridge-cress (*Lepidium barnebyanum*), Ute Ladies'-tresses (*Spiranthes diluvialis*), and Barneby Reed-mustard (*Schoenocrambe barnebyi*). EIS also conducted inventories for nine BLM candidate and sensitive species which occur or have the potential of occurring in Emery, Carbon and Duchesne Counties, including; Bicknell milkvetch (*Astragalus consobrinus*), basalt milkvetch (*Astragalus subcinereus*), Sedge fescue (*Festuca dasyclada*), Mussentuchit Gilia (*Gilia tenuis*), entrada rushpink (*Lygodesmia entrada*), Book Cliffs blazing star (*Mentzelia multicaulis var. librina*), Jones indigo-bush (*Psorothamnus ploydenius var jonesii*), psoralea globemallow (*Sphaeralcea psoraloides*), and Thompson talinum (*Talinum thompsonii*).

**Methodology**

Jones cycladenia

Areas suspected to contain potential habitat for Jones cycladenia consist of gypsiferous saline soils on the Chinle, Cutler and Summerville formations in cool desert shrub and juniper communities between 4,400 and 6,000 feet elevation, flowering from mid May to June.

Graham beardtongue

Areas suspected to contain potential habitat for Graham beardtongue consist of sparsely vegetated desert shrub and pinyon-juniper communities on shaley talus knolls between 4,600 and 6,700 feet elevation, flowering from May to mid June.

Maguire daisy

Areas suspected to contain potential habitat for Maguire daisy consist of cool, moist mesic wash bottoms and dry, partially shaded slopes of eroded sandstone cliffs. Wingate, Chinle and Navajo Sandstone formations in mountain shrub, Douglas fir, ponderosa pine, and lower limits of the juniper woodland communities between 5,600 and 7,200 feet elevation, flowering from June and July.

Shrubby reed-mustard

Areas suspected to contain potential habitat for shrubby reed-mustard consist of calcareous shale of the Green River Shale formation in shadsscale, pygmy sagebrush, mountain mahogany, juniper, and other mixed desert shrub communities between 5,400 and 6,000 feet elevation, flowering from May to mid August.

Barneby ridge-cress

Areas suspected to contain potential habitat for Barneby ridge-cress consist of white shale outcrops on the Uinta formation in pinyon-juniper (mainly on ridge crests) between 6,200 and 6,500 feet elevation, flowering from May to June.

Ute ladies' tresses

Areas suspected to contain potential habitat for Ute ladies' tresses consist of areas along streams, bogs, and open seepage areas in cottonwood, tamarix, willow, and pinyon-juniper communities between 4,400 and 6,810 feet elevation, flowering from late July to September.

Barneby reed-mustard

Areas suspected to contain potential habitat for Barneby reed-mustard consist of mixed shadscale, eriogonum and ephedra communities on the Chinle formation between 5,600 and 5,700 feet elevation, flowering in May.

Bicknell milkvetch

Areas suspected to contain potential habitat for Bicknell milkvetch consist of sagebrush-grassland and pinyon-juniper communities on the Mancos Shale formation, volcanic gravel, open gravelly or sandy knolls, and barren stony hillsides between 5,200 and 9,000 feet elevation, flowering from May to July.

Basalt milkvetch

Areas suspected to contain potential habitat for basalt milkvetch consist of pinyon-juniper and ponderosa communities between 4,520 and 7,970 feet elevation, flowering between May and July.

Sedge fescue

Areas suspected to contain potential habitat for sedge fescue consist of open slopes and ridges in sagebrush, mountain brush and juniper communities on the Green River Shale formation and limestone gravels between 6,990 and 10,000 feet elevation, flowering from June to August.

Mussentuchit gilia

Areas suspected to contain potential habitat for mussentuchit gilia consist of open habitat of pinyon-juniper woodland, growing on sparsely vegetated, fine textured, pale, poorly cemented limestone, flowering between May and June.

Entrada rushpink

Areas suspected to contain potential habitat for entrada rushpink consist of mixed desert shrub and juniper communities between 4,400 and 4,800 feet elevation, flowering in June.

Book Cliffs blazing star

Areas suspected to contain potential habitat for Book Cliffs blazing star consist of sagebrush, rabbitbrush and pinyon-juniper communities at about 6,200 feet elevation, on Mancos Shale and Price River formations.

Jones indigo-bush

Areas suspected to contain potential habitat for Jones indigo-bush consist of salt desert shrub communities on Mancos Shale formation (Blue Gate and Tununk members) and less commonly elsewhere at approximately 4,820 feet elevation, flowering from May to mid-July.

Psoralea globemallow

Areas suspected to contain potential habitat for psoralea globemallow consist of Zuckia-ephedra communities on saline and gypsiferous Entrada siltstone between 4,000 and 6,000 feet elevation, flowering from mid-May to June.

Thompson talinum

Areas suspected to contain potential habitat for Thompson talinum consist of silicious conglomeratic gravels in pinyon-juniper and ponderosa pine communities at about 7,500 feet elevation, flowering from mid-July to August.

**Results**

Although suitable habitat was within the area for a number of the listed species, none were encountered during this inventory.

Field data sheet and species list included in Attachment 1.

Individuals who participated in this survey include;

M. Dean Stacy, EIS: Environmental & Engineering Consulting
David Steed, EIS: Environmental & Engineering Consulting
Denise Chavez, EIS: Environmental & Engineering Consulting
Wayne Ludington, Price BLM Field Office
Mike Kaminski, Price BLM Field Office
Bobby Tweddell, Price BLM Field Office

I believe the information included in this document to be true and accurate.

M. Dean Stacy, Rangeland Ecology and Watershed Management, M.S.

**ATTACHMENT 1**

**SPECIES INVENTORY LIST**
**AND**
**FIELD DATA SHEET**

*Utah American Energy*
*Threatened, Endangered and Sensitive Floral Species Inventory*
*May 2002*

# SPECIES LIST

## Federal Treatened, Endangered and Candidate Species

### Species

Jones cycladenia (*Cycladenia humilis var jonesii*)
Graham beardtongue (*Penstemon grahamii*)
Maguire daisy (*Erigeron maguirei*)
Shrubby reed-mustard (*Schoencrambe suffrutescens*)
Barneby ridge-cress (*Lepidium barnebyanum*)
Ute ladies'-tresses (*Spiranthes diluvialis*)
Barneby reed-mustard (*Schoenocrambe barnebyi*)

## BLM and State of Utah Candidate and Sensitive Plants

### Species

Bicknell milkvetch (*Astragalus consobrinus*)
Basalt milkvetch (*Astragalus subcinereus var basalticus*)
Sedge fescue (*Festuca dasyclada*)
Mussentuchit gilia (*Gilia tenuis*)
Entrada rushpink (*Lygodesmia entrada*)
Book Cliffs blazing star (*Mentzelia multicaulis var librina*)
Jones indigo-bush (*Psorothamnus polydenius*)
Psoralea globemallow (*Sphaeralcea psoraloides*)
Thompson talinum (*Talinum thompsonii*)

