

SITE CONSERVATION PLAN

for the

GOLD BUTTE PAKOON DESERT WILDLIFE MANAGEMENT AREA in the Northeastern Mojave Recovery Unit



**U.S. Dept. of Interior
Fish & Wildlife Service**



**Nevada Field Office
The Nature Conservancy**



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FINAL DRAFT

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CHAPTER 1

INTRODUCTION

Purpose

Wildlife habitat loss continues to escalate in Southern Nevada as urban growth advances outward from rapidly expanding urban centers. In response to this encroachment, large-scale ecosystem plans, such as the Desert Conservation Plan (DCP) (RECON 1994), have called for an umbrella document to coordinate and guide management efforts in conservation zones known as Desert Wildlife Management Areas (DWMAs). Since multiple land and wildlife management agencies must be represented in such a plan, it is essential that they have a unified strategic focus for their conservation activities. The strategies presented in such a plan should not be limited to what is feasible under current political or agency mandates, but should be a biologically based suite of recommended conservation actions. This affords each agency the flexibility to determine which of the conservation actions they can adopt into their respective management plans. Strategies that require the involvement of more than one agency or landowner may be necessary to achieve the goals of the plan, and should not be discounted or artificially segregated by current land management status. Rather, the involved land managers should explore ways to work collaboratively, and thus be better able to budget time, resources, and personnel accordingly.

The recent effort by land management agencies to adopt ecosystem-scale conservation measures means that management efforts must preserve components of biodiversity at multiple scales. This can be accomplished through the preservation or restoration of the ecological processes that are necessary to maintain the evolutionary potential and viability of target species and systems. An expanded site conservation planning framework is therefore needed to facilitate implementation of ecological-process-based conservation for sites of any spatial scale or level of complexity (TNC 1994). Toward this end, the establishment of DWMAs represents an attempt to capture both elements (species and communities) and ecological process at the landscape-level.

It is the intent of this document to:

- Provide a framework for decision making and to capture information for future use in a dynamic planning mechanism;
- Provide better focus - the planning process will increase everyone's understanding of the issues and relevant actions;
- Provide a context to judge opportunities - land managers and conservation planners will be

better able to take advantage of opportunities;

- Allow Clark County, Nevada and all cooperating agencies/entities to better protect and/or enhance their conservation investments by providing an ecosystem context for site conservation.

Background

Short-Term Habitat Conservation Plan and the Desert Conservation Plan

In 1990, Clark County, Nevada took the lead on developing a Short-Term Habitat Conservation Plan (HCP) for the desert tortoise (*Gopherus agassizii*). The County assembled a steering committee of affected local interests including homebuilders, recreation interests, mining and grazing representatives and environmental organizations. These interests were joined by local government representatives from each of the affected cities, and state and federal land, wildlife, and agricultural agency partners. The process resulted in the Short-Term HCP for the Desert Tortoise in Clark County, Nevada (RECON, 1991). This HCP proposed mitigation measures which included the establishment of tortoise management areas (TMAs), in increments of 100,000-acre blocks totaling at least 400,000 acres of conserved tortoise habitat. In exchange for establishing the TMAs, developers were allowed to build on up to 22,352 acres of non-Federal lands in a prescribed permit area within the city boundaries of Las Vegas, North Las Vegas, Henderson, and Boulder City. The Short-Term HCP also allowed for the incidental take of up to 3,710 desert

tortoises. The U.S. Fish and Wildlife Service (FWS) approved the permit application and on July 24, 1991 issued an incidental take permit under section 10(a)(1)(B) of the Endangered Species Act (ESA) to the applicants effective for three years. During these three years a long-term plan was to be developed which would address the growth and economic needs of Clark County and each of the cities into the next century.

On July 11, 1995, the FWS issued an incidental take permit (PRT-801045) to Clark County, Nevada, including cities within the county and the Nevada Department of Transportation (NDOT), under the authority of section 10(a)(1)(B) of the ESA. The permit became effective August 1, 1994, and allowed the “incidental take” of desert tortoises for a period of up to 30 years on 111,000 acres of non-Federal land in Clark County, and approximately 2,900 acres of NDOT rights-of-way in Clark, Lincoln, Esmeralda, Mineral and Nye Counties, Nevada. The Clark County Desert Conservation Plan (DCP) served as the permittees’ habitat conservation plan and detailed their proposed measures to minimize, monitor, and mitigate the effects of the proposed take on the desert tortoise (RECON 1995). The DCP focused on desert tortoise conservation but also recognized the need to investigate the status and conservation needs of 18 additional species. The permittees imposed, and NDOT paid, a fee of \$550 per acre of habitat disturbance to fund these measures. The permittees expended approximately \$1.65 million per year to minimize and mitigate the potential loss of desert tortoise habitat. The majority of these funds were used to implement minimization and mitigation measures, such as increased law enforcement;

construction of highway barriers; road designation, signing, closure and rehabilitation; and tortoise inventory and monitoring within the lands initially conserved during the Short-Term HCP and other areas being managed for tortoise recovery (e.g., Areas of Critical Environmental Concern and Desert Wildlife Management Areas).