EIS ENVIRONMENTAL CONSULTING
DATA FORM

FLORA SPECIES Sample data form. See attached list for specific speci

Date 5·30·02 Observer D. Steed, D. Stacy, D. Chaver

Survey Start Time 0900 Survey End Time 1400

Weather Conditions clear

Site Lila Canyon Mine USGS Quad

Township 16S Range 14E Section

Proposed Activity (road/well; size of inventory area) Mine surface facilities

approx 50 acres, including 200' buffer

General Habitat Description (vertical structure, dominant vegetative species, topography)

P/J, prickly pear, claret cup, greasewood, Artemesia sp, shadscale

Brassicaceae sp., needle & thread, indian rice grass, Agropyron sp

Soil Characteristics sandy - fine sandy loam

POSITIVE IDENTIFICATION

Number of plants Located NI Flowers Present (Y/N)

Key Characteristic

Other Species Identified

MANAGEMENT OPPORTUNITIES (Mitigation/Habitat Improvement)

# State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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Michael O. Leavitt
Governor
Robert L. Morgan
Executive Director
Lowell P. Braxton
Division Director


September 9, 2002

TO: Internal File

FROM: Susan M. White, Sr. Reclamation Specialist/Biology SMW

RE: Technical Field Visit, Book Cliff's Blazing Star, UtahAmerican Energy, Inc., Horse Canyon Mine, C/007/013

**Other Attendees:** Wayne Luddington (BLM) and Jay Marshall (UEI) attended the Lila portion of the field visit.

**Date & Time:** September 6, 2002 10:00 a.m. to 2:00 p.m.

**PURPOSE:**

The purpose of this field visit was to look for *Mentzelia multicaulis* var. *librina* (Book Cliff's blazing star), a BLM sensitive species, in and adjacent to the disturbed area of the Lila Canyon Mine.

**OBSERVATIONS:**

We began by visiting the town of Columbia where a known population of the Book Cliff's blazing star occurs. The plant was found on naturally occurring slopes and railroad cuts on the Mancos Shale. A robust population was found growing on an area disturbed by the old Columbia Mine. This area had a veneer of coal waste on top of the Mancos Shale. The plant was in various stages of phenology, bud and fruit. No open flowers were found; we didn't know if this was due to the overcast and raining weather.

No Mancos Shale slopes are found on the proposed disturbed area at Lila Canyon. We briefly walked through the site and the plant was not found. Since the habitat wasn't right we didn't look very long.

The south facing Mancos Shale slopes immediately north of the disturbed area were searched for the Book Cliff's blazing star. A population of approximately 15 individuals was found on these slopes. Many of the plants were skeletons of last year's plants. Since this year has been so dry it is assumed that the plants are dormant.

Some small Mancos Shale outcrops occur on the slopes to the south of the proposed disturbed area. We looked at those slopes and did not find the Blazing Star. Crossing the drainage to these slopes we found a sweetvetch. The sweetvetch was small and had not flowered this year. The sweetvetch in this drainage should be identified to determine if the plants are Canyon sweetvetch, a BLM sensitive species.

## OTHER OBSERVATIONS:

- Rain had fallen the day of this site visit. A large storm had been through the area on August 30 (communication from Jay Marshall). Evidence of flows was observed in all drainages. The drainage through the middle of the proposed disturbed area also flowed.
- A piece of chert or chipping was observed in the area to be disturbed. The piece was worked on two sides.
- No evidence of big horn sheep was observed.

## RECOMMENDATIONS/CONCLUSIONS

The Book Cliff's blazing star should not be affected by the current proposed mine disturbance. The sweetvetch in the drainage to the south of the pediment should be identified.

# Assessing The Impact of Scale on the Performance of GIS Habitat Models For Mexican Spotted Owls In Utah

**FINAL REPORT**

**Prepared By**

David W. Willey, Ph.D.,
High Desert Research
509 W. Alderson, Bozeman, MT 59715

**Submitted To:**

**Utah Division of Wildlife Resources**
1596 W. North Temple
Salt Lake City, Utah 84116

**October 2002**

# Assessing The Impact of Scale on the Performance of GIS Habitat Models For Mexican Spotted Owls In Utah

## INTRODUCTION

The Mexican spotted owl (*Strix occidentalis lucida*) was listed as threatened in March 1993 by the U.S. Fish and Wildlife Service (Cully and Austin 1993). The Mexican spotted owl occupies a variety of habitat types throughout the southwest United States including mixed conifer forests; riparian madrean woodland; riparian vegetation; and in Utah, arid canyonlands (USDI 1995, Willey 1995). Spotted owl populations may be declining in Arizona and New Mexico (Seamans et al. 1999) where the owl is strongly associated with montane forests susceptible to wildfire (Gutierrez et al. 1995). The population status of spotted owls in the canyonlands of Utah has not been determined and, in that region, most research has focused on habitat associations (Willey 1998), inventory of potential habitat (Johnson and Reynolds 2001), and informal territorial monitoring (Charlie Sheltz, NPS Biologist, Canyonlands National Park, pers. comm.). Due to potential conflicts between maintenance of appropriate nesting habitats and human-related activities, e.g., timber management, exploration for gas and oil, and livestock grazing, habitat planning tools are needed by wildlife and natural resource managers (e.g., see Fig. 1).

Using the ArcInfo geographic information system (GIS), Willey and Spotskey (1997, 2000) used spotted owl life history data and physical landscape features (e.g., geology, slope, aspect) to create predictive the extent of potential Mexican spotted owls breeding habitat in Utah (Figs 2 and 3). They produced GIS models that were designed to be used by wildlife managers at two different scales: 1) the 1997 model (Fig. 2) predicted the location of breeding habitat at the state-wide scale (1:500,000 map scale); and 2) the 2000 model (Fig. 3) was [both built at 100 m pixel scale - it's about intent of use] designed for planners to zoom in to a project-level scale ($\leq$ 1:100,000 map scales). The 2000 model was intended for detailed analysis of habitat features to support the design of field surveys or to designate important habitats for protection.

The *Recovery Plan for Mexican Spotted Owls* (USDI 1995) recommended protecting spotted owl territories by designing Protected Activity Centers (minimum 600 acre zone) around known owl nest and roost sites. Further, the plan strongly encouraged inventory of potential habitat that may be affected by human activities. GIS models can help support these recovery and management objectives by providing reasonable estimates of the distribution of vital habitat. This is particularly true when models are field tested. Although the 2000 model has been field tested and shown to be very effective (e.g., Willey and Spotskey 2000), standards for the application of the GIS models have not been developed, and planners are faced with a dilemma: where and when can the models be used appropriately? Misuse of GIS models could have important ramifications for management of habitat in Utah, therefore, the current study was designed to contrast the performance of the two spotted owl habitat models in Utah and provide recommendations for their use.

**Relevant Background Information**

Spotted owls *(Strix occidentalis)* are placed within the genus *Strix*, which includes the barred owl (*S. Varia*) and the great gray owl (*S. nebulosa*) in North America (AOU 1957:285). Although spotted owls and great gray owls are not considered close relatives, the barred and spotted owl have hybridized in the Pacific Northwest after approximately three decades of sympatry (Hamer et al. 1994). Both spotted and barred owls are considered forest adapted species and may be ecological replacements due to their broadly-similar habitat requirements (Haney 1997).

Three subspecies of spotted owl are recognized in North America: the Mexican spotted owl (*S. o. lucida*), the Northern spotted owl (*S. o. caurina*), and the California spotted owl (*S. o. occidentalis*). A recent genetic study found one major allelic difference between the coastal subspecies (i.e., *caurina* and *occidentalis*) and the Mexican subspecies (Barrowclough and Gutiérrez 1990). Regional genetic differences may also occur at the sub-population level for *lucida*, with spotted owls in Utah showing distinct genetic variation from populations south in Arizona and New Mexico (Barrowclough et al. 1999).

Spotted owls are distributed throughout the pacific northwest, California, and the southwest U.S. and northern Mexico and are typically associated with late seral forests with high crown closure (Forsman et al. 1984, Ganey and Balda 1989a,b,&1994, Bias and Gutieérrez 1992, Blakesley et al. 1992, Hunter et al. 1995, Forsman and Giese 1997, Grubb et al. 1997, LaHaye et al. 1997, Ripple et al. 1997). Because of perceived dependence on forest vegetation, spotted owls have been a focus of controversy over management of mature forests and canyonland habitats across the west (e.g., Anderson and Mahato 1995, Lamberson et al. 1997).

The Northern and Mexican spotted owls are listed as threatened under the Endangered Species Act (Gutierrez et al. 1995). Timber management practices and catastrophic wildlife have been recognized as the primary threats to the owls and their habitat (Smith 1990, Smith 1991, Cully and Austin 1993, USDI 1995). The breeding range of the Mexican spotted owl extends from the southern Rocky Mountains south to the end of the Mexican Plateau. Although widely distributed in forest habitats in the Southwest, the Mexican spotted owl also inhabits relatively open canyon country along the northwest edge of its range. For example, early published records from Utah date back to the 1920s and include places like Zion National Park (Hayward et al. 1976), Glen Canyon (Atwood et al. 1980), Capitol Reef and Canyonlands National Parks, and Dinosaur National Monument (Willey 1998). Rinkevich (1991) and Willey (1995) located numerous nesting pairs scattered across Utah's canyon country, and the owl is strongly associated with steep sandstone canyons. Vegetation in this region is dominated by Great Basin Desert Scrubland and Great Basin Conifer Woodland communities (Brown 1982).

## PROJECT OBJECTIVES

The GIS habitat models for Utah identified large tracts of un-surveyed potential habitat on BLM lands surrounding the city of Price (Fig. 1). Land management in this region has traditionally included proposed BLM wilderness study areas (WSA), livestock grazing, active and proposed mineral and oil/gas resource development project areas, and non-wilderness recreation zones (David Mills, Wildlife

Biologist, Price BLM). Spotted owls have been located within the study area along the Green River in lower Desolation Canyon (Willey 1998). Overall, the goal of this analysis is to support spotted owl management in the region by evaluating the performance of the GIS models and discussing their appropriate scale and application.

This project had the following specific objectives:

**1.** To conduct helicopter over-flights within four project areas in the Price region to visually evaluate the performance of GIS models.

**2.** To conduct a contrast of the two GIS models using image overlays for these Project Areas: Barrett Project Area adjacent to 9-mile Canyon; the Pine Creek Project Area; the Little Park Wash Project Area; and the Drunkard Project Area.

**3.** To provide recommendations regarding the application and scope of the GIS models near Price, Utah.

## METHODS

### Study Areas

The BLM Price Field Office is located within the Colorado Plateau physiographic province of the southwestern United States (Thornbury 1965, Brown 1982). This region includes an important habitat concentration in Desolation Canyon (DESO), located approximately 40-km northeast of Price in east-central Utah. The four project areas are located nearby the city of Price in surrounding canyonlands. All four areas are characterized by entrenched canyonlands rimmed by high cliff faces, stair-step benchlands, numerous side-canyons, and high plateaus. The areas possess riparian and upland vegetation types along canyon bottoms, with montane vegetation present along the upper reaches of side-canyons, pinyon juniper habitat along mid-elevation slopes, and mixed conifer at the highest elevations. Vegetation included within riparian habitats is dominated by Fremont Cottonwood (*Populus fremontii*). Uplands are dominated by pinyon-juniper forest, often including blackbrush (*Coleogyne ramosissima*) and curl-leaf Mahogany (*Cercocarpus ledifolius*) with indian ricegrass (*Stipa hymenoides*) in the understory, and montane highlands are composed of mixed-conifer forest.

### Model Evaluation

The 1997 and 2000 GIS models were used to identify potential spotted owl habitat within the four project areas (Figs 4, 5, 6, and 7). In the first phase of the this project, field maps were produced for each area using ArcView GIS and used for reference during helicopter overflights of each project area. During the flights, each project area was inspected from approximately 500 feet above-ground-level. At each project area, the extent of potential spotted owl breeding and roosting habitat was determined by visual inspection and traced on 7.5 minute USGS topographic quads. The extent of potential habitat was identified to the nearest 100 meters and outlined on the field maps for comparison with the GIS models. During the second phase of this work, the 1997 and 2000 model predictions were overlaid with the over-flight field maps using the ArcView 3.2 GIS. Performance of the GIS models was assessed by comparing the prediction of the GIS maps with the extent of habitat identified during the over-flights.

GIS Model Characteristics

The 1997 GIS model for spotted owl breeding habitat in Utah was designed to be used at a regional scale (i.e., >1:100,000 map scale) to identify landscapes with potential for spotted owl territories. The model identified regions that could be used for roosting and nesting by spotted owls and also identified landscapes that might be of marginal value during non-breeding months (e.g., October-February). Three habitat layers were depicted by the 1997 model: white pixels showed non-suitable habitat; yellow pixels showed marginal habitat; and green pixels identified potential breeding habitat (Fig 2). The 1997 GIS model used the following data themes, or layers (100-m pixel minimum mapping unit): slope, aspect, slope curvature (ruggedness) and vegetation . The 2000 GIS habitat model for spotted owl breeding habitat (Fig. 3) was designed as a multi-scale tool to operated across various map scales, e.g., from 1:24,000 and greater ("fine to coarse grains"). It was designed to allow managers to locate broad landscapes with habitat potential and then zoom to the fine grain to classify individual 100 meter by 100 meter pixels. Thus, the 2000 model was designed to work at various spatial scales to indicate broad landscapes as well as detailed patches where potential spotted owl breeding habitat could occur. Further, the 2000 model identified areas that could be used for roosting and nesting during the

breeding season (March-September). The 2000 model used a larger number of GIS data layers than the 1997 model, including: slope, aspect, slope curvature (ruggedness), vegetation (at the species level), surface geology, soil moisture, and an index to surface temperature. These themes provided the detail needed to identify habitat at a fine grain (Willey and Spotskey 2000).