Multiple Species Habitat Conservation Plan (MSHCP)

Newly proposed HCP guidelines, designed by the U.S. Fish and Wildlife Service to protect declining but not ESA listed species, spurred Clark County to assemble a HCP with a multiple species perspective beginning in 1995. On November 22, 2000, FWS issued an incidental take permit to Clark County, Nevada, including cities within the county, and NDOT, under authority of section 10(a)(1)(B) of the ESA. The Clark County Multiple Species Habitat Conservation Plan and Environmental Impact Statement (MSHCP; RECON 2000) serves as the permittees' habitat conservation plan and details their proposed measures to minimize, mitigate, and monitor the effects of covered activities on the 79 species. Clark County committed to expend \$4.1 million per biennial period for implementation of conservation measures and administration of the MSHCP. This permit supercedes the incidental take permit of the DCP. In the biological/conference opinion, FWS determined that issuance of the incidental take permit would not jeopardize the listed desert tortoise or southwestern willow flycatcher (*Empidonax traillii extimus*), or any of the 77 unlisted, un-proposed species covered under the permit. Under the

special permit terms and conditions of the permit, take of avian species, with the exception of American peregrine falcon (*Falco peregrinus anatum*) and phainopepla (*Phainopepla nitens*), would not be authorized until acquisition of private lands in desert riparian habitats in southern Nevada has occurred. The incidental take permit allows incidental take of covered species for a period of 30 years on 145,000 acres of non-Federal land in Clark County, Nevada and within NDOT rights-of-way, south of the 38th parallel in Nevada.

In an attempt to maximize conservation value, the MSHCP has been designed to focus on ecosystem-based planning as opposed to a species-by-species approach. The first phase of the MSHCP set the following objectives:

- identify key habitats in the County
- identify species vulnerable to future listing
- identify threats and stressors impacting the above mentioned habitats and species
- secure incidental take permits for listed species, and pre-listing agreements for "covered species"
- prioritize and obtain adequate information on "evaluation species" for eventual coverage under the MSHCP.

Additionally, development of an Adaptive Management Plan (AMP) is proposed in Phase 1. The AMP will be designed as a mechanism by which habitat management techniques may be scientifically evaluated and improved upon over time.

Protection of covered species is to be ensured by Clark County through a variety of mechanisms including the

collection and expenditure of a \$550/acre development fee on non-Federal land. These fees are to be applied to the management of public lands within the county that harbor ecosystems upon which covered species depend. Additionally, the MSHCP has categorized land management in the County based on conservation status. Much of the plan depends on the continued maintenance of Intensively Managed Areas (IMAs) to provide sufficient quantity and quality of habitats to support viable populations of species covered by the plan. The plan's provisions include agreements between federal and state land managers to continue to manage IMAs in a manner consistent with conservation of MSHCP covered species. IMAs include Wilderness, Wilderness Study Areas, state and national parks, U.S. Fish and Wildlife refuges and BLM designated Areas of Critical Environmental Concern (ACEC) as well as otherwise designated critical habitat.

The Desert Tortoise Recovery Plan

The Desert Tortoise (Mojave population) Recovery Plan (FWS 1994) identified six broad Recovery Units across the range of the Mojave population of the desert tortoise. The six Recovery Units were further divided into fourteen proposed Desert Wildlife Management Areas (DWMAs) based primarily on BLM's desert tortoise category map (1989). This map depicted relative density of tortoise populations derived from hundreds of tortoise transects performed over two decades (Karl 1983, Bury and others 1994). Each of these geographically delineated DWMAs was briefly described in the Recovery Plan with management recommendations made based on information available to

the Recovery Team at the time the plan was drafted.

The Recovery Plan and Section 2(b) of the ESA call for protection of the ecosystems on which threatened or endangered species depend. Further, the Recovery Plan states that land managers should be strongly encouraged to take a multi-species approach to reserve design and include the habitat of other rare or declining species within DWMAs.