## RESULTS AND DISCUSSION

### GIS Model Assessment and Recommendations: Pine Creek Project Area

The performance of the GIS models was evaluated within the Pine Creek project area. The 1997 model identified owl habitat throughout the project area (Fig.4). In contrast, the 2000 model identified 2 small isolated patches of habitat located on steep north-facing slopes located in the east portion of the project area. Following the aerial inspection during results of the over-flight, the 1997 model appeared to contain significant errors of "commission" (habitats were included that are not suitable for spotted owl nesting or roosting). For example, the 1997 model classified unsuitable low angle scree and talus slopes, and hot south-facing slopes, as suitable spotted owl nest and roost habitat. In contrast, the 2000 model omitted these unsuitable habitat types and correctly classified two steep canyon habitat patches that were present and identified during the field examination. In conclusion, the 1997 model incorrectly classified much of the project area as suitable (significant errors of commision). Overall, the Pine Creek project area represents unsuitable habitat for spotted owls because only two isolated roost habitat fragments, identified by the 2000 model, are included in the study site. The bulk of the project does not warrant surveys for Mexican Spotted Owls due to an overall lack of suitable habitat. However, new guidelines for use of the 2000 habitat model have been developed by the U.S. Fish and Wildlife Service. (Laura Romin, personal communication, December 2002). It is recommended that each 100 X 100- meter pixel identified by the 2000 model as suitable habitat within the Pine Creek Project Area receive a 0.5 mile circular buffer radius (i.e.,0.5 mile outward from the pixel center). All buffered areas require establishment of spotted owl calling stations designed for complete coverage of the buffered zone, with

each point called four times during two consecutive survey years following the standardized protocol for inventory of spotted owls (e.g., USDI 1991).

## GIS Model Assessment and Recommendations: Dry Park Wash

The performance of the GIS models was evaluated within the Dry Park Wash (Lila Mine) project area (Fig. 5). The 1997 model identified breeding habitat throughout the main wash running North-South through the project area. In addition, the majority of remaining land with the project area outside of prime habitat was classified as marginal. In contrast, the 2000 model identified only four patches of suitable habitat on steep north-facing slopes located in the east portion of the project area adjacent to a BLM WSA boundary. Based on the overflight analysis, the 1997 model was consistently identifying unsuitable south-facing and low angled slopes as suitable habitat, and thus committing significant errors of commission. The 1997 model incorrectly classified much of the project area as suitable (green pixels) and the remainder of the area as marginal (Fig. 5). The 2000 model correctly classified several potential cliff faces as suitable roost and nesting habitat. Overall, the Dry Park Wash project area represents unsuitable habitat for spotted owls except for a few isolated habitat fragments identified in the east section, all of which were identified correctly by the 2000 model. Although it is likely that there is insufficient suitable roost and nest habitat within the project area for establishment of a breeding territory, most of the project are represents suitable mid-elevation winter habitat for migrating adults and dispersing juveniles (Willey 1998, Willey and Van Riper III 2000).

Management actions recommended for the Lila Mine project area include: 1) each 100 X 100-meter pixel identified by the 2000 model as suitable habitat within the Project Area receive a 0.5 mile circular buffer radius (i.e.,0.5 mile outward from the pixel center); 2) All buffered areas should include the establishment of spotted owl calling stations designed for "complete coverage" (as defined by the inventory protocol) of the buffered zone; 3) each called point should be surveyed four times a year during

two consecutive survey years; and 4) the survey design must follow the standardized protocol for inventory of spotted owls (e.g., USDI 1991, amended 2002).

## GIS Model Assessment and Recommendation: Barrett Project Area

The performance of the GIS models was evaluated within the Bill Barrett project area. This area contains several premier sections of steep-walled rocky canyon habitat for spotted owl nesting and roosting located within sections of 9-mile Canyon, Dry Canyon, Cottonwood Canyon, and lower Jack's Canyon (Fig. 6). The lower reaches of these canyons represent some of the best rocky canyon habitat in the Price, Utah and Desolation Canyon region, and spotted owl territories have been located nearby the project area (Willey 1995, 1998).

The 2000 model identified large sections of suitable breeding habitat in the main canyon corridors throughout the project area. These habitats are characterized by parallel-sided vertical rocky cliffs that rim the canyons. As determined by comparison with maps produced during the aerial inspection using a helicopter, the 2000 GIS model correctly classified the steep cliff habitats that are present in the project area, and furthermore, the 2000 GIS model did not incorrectly classify suitable habitat (no obvious errors of omission or commission). In contrast, the 1997 model misclassified habitats, frequently including unsuitable low-angled terrain that was south-facing or less than vertical. The 1997 model incorrectly included pixels from within the low-slope Pinyon-Juniper uplands surrounding the canyons. These uplands are composed of open Pinyon-Juniper forests and open grasslands distributed across rolling hills and dry washes with virtually no vertical-walled suitable roosting or nesting habitat for spotted owls.

Management actions recommended for the Bill Barrett project area are suggested only for those areas identified by the 2000 GIS model that have not been surveyed for spotted owls. Furthermore, the following recommendations include only those pixels that are isolated from the canyon floor (e.g., pixels that are identified on the plateau uplands above the canyon rims). For these isolated pixels: 1) each 100 X 100- meter pixel identified by the 2000 model as suitable habitat must receive a 0.5 mile circular buffer

radius (i.e., 0.5 mile outward from the pixel center); 2) All buffered areas should include the establishment of spotted owl calling stations designed for "complete coverage" (as defined by the inventory protocol) of the buffered zone; 3) each called point should be surveyed four times a year during two consecutive survey years; and 4) the survey design must follow the standardized protocol for inventory of spotted owls (e.g., USDI 1991, amended 2002).

## GIS Model Assessment and Recommendations: Drunkard Project Area

The performance of the GIS models was evaluated within the Drunkard project area (Fig. 7). It is important to note that this project area is dominated by lowland and mid-elevation Pinyon-Juniper forests and grass-shrublands dispersed among shallow washes, low hills and open valleys in the central and east portions of the project area. All of these lowland habitats are unsuitable for Mexican spotted owls and model output in these areas represents errors of commission by both habitat models, i.e., isolated small north-facing cliffs were erroneously included in the GIS models but do not represent suitable nest or roost habitat.

However, along the extreme western edge of the project area, several steep montane canyons do include sections of potential spotted owl nest and roost habitat and warrant further study. In particular, the upper reaches of these canyons do possess potential rocky canyon habitat for spotted owls. Furthermore, it should be noted that the upper one-third of north-facing slopes in these western canyon are covered by steep slope mixed-conifer forest habitat that are protected by the Recovery Plan for Mexican Spotted Owls (USDI 1995) and warrant survey work for spotted owls before habitat altering activities can be conducted. Overall, the 2000 habitat model identified numerous pixels of suitable breeding habitat in the upper reaches of canyons located along the west edge of the project area (Fig. 7).

The 2000 model also classified 3 suitable areas identified on north-facing cliffs in the eastern portion of the project area. The 2000 model incorrectly classified these north-facing cliffs as suitable and appeared to be biased by slope and aspect features, i.e., these cliffs are slope-aspect outliers that do

not represent suitable nesting habitat (Dan Spotskey, GIS specialist, Grand Canyon, pers. comm.). In contrast, the 1997 model identified unsuitable low-slope and moderate-slope terrain throughout the central and eastern valleys and dry washes of the project area and was clearly committing gross errors of commission. Based on the over-flight examination, the 1997 model was strongly misclassifying south-facing and low angled slopes as suitable breeding habitat.

The over-flight inspection and the 2000 habitat model identified several potential habitat areas in the west and extreme north-west corner of the Drunkard project area that warrant field surveys for spotted owls before habitat altering activities should proceed (Fig. 7). Management actions recommended for the project area include:

**A)** Do not survey for spotted owls in the eastern two-thirds of the entire project area.

**B)** For isolated pixels in the western one-third of the project area: 1) each 100 X 100- meter pixel identified by the 2000 model as suitable habitat within the Project Area receive a 0.5 mile circular buffer radius (i.e.,0.5 mile outward from the pixel center); 2) All buffered areas should include the establishment of spotted owl calling stations designed for "complete coverage" (as defined by the inventory protocol) of the buffered zone; 3) each called point should be surveyed four times a year during two consecutive survey years; and 4) the survey design must follow the standardized protocol for inventory of spotted owls (e.g., USDI 1991, amended 2002).

**C)** For major canyons (greater than 2-km long and not more than 2-km wide) with suitable habitat identified by the 2000 GIS model that are located in the western one-third of the project area: establish spotted owl calling stations designed for "complete coverage" (as defined by the inventory protocol) within all portions of suitable canyons; 3) each called point should be surveyed four times a year during two consecutive survey years; and 4) the survey design must follow the standardized protocol for inventory of spotted owls (e.g., USDI 1991, amended 2002). In additional, surveys for spotted owls area recommended within all steep-sloped ($\geq$40% slope) mixed-conifer forest stands.

## CONCLUSIONS AND ADDITIONAL RECOMMENDATIONS

The helicopter over-flights provided an efficient mechanism for inspecting spotted owl habitat in the Price region. All four project study areas were inspected visually from various altitudes and angles AND generated a detailed assessment of the distribution of potential spotted owl habitat in the project areas. In general, the 1997 model performed poorly at the fine grained scale within the project areas, but given it's original design, this was not an unexpected outcome. For example, the 1997 model consistently misclassified south-facing slopes as suitable spotted owl breeding habitat, thus the 1997 model does not perform well at the 1:24,000 map (fine grained) scale. However, the 1997 model is still a useful tool for managers and planners seeking information about broad distribution patterns of spotted owl habitat at regional scales (e.g., >1:100,000 map scale). The 1997 model can be used as a first approximation of the distribution and extent of habitat at state-wide scales to prioritize broad survey areas and alert managers that spotted owls may be present in their management region. The 1997 model should not be used at fine scales (i.e., less than 1:100,000) because of its high level of habitat misclassification.

The 2000 habitat model performed extremely well at all scales, but was particularly informative at the fine grain. The 2000 model consistently identified steep rocky canyon habitat that was present in four independent test areas in the Price region and matched the qualitative results of aerial over-flights. The 2000 model did not miss any key habitats for spotted owls in this region (no apparent errors of omission). Furthermore, because the 2000 model correctly identified habitat at the regional scale, it can serves as a scale-independent GIS model for land planners concerned with management of Mexican spotted owls in Utah. Managers and wildlife biologists are encouraged to use the 2000 GIS model for planning decisions that require resolution at scales <1:100,000. Inventory and clearance projects that rely on the 1997 model to identify the boundaries of project areas and locations of spotted owl calling points may greatly over-represent suitable spotted owl habitat and run the risk of misusing limited funds available for surveys.

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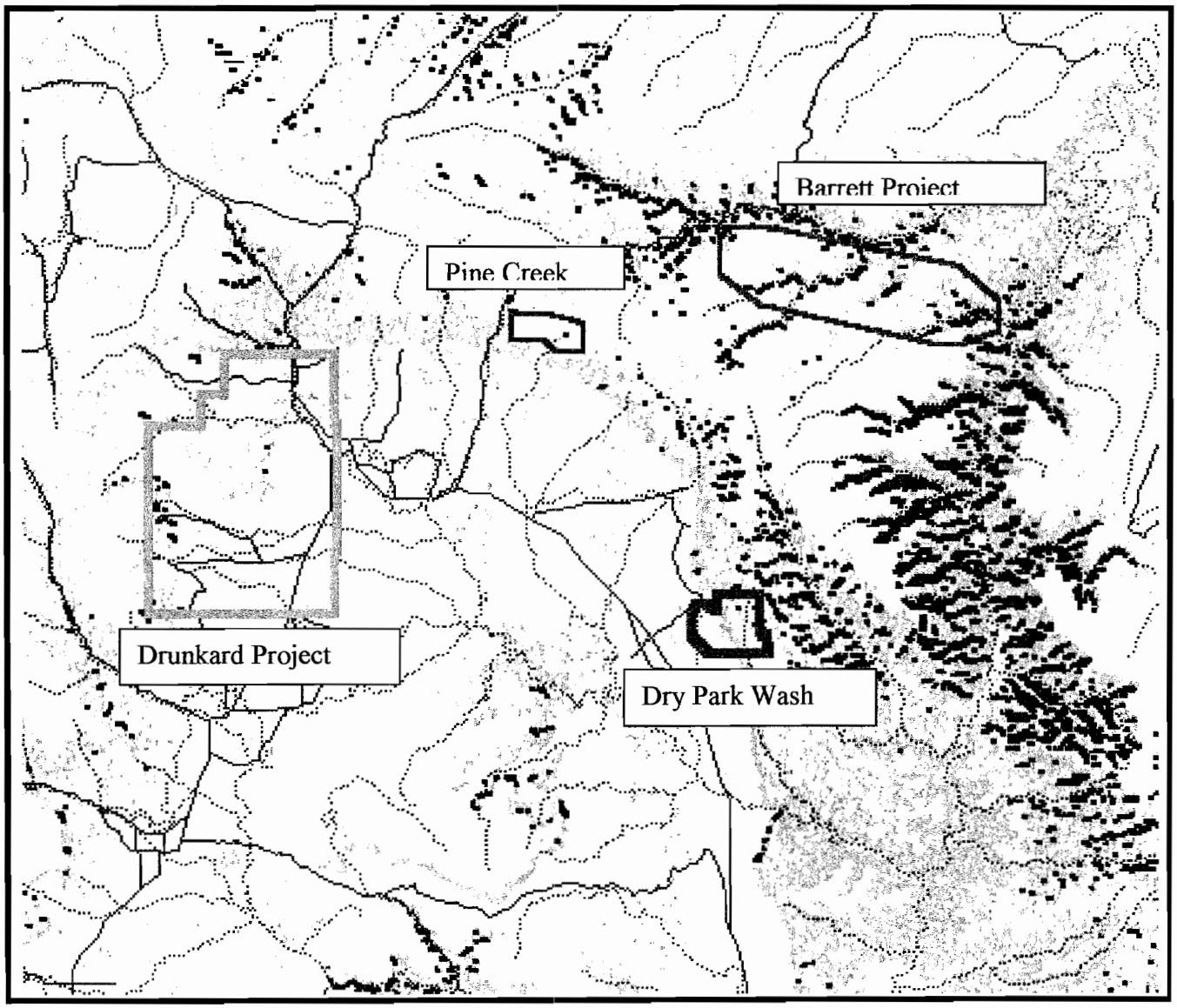