The scientifically rigorous yet relatively general information contained in the Recovery Plan was largely provided by wildlife biologists, scientists, and land managers familiar with the specific DWMAs. It became evident, however, that more specific information on local conditions, both biotic and abiotic threats, management concerns and challenges, was needed by the managers to provide a more unified and task-specific direction for their annual and biennial management planning and budgeting processes. This need became the impetus for developing a site specific planning process for each DWMA in the state of Nevada.

Bureau of Land Management Resource Management Planning

Release of the Desert Tortoise Recovery Plan in 1994 had significant implications for the BLM since the agency manages the majority of lands affected by recovery recommendations. The BLM manages land for desert tortoise protection in the Northeastern and Eastern Mojave Recovery Units by the establishment of desert tortoise Areas of Critical Environmental Concern (ACECs) (Map A) and implementation of Recovery Plan tasks therein.

Boundaries for ACECs were to a large extent based on Fish and Wildlife Service designations of tortoise critical habitat. Desert tortoise ACECs were established by the Las Vegas Resource Management Plan (RMP; BLM 1998), in what were identified in the Recovery Plan as the Piute-Eldorado, Coyote Springs, Gold Butte and Mormon Mesa (Clark Co. portion) DWMA. The Kane Springs, Mormon Mesa (Lincoln Co.) and Beaver Dam Slope (Nevada) ACECs have been designated by the Caliente Management Framework Plan Amendment (BLM 2000). The Pakoon Basin, Virgin Slope and Beaver Dam Slope (Arizona) ACECs have been designated by the Mojave Desert Amendment to the Arizona Strip Resource Management Plan (MDAASRMP; BLM 1999b). Desert Tortoise ACECs in California have also been designated in the California Desert Conservation Plan (BLM 1999a).

These plans proposed that ACECs be managed to guarantee a sufficient quality and quantity of desert tortoise habitat to meet tortoise recovery requirements established in the Desert Tortoise Recovery Plan (FWS 1994). Further, ACEC designation is intended to protect functional corridors of habitat between blocks of tortoise habitat, thereby reducing fragmentation stresses in order to enhance long term persistence of desert tortoise populations.

Extent and Boundaries of the Planning Area

The purpose of this document is to provide a suite of management recommendations for the biologically rich and diverse landscape commonly

referred to as Gold Butte and the Pakoon Basin. The multiple designations of the area and the frequent interchange of place names used to describe the region complicate understanding of the extent of this area. The valley encompasses the Gold Butte - Pakoon DWMA as originally identified by the Desert Tortoise Recovery Plan. The Gold Butte ACEC, parts A & B as designated by the Las Vegas RMP, and the Pakoon Basin and Virgin Slope ACECs as designated by the MDAASRMP are also included (Map B).

However, it suits the ultimate purpose of this document to address the planning area in question from a larger perspective—one not confined by county, state and administrative boundaries. As such, this site conservation plan will analyze and make recommendations based on the larger, consolidated landscape that contains Gold Butte, the Virgin Mountains, the Pakoon Basin, and the Grand Wash area. (Map C). This contiguous block of wildlife habitat is roughly bounded by Lake Mead, the Virgin River and the Grand Wash Cliffs. This peninsular area of interest will be hereafter referred to in this document as the Gold Butte Pakoon area. Alternatively, the Gold Butte Pakoon area may simply be referred to as the planning area.

This plan has no authority regarding designation, and as such, there is limited utility in defining the planning area by a single line drawn around the totality of the site. Instead, the scope of the planning area is driven by the extent and distribution of conservation targets within the planning area. These targets and the rationale behind their selection

are addressed in Chapter 4 – *Conservation Targets*. The planning area is then further refined by the delineation of five Conservation Zones that spatially describe where the application of conservation strategies should occur to ensure the protection of these targets (Map G). Justification for these zones is addressed in Chapter 9 – *Area Specific Management Recommendations*.

Long-term Vision

In order to provide an overarching framework on which to base management recommendations, the following operational long-term vision for the planning area is proposed:

The Gold Butte Pakoon planning area is intended to serve as a contiguous block of habitat of sufficient quality and quantity to promote the survival, growth, reproduction and maintenance of viable populations of Mojave Desert flora and fauna. The protection of this area is intended to mitigate the loss of habitats and the species that formerly depended upon them in the greater Las Vegas Valley and urbanized areas in Clark County, Nevada. Additionally, the Gold Butte Pakoon planning area should also be recognized as just one part of a larger Northeastern Mojave wildlife conservation and recovery effort.

CHAPTER 2

GENERAL TOPOGRAPHIC AND ECOLOGICAL DESCRIPTION

Topographic Description (Map C)

(adapted from Nevada Bureau of Mines and Geology Bulletin 62 (Longwell and others 1965) and Arizona Bureau of Mines Bulletin 186 (Moore 1972))

The lower Virgin River, the shores of Lake Mead and the Grand Wash Cliffs form the borders of the Gold Butte Pagoon planning area. Stretching across the planning area, the Virgin Mountains rise to their maximum elevation on Virgin Peak, at 8075 feet. The Virgin Mountain Range is separated from several low hills and ridges in the southern portion of the planning area by St. Thomas Gap. These low hills and ridges are further divided by the Gold Butte Fault.

The planning area abuts the foot of the Grand Wash Cliffs, which separates the Basin and Range province from the Columbia Plateau. The Grand Wash system drains the eastern portion of the area and empties into Lake Mead. Several smaller washes drain the remainder of the planning area into the Overton Arm of Lake Mead.

Soils

The uplifted metamorphic and granitic rocks, limestones, shales and sandstones which form the Virgin Mountain Range and southern ridges are encircled by fan piedmont remnants. These lowland

soils have been formed largely in alluvial deposits, on alluvial fans, terraces and fan remnants. Arid conditions slow soil formation processes significantly and in general, soils are very shallow to shallow. Shallow layers typically cover a hardpan composed largely of calcium carbonate. Erosion is minimized due to the high amount of rock fragments found on surfaces and throughout the soil profile. Surface soil textures are characterized as sandy loams.

Hills and low mountains in the planning area such as Lime and Tramp Ridges have soils that are very shallow to shallow, having developed largely in sedimentary rock. These islands of residual soils have high percentages of rock fragments throughout the profile and on soil surfaces.

The Virgin Mountains and the St. Thomas Gap area have large deposits of gypsum, and smaller outcrops of gypsum derived soils occur throughout the planning area. Sandy soils can be found near sandstone deposits in the lower portions of the planning area.

Hydrology

On all sides of the Virgin Mountains, sheet flow from intense summer storms is channeled into the Colorado River system along an extensive network of ephemeral washes. In the valley bottoms, these washes become broad

channels that cleave through the alluvial soils of the surrounding upland bajadas. Throughout the planning area, the water table is found well below the desert surface (BLM 1998).

Climate

Summers are typified by hot days and mild nights with daily average temperatures hovering in the mid-90s °F range. December through February, daily temperatures average in the mid-40s F. Approximately 12 days per year, lows dip below the freezing mark. Most precipitation falls in either the period extending from November to February or during the summer months of July and August. The region's driest periods are from April through June and the month of September. Summer rains are of high intensity, localized, and short in duration. Total annual precipitation may range anywhere from 2 to 13 inches, with 5 inches per year being the mean.

The inundation of the Colorado River and creation of Lake Mead has generated a local climate phenomenon in the planning area. Prevailing winds blow across the lake and over the ridges and Virgin Mountains, and the orographic lift causes a lake effect rain pattern in the Pakoon Basin. An extra two inches of rain is estimated to fall in the Pakoon Basin annually as a result of this local climate pattern (Tim Duck, pers comm 2002).

It is generally believed that rains in November and December of at least 25mm (~1 inch) are needed to trigger annual plant growth and reproduction in the following spring.

Dominant Vegetative Communities (Map D)

(adapted from Charlet 2002)

Creosote-Bursage Mixed Scrub

Found below approximately 3800 feet in the valley bottoms and lowlands of mild slope aspect, creosote-bursage dominates the planning area. This community type is composed primarily of creosote (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*). Associated shrub species include blackbrush (*Coleogyne ramosissima*), Mormon tea (*Ephedra* spp.), indigo bush (*Psoralea fremontii*), shadscale (*Atriplex confertifolia*), spiny hopsage (*Grayia spinosa*), desert thorn (*Lycium* spp.), ratany (*Krameria erecta*), burro bush (*Hymenoclea salsola*), honey mesquite (*Prosopis glandulosa*), and brittlebush (*Encelia farinosa*). Other associated species include Joshua tree (*Yucca brevifolia*), Mojave yucca (*Yucca schottigera*), cholla (*Opuntia* spp.), and beavertail cactus (*Opuntia basilaris*).