Figure 1. GIS Habitat predictions in the Price, Utah region, for Mexican Spotted owls. Black pixels show 2000 GIS model rocky canyon breeding habitat; Green pixels show 1997 breeding habitat; yellow pixels show 1997 marginal habitat. Study areas: Bill Barrett area outlined in red; Pine Creek outlined in pink; Dry Park Wash in blue; and the Drunkard project area outlined in purple. Also shown are roads (black lines) and watercourses (blue dashes).

Figure 2. Map showing the prediction of the 1997 GIS Mexican spotted owls habitat model. Green pixels show 1997 breeding habitat, yellow pixels represent marginal habitat; white pixels show habitat that is not predicted suitable for spotted owls in Utah.

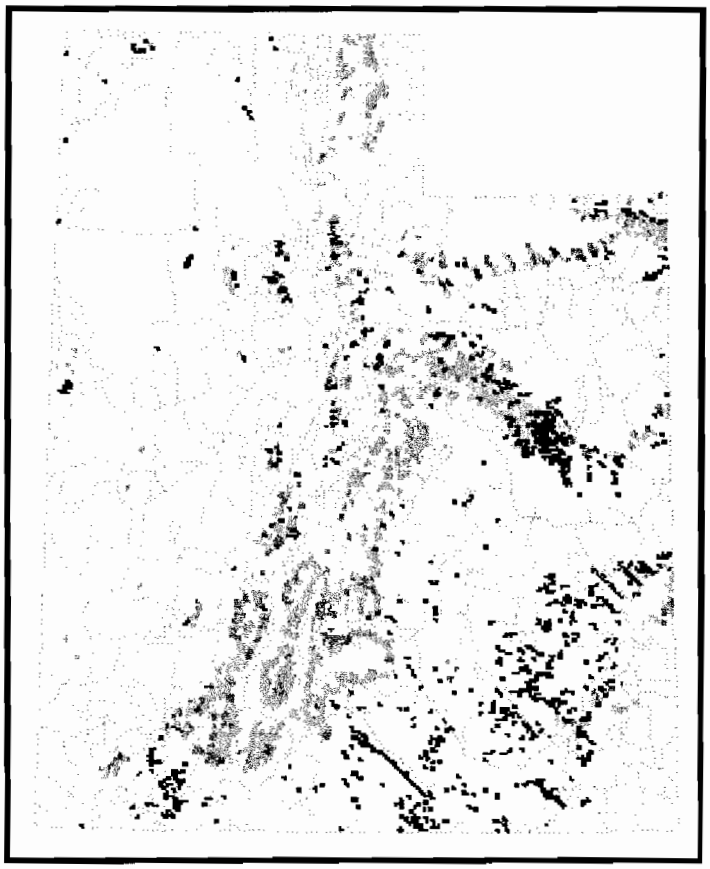

Figure 3. Map output showing the 2000 GIS Mexican spotted owl predicted breeding habitat. Black pixels show potential rocky canyon breeding habitat; green pixels show mixed-conifer forest breeding habitat defined by the Recovery Plan.

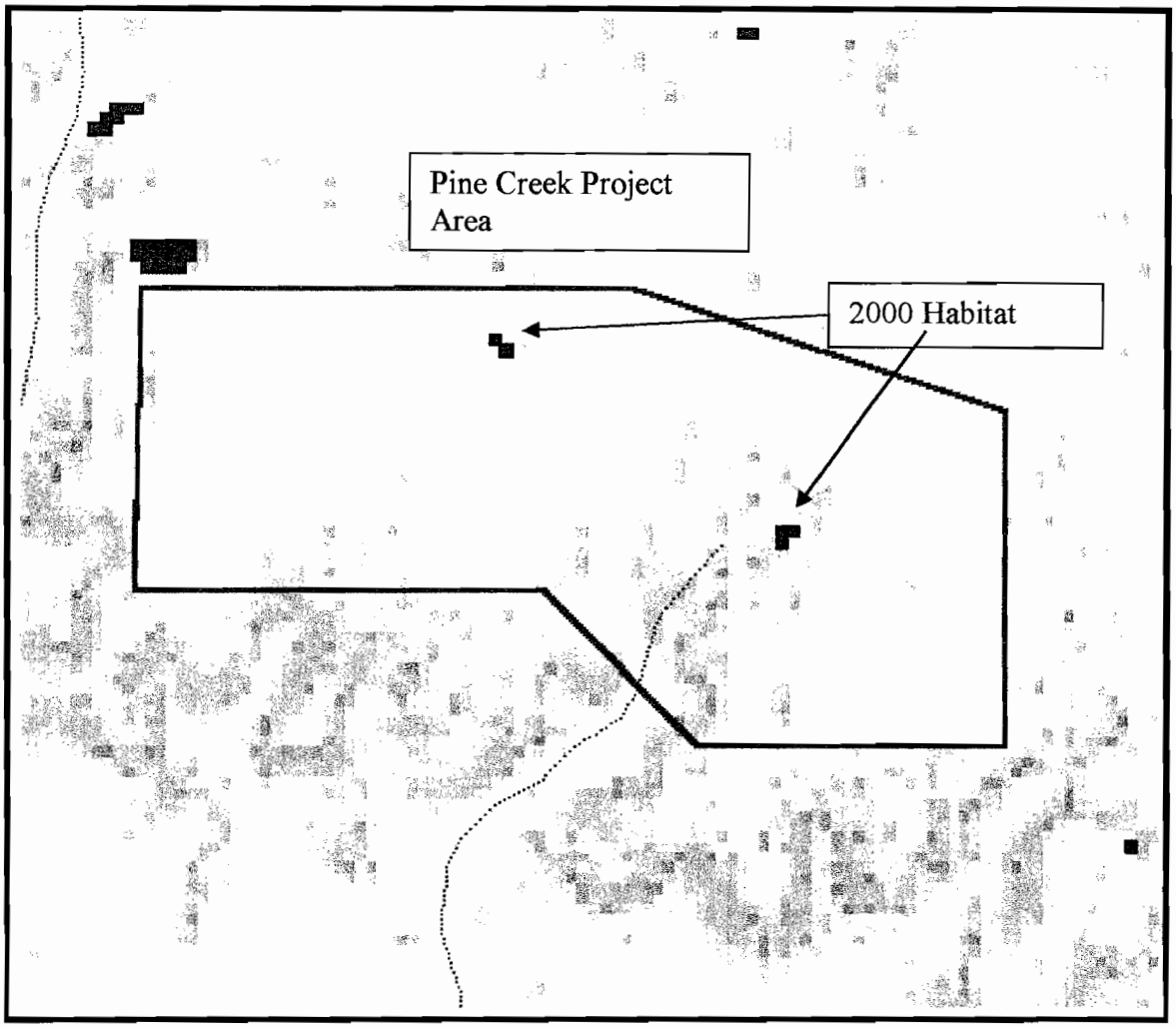


Figure 4. Pine Creek Project Area. Black pixels show 2000 GIS model predicted breeding habitat pixels. Green pixels show 1997 breeding habitat pixels, and yellow pixels represent marginal habitat.