Blackbrush – Joshua Tree Mixed Scrub

This community is characterized as shrubland dominated by blackbrush and Joshua tree and is found on the upper bajadas and slopes of the Virgin Mountains and on the southern ridges in the planning area. Blackbrush – Joshua tree communities are viewed as a transitional habitat between Mojave and Great Basin ecosystems and typically occur between 3800 and 5200 feet. Joshua tree dominated shrublands are found on sandier soils, while blackbrush dominates on rocky slopes. Associated tree species include Utah juniper (*Juniperus osteosperma*) and associated

shrubs include spiny hopsage, Mormon tea, shadscale, desert thorn, snakeweed (*Gutierrezia sarothrae*), and creosote bush.

Converted Asian Steppe

Significant portions of the planning area in the Pakoon Basin have undergone a type-conversion to a grassland dominated by cheatgrass (*Bromus tectorum*), red brome (*B. rubens*), filaree (*Erodium cicutarium*) and Indian wheat (*Plantago insularis*). Although the GAP analysis used to delineate the dominant vegetation communities identified this community type as Desert Grassland-Shrub Steppe, in fact few native species persist in these areas. These communities are sustained and spread by an altered landscape-scale process: an unnatural increase in fire spread and frequency. More information about this altered dynamic can be found in Chapters 4 and 6.

Pinyon-Juniper Woodlands

The pinyon-juniper community is found between 3600 and 7400 feet on the upper slopes of the Virgin Mountain range. Single leaf pinyon (*Pinus monophylla*) and Utah juniper co-dominate this conifer woodland community type. Mountain mahogany (*Cercocarpus ledifolius*) is a primary associated tree species. Sagebrush (*Artemisia* spp.), rabbitbrush (*Chrysothamnus* spp.), oak (*Quercus gambelii*), alder leaf mahogany (*Cercocarpus montanus*), bitterbrush (*Purshia tridentata*), little leaf mountain mahogany (*Cercocarpus intricatus*), and cliffrose (*Cowania mexicana*) are all primary associated shrubs.

Utah juniper dominated plant communities can be found at lower

elevations in the Virgin Mountains and on the southern ridges. Single-leafed pinyon pine is excluded from some occurrences of this community. Primary associated shrub species include sagebrush, rabbitbrush, and blackbrush.

A single-leaf pinyon dominated community can be near Summit Spring.

Mountain Shrubland

Above 5000 feet in the Virgin Mountain Range is a band of dense mountain shrubs composed primarily of manzanita (*Arctostaphylos mexicana* and *A. pringlei*), Gambel oak (*Quercus gambelii*), mountain mahogany, silktassel (*Garrya flavescens*), and buckbrush (*Ceanothus* spp.). This shrub community forms a wide band on the mountain tops and surrounds the fir and pine community. The primary components of the shrub community form a very dense overstory about three feet in height.

CHAPTER 3

CURRENT LAND OWNERSHIP AND MANAGEMENT

Bureau of Land Management Lands

Within the Gold Butte Pakoon area, Bureau of Land Management (BLM) managed land has been largely designated as Areas of Critical Environmental Concern (ACEC), Wilderness Area, Wilderness Study Area (WSA) or National Monument (see Map B). Undesignated BLM lands do remain within the planning area. The BLM portions of the planning area are managed by BLM's Las Vegas Field Office and Arizona Strip Field Office. For a complete listing of the management objectives for BLM lands in the planning area, see the Las Vegas Resource Management Plan (RMP; BLM 1998), the Mojave Desert Amendment to the Arizona Strip Resource Management Plan (MDAASRMP; BLM 1999b) and the Wilderness Management Plans for the Paiute and Beaver Dam Mountains Wilderness Area (BLM 1990b) and the Grand Wash Cliffs Wilderness Area (BLM 1990a). The majority of the Arizona portion of the planning area is also part of the recently designated Grand Canyon Parashant National Monument. Interim guidelines for the management of this portion of the planning area until a management plan and Environmental Impact Statement can be completed by BLM and the National Park Service (NPS) have been outlined by the Department of the

Interior in Instruction Memorandums No. 2000-062 and 2002-008 (USDOI 2000, 2002).

Wilderness Areas

Two areas in the Arizona portion of the planning area have been designated as Wilderness Areas, and are to be managed as outlined in the Federal Wilderness Act of 1964 (USPC 1964) and the Arizona Wilderness Act of 1984 (USPC 1984). In general, these areas are to be managed to maintain their natural and wild state, while allowing for uses that do not degrade the wilderness character of the areas. Some nonconforming uses of these lands are allowed under the Federal Wilderness Act, and are to be managed in such a way as to minimize negative impacts upon the wilderness character of the area.

The Grand Wash Cliffs Wilderness Area includes the eastern boundary of the planning area, the Pakoon Basin. Management in the Pakoon Basin focuses on restoring native vegetation to areas damaged by wildfires and invaded by non-native annual grasses such as cheatgrass and red brome. Recreational use in this area is currently relatively light. Current management guidelines for this area can be found in the Grand Wash Cliffs Wilderness Management Plan (BLM 1990a).

The Paiute Wilderness Area includes a portion of the Virgin Mountain Range, on the northern portion of the Gold Butte Pakoon planning area. Much of this wilderness area is in upland communities and includes ponderosa pine stands on Mount Bangs. Management in this area focuses on maintaining the wilderness character of the area, and habitat for pronghorn antelope, big horn sheep and desert tortoise. Additional information on management objectives for this area can be found in the Final Wilderness Management Plan for the Paiute and Beaver Dam Mountains (BLM 1990b).

Wilderness Study Areas

There are several wilderness study areas (WSA) on the BLM portion of the planning area in Nevada. The Virgin Mountains Natural Area is an Instant Study Area due to its designation status at the time the Federal Wilderness Act was passed in 1964. This area receives little use and is managed to maintain its wilderness character. Four additional WSAs were identified by BLM as potential wilderness areas in the Nevada portion of the Gold Butte Pakoon planning area. Lime Canyon, Million Hills, Garrett Buttes and Jumbo Springs WSAs include primarily lowland habitats in the southern portion of the planning area.

Until such time that WSAs are either designated as Wilderness or released for other uses, they are to be managed as Wilderness in accordance with BLM Manual H-8550-1, entitled Interim Management Policy for Lands under Wilderness Review (IMP; USDO 1964). Activities not compatible with the preservation of natural conditions are prohibited by the IMP and include

surface disturbance, placement of permanent structures, and land disposal.

The Clark County Conservation of Public Land and Natural Resources Act of 2002 (S 2612; US Senate 2002) has been proposed by Nevada Senators Reid and Ensign. It is not clear at this time if any portion this WSA or additional NPS and BLM lands in the Nevada portion of the Gold Butte Pakoon area will be included in the final version of this bill.

Desert Tortoise Areas of Critical Environmental Concern

The Gold Butte Pakoon ACEC (parts a, b and c) is wholly contained within the Nevada portion of the planning area, and is managed by the BLM's Las Vegas Field Office. The Las Vegas RMP directs that desert tortoise ACECs be managed to guarantee a sufficient quality and quantity of desert tortoise habitat necessary to meet minimum protection needs for desert tortoise. The ACEC configuration in the Northeastern Mojave is also intended to allow for functional corridors of habitat between ACECs, in order to enhance long term persistence of desert tortoise populations. In addition to desert tortoise considerations, ACECs are to be managed in such a way as to maximize benefits to other sensitive plants and animals within ACEC boundaries.

The Pakoon ACEC and Virgin Slope ACEC are managed by the BLM's Arizona Strip Field Office, and were established by the MDAASRMP (BLM 1999b). Both the Pakoon and Virgin Slope ACECs are to be managed primarily for the recovery of desert tortoise. The Virgin Slope ACEC also serves as a link between the Piute

Wilderness Area and the Beaver Dam Slope Wilderness Area. The Pakoon ACEC is wholly within the boundaries of the newly designated Grand Canyon Parashant National Monument, and the management of this area will eventually be directed by a Resource Management Plan for the monument. Current management directives for this area are discussed below.

National Monuments

The Grand Canyon Parashant National Monument, designated in 2000, includes the Grand Wash Basin on the eastern edge of the Gold Butte Pakoon planning area. The monument is jointly managed by Lake Mead National Recreation Area (LMNRA) of the National Park Service and the BLM Arizona Strip Field Office. Most of the Arizona portion of the planning area is contained within the Grand Canyon Parashant National Monument. A new management plan and environmental impact statement for this monument will be completed by BLM and NPS with considerable public involvement, and is scheduled for completion in 2005.

Interim management policies issued by the U. S. Department of the Interior (USDOI 2000, 2002) direct that BLM and NPS in general continue with current management policies for this area, unless justification for swift protective action is warranted. Changes in management are allowed via normal channels on a case by case basis. For instance, a road determined to be damaging to the resources protected by the monument could either be reviewed for closure via normal channels, or closed immediately if warranted. All roads in the monument could not, however, be closed unless normal road

designation procedures were followed. Some very specific management changes were directed in the interim guidelines. For instance, chaining of vegetation is specifically prohibited within new monuments due to the substantial soil surface disturbance generated by this tree and shrub control technique. The Grand Canyon Parashant National Monument was withdrawn from locatable mineral mining via the monument proclamation.