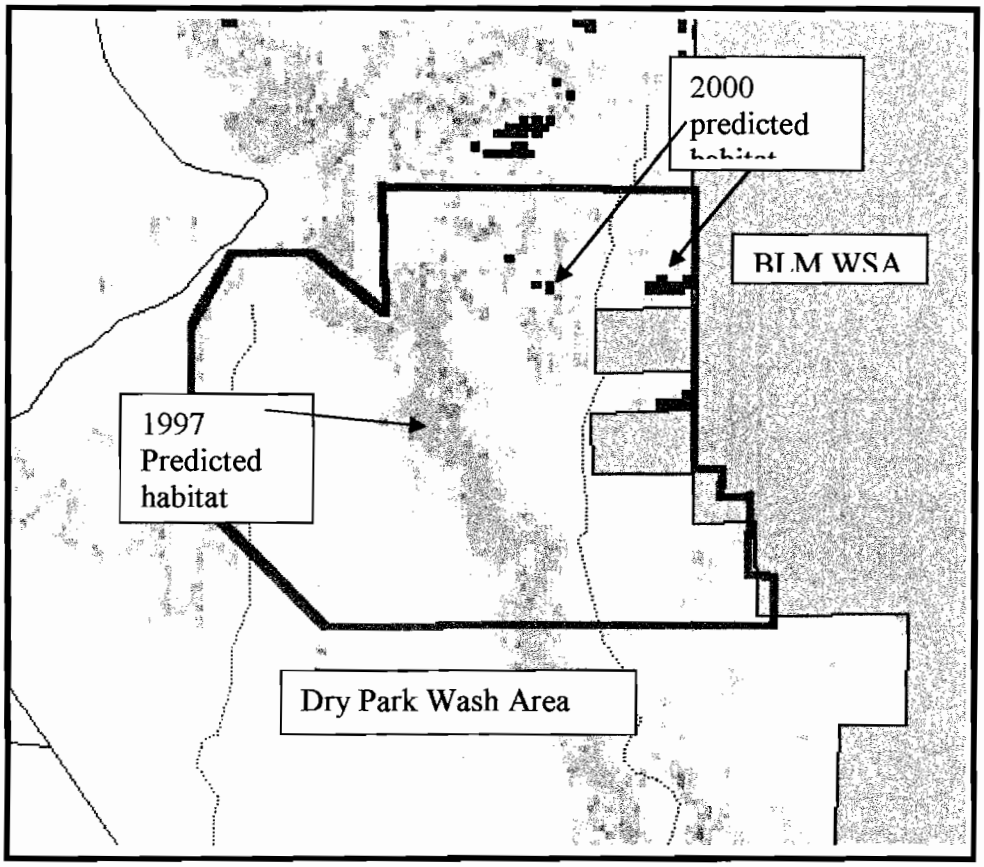


Figure 5. Dry Park Wash Project Area showing BLM Wilderness Study Area boundary; 2000 model prediction in black pixels; and the 1997 predictions in yellow and green pixels.

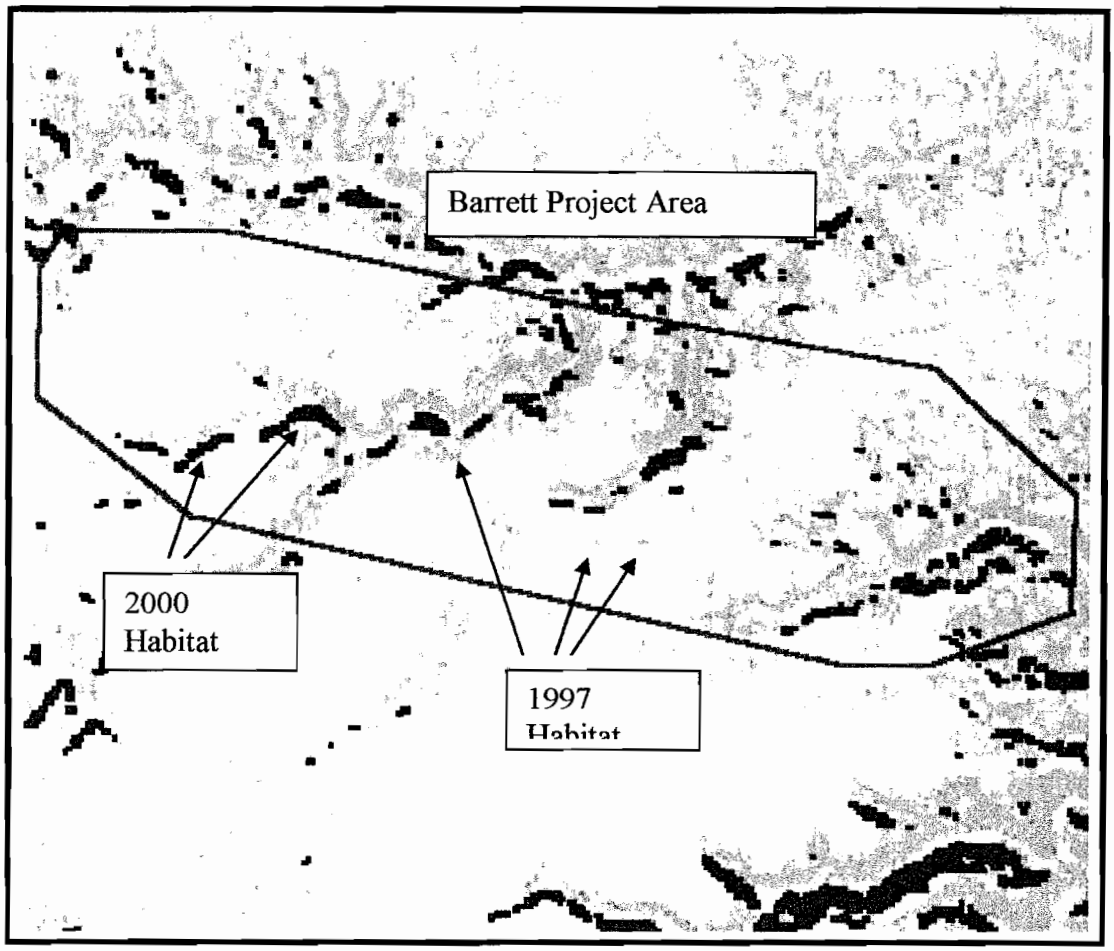


Figure 6. Barrett Project Area showing 2000 model and 1997 model predictions of potential spotted owl habitat.