Major Rights-of-Way (Map E)

Utilities:

There are currently no utility corridors or rights-of-way (ROWs) within the planning area. Both the Las Vegas RMP (BLM 1998) and MDAASRMP (BLM 1999b) consider ACECs to be ROW avoidance areas. However, new ROWs are expressly prohibited in the Pakoon ACEC (BLM 1999b). Likewise, National Monument land management guidance directs that they are also avoidance areas for new ROWs. New major utility construction would not be authorized outside of designated corridors or existing ROWs without justification. WSA interim management guidance prohibits new ROWs in these areas.

Mineral Resources

Saleable Mineral Material Sites:

The Las Vegas RMP established that mineral material site ROWs may be permitted in ACECs for government entities within 0.5 miles of either side of federal aid highways. Free use permits may also be permitted in ACECs for government entities within 0.5 miles of federal highways or county roads, if

they provide for public benefit. Further stipulations regarding material site surface disturbances may be found in the Las Vegas RMP. The MDAASRMP closed ACECs to new ROWs or renewal of existing material site ROWs, and closed ACECs to mineral material disposal. No mineral material sites are currently present within either the Virgin Slope or Pakoon ACECs. Much of the planning area has a moderate to low potential for salable mineral materials.

Locatable Mineral Material Sites:

The planning area contains areas with high potential for locatable minerals on the BLM lands in Nevada, including some rare earth minerals of national security interest. The remainder of the planning area has a mix of moderate to low potential for locatable mineral materials. Several claims have been filed in the planning area. Gypsum deposits in the Virgin Mountains and in the Pakoon Basin do not currently have plans of operation on file. As mentioned above, the Grand Canyon Parashant National Monument lands have been withdrawn from locatable mineral mining. The Las Vegas RMP (BLM 1998) directed that the ACECs within the Nevada portion of the planning area be withdrawn from locatable mineral mining as well, but no action has been taken on this directive.

The pending SB 2612 (US Senate 2002) proposes withdrawal of all ACECs designated for such action in the Las Vegas RMP. It is not clear if this action will be included in the final version of the bill.

Gas and Oil Fluid Leases:

A portion of the planning area has a moderate potential for oil and gas, and some lands are currently leased. No oil or gas production has occurred within the planning area.

Livestock Grazing Management (Map F)

All grazing allotments within portions of the planning area managed by the Las Vegas Field Office have been administratively closed by the BLM as directed in the Las Vegas RMP. Some 100 head of trespass cattle remain on the northwest slopes of the Virgin Mountains. Grazing allotments remain open in most of the Arizona Strip, as per the MDAASRMP (BLM 1999b). However, the MDAASRMP directed closure of portions of the Pakoon Springs and Pakoon allotments, as well as the entire Tassi and Mosby-Ney allotments. The Mosby-Ney allotment closure is currently under appeal and grazing continues pending a court decision. Cattle also remain on the closed Tassi allotment although no appeal of the closure decision was ever filed. Allotments within the Virgin Slope ACEC boundaries are to remain open to livestock grazing from October 15 to March 15 of each year.

The Parashant allotment is utilized as part of a grass banking program that allows cattle from other allotments to be temporarily moved to the Parashant allotment during seasonal or temporary closures of their range.

Herd Management Areas:

The Nevada portions of the Tassi-Gold Butte Herd Management Area (HMA) are currently managed for 100 head of burros, as directed by the Las Vegas RMP (BLM 1998). The Arizona portions of this HMA are to be managed for a zero population level (BLM 1999b). The adjacent Lake Mead National Recreation Area burro herd is being managed for a zero population level as well (NPS 1995).

National Park Service

National Recreation Area

The Lake Mead National Recreation Area (LMNRA) covers the shores of Lake Mead and the surrounding lowlands habitats. LMNRA also harbors numerous other wildlife species and habitats which are targets of this planning effort, including desert tortoise. A total of 147,200 acres of desert tortoise critical habitat within LMNRA were designated by FWS in the Desert Tortoise Recovery Plan (FWS 1994). See the Lake Mead National Recreation Area Resource Management Plan (LAMERMP; NPS 1999) for a list of management objectives for the Lake Mead National Recreation Area.