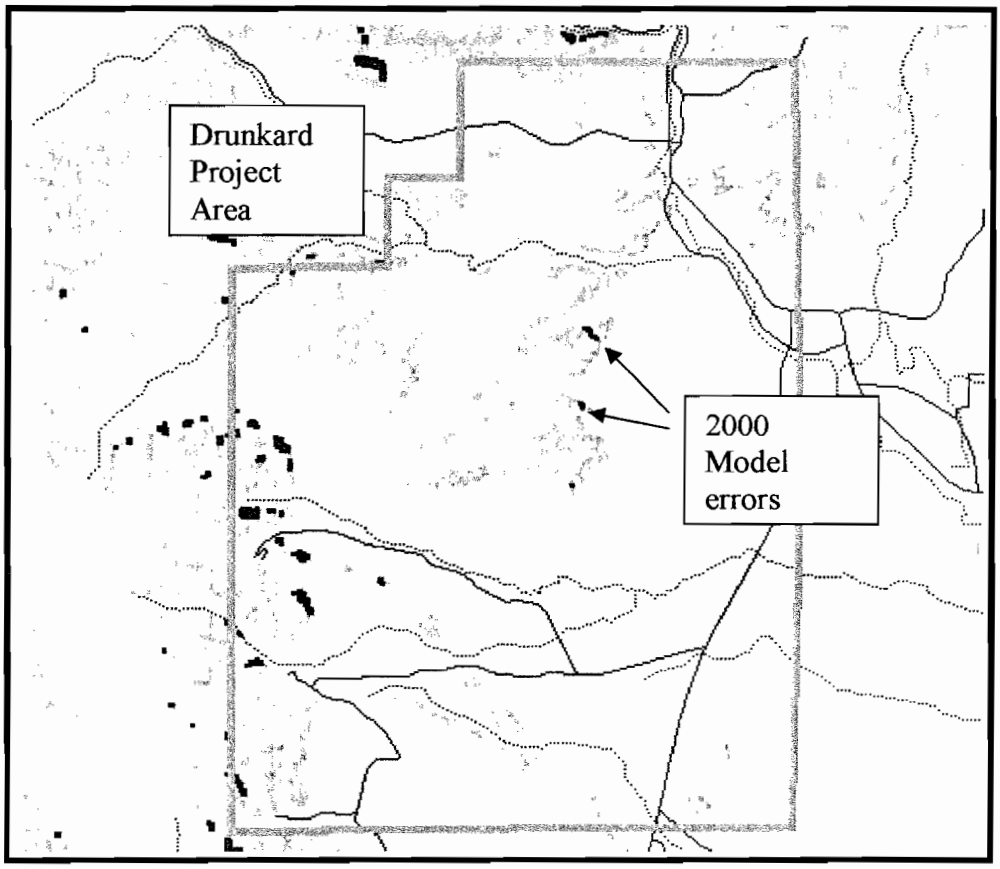


Figure 7. Drunkard Project Area southwest of Price, Utah, showing 1997 (green and yellow pixels) and 2000 (Black pixels) model predictions.

## Summary of Mexican Spotted Owl Habitat Survey
### Within The Lila Canyon Coal Lease Area

The Lila Canyon Mine lies approximately 1.5 miles from an area designated as critical habitat for the Mexican Spotted Owl (*Strix occidentalis lucida*)(MSO). Even though the actual mine site surface facility area has been deemed unsuitable habitat by way of a cooperative survey by Frank Howe, Utah Division of Wildlife Resources (UDWR), Ms. Susan White, Utah Division of Oil, Gas and Mining (UDOGM) and M.A. Coonrod of the consulting firm EIS Environmental and Engineering Consulting (EIS).

In 2002 Dr. David W. Willey performed an overflight of the Lila Canyon Area. His results and management recommendations can be found in his Final Report dated October 2002. His study was completed in two phases.

> In the first phase, field maps were produced using ArcView GIS and used for reference during helicopter overflights. During the flight, the Lila Canyon Area (Dry Wash) was inspected from 500 feet above-ground-level. The extent of potential spotted owl breeding and roosting habitat was determined by visual inspection and traced on 7.5 minute USGS topographic quad map. The extent of potential habitat was identified to the nearest 100 meters and out lined on the field maps for comparison with the GIS models.
>
> During the second phase, the 1997 and 2000 model predications were overlaid with the over-flight field maps using the ArcView 3.2 GIS. Performance of the GIS models was assessed by comparing the prediction of the GIS maps with the extent of habitat identified during the over-flights.

Dr Willey's recommendations for Lila Canyon (Dry Wash) were:

1) each 100 x 100 meter pixel identified by the 2000 model as suitable habitat within the Project Area receive a .5 mile circular buffer radius (i.e., .5 mile outward from the pixel center);
2) All buffered areas should include the establishment of spotted owl calling stations designed for "complete coverage" (as defined by the inventory protocol) of the buffered zone;
3) each point should be surveyed four time a year during two consecutive survey years; and
4) the survey design must follow the standardized protocol for inventory of spotted owls (e.g., USDI 1991, amended 2002).

UtahAmerican Energy Will:

1) Preclude any surface disturbance within a 0.5 mile circular buffer radius of any 100 x 100 meter pixel identified by the 2000 model as shown on Figure 5 of Dr.

Willey's October 2002 final report. The buffer will remain in effect until the Formal MSO survey is completed..

2) Formal MSO surveys will commence two years prior to the potential occurrence of subsidence in areas described below:

   A) areas identified as potential habitat in the 2000 model and confirmed as potential habitat by Dr. Willey in his October 2002 report;
   B) and those identified areas are within the area of influence from subsidence.

   UEI will establish spotted owl calling stations designed for "complete coverage" (as defined by the inventory protocol) of the buffered zone; each point will be surveyed four times a year during two consecutive survey years; and the survey design will follow the standardized protocol for inventory of spotted owls (e.g., USDI 1991, amended 2002) or any new subsequent protocol that may be effect at the time.

3) In areas outside the limit of projected subsidence, NO additional surveys will be required.

Any inventories and surveys that may be conducted will be submitted to DOGM, UDWR and USFWS.

The Division and UDWR will be provided the following information from the MSO calling survey.

1) Surveyor name (DOGM requires a copy of license to conduct MSO)
2) Methods
3) Results
4) Raw data sheets
5) Maps showing exact locations (GPS) of habitats
6) Analysis
7) Summary
   A) Occupied and suitable habitat.
   B) Possible impacts to owls and their habitat by the project.

Since the surface facility area and a 1 mile buffer zone around the surface facility area has been determined not to be suitable MSO habitat, no additional inventories are warranted.