The portions of the LMNRA that are contiguous with Gold Butte Pakoon area are proposed wilderness and the management plan calls for strict enforcement of off-road vehicle regulations and the regulation of user group activities through Special Use Permits. Currently, the LMNRA restricts vehicular travel to a handful of designated roads that are posted 'open'. Camping is allowed within 100 feet of posted open roads. No camping is permitted within ¼ mile or within sight

of any water hole or spring. Limited hunting is permitted. Bighorn sheep enhancement is carried out through development of new water sources (catchments and storage tanks) and enhancement of natural springs. The burro herd in the portion of LMNRA that overlaps with the planning area is managed for a zero population level.

National Monument

The Parashant National Monument was designated in 2000 and includes the Grand Wash Basin, the eastern edge of the Gold Butte Pakoon planning area. The monument is jointly managed by LMNRA and BLM Arizona Strip Field Office. Interim management guidelines are discussed above.

Private Inholdings

There are a few privately held lands within the planning area. Most of these are centered on springs, including Tassi/Seven Springs and Juanita Springs. There are also privately held lands along the Virgin River and some patented mining claims on Lime Ridge which could impact the planning area. Current use of these lands includes residential, mining, agricultural and grazing.

CHAPTER 4

CONSERVATION TARGETS

Map G

Target Selection Criteria

A list of focal species and communities has been established for the planning area in order to plan for, and measure progress toward, achievement of the Gold Butte Pakoon planning area long-term vision. By focusing on a specific subset of species and communities within the planning area, management actions can be directed more efficiently (Poiani and Richter 1998). Well planned conservation actions that benefit these focal species and communities should also provide benefit to the larger universe of biological diversity that utilizes the planning area.

These focal species and communities, or “conservation targets” were selected based on their ability to meet one or more of the following criteria:

- their contribution to describing the overall biotic and abiotic character of the planning area,
- their relevance to specific conservation mandates in the overarching management plans of the region (e.g. Desert Tortoise

Recovery Plan, Clark County MSHCP),

- their utility in regards to informing management, protection and restoration efforts and the scale at which these efforts must occur, and
- their value as indicators for gauging the effectiveness of management actions in achieving conservation objectives.

For each conservation target a description is given, which includes species of interest to land managers which are “nested” within the target’s geographic extent.

Also for each target the current federal/state status, global rank, and Clark County MSHCP (RECON 2000) status are listed. Global rankings are a measure of the abundance, geographic extent, and degree of imperilment of the target species or community. The global rank scores are from the Natural Heritage Network, as reported by the Association for Biodiversity Information. A description of the Natural Heritage Network ranking system can be found in Appendix I.

Targets

A. Desert Tortoise, *Gopherus agassizii*

Federal / State Status: USFWS
Threatened, BLM Sensitive Species
Global Rank: G3, S3
Clark County MSHCP Status:
Covered

Distribution in Planning Area

Estimates of desert tortoise densities are the product of almost three decades of BLM transects carried out in the Northeast Mojave Recovery Unit and across the range of the desert tortoise. Existing survey data indicate that the planning area largely consists of moderate to high-density desert tortoise habitat. Tortoises are largely concentrated on the lowland bajadas of Gold Butte and the Grand Wash area (Bury and others, in press; Karl 1982).

A thorough treatment of desert tortoise biology and life history is presented in the Desert Tortoise (Mojave Population) Recovery Plan (FWS 1994).

Pertinent biological factors and assumptions related to understanding desert tortoise recovery are presented below.

Assumptions for Desert Tortoise Recovery Strategy

Referring to the Stress Assessment Table for the Gold Butte Pakoon DWMA (Table 4.1) and the ecological models in Figures 4.1, and 4.2 a few basic, shared components become obvious. Clearly,

soil stability is not directly important to the well being of an individual desert tortoise as any observer can readily see tortoises traversing unstable soils, even feeding and perhaps sheltering beneath introduced, alien vegetation present in disturbed soil conditions. However, when the situation is examined from an ecological and population perspective, it becomes clear that soil surface stability creates the conditions for more typical Mojave Desert vegetation; stable and predictable microclimates; and burrow, shelter and nest suitability. This surface stability allows the resident tortoise population and their offspring to become more adapted to local conditions and the range of fluctuations in rainfall patterns and temperature extremes. It is also evident that there are areas with naturally unstable surface soils throughout the Mojave Desert Ecoregion, as evidenced by sand dune formation and the ubiquitous dust devils. Overall, however, the absence or minimization of soil destabilizing activities lends itself to greater ecological stability and natural community predictability.

In summary, the basis for which management recommendations regarding desert tortoise will be made in this document are founded on the following assumptions regarding desert tortoise ecology (see Figures 4.1 and 4.2):

- Soil stability leads to more stable and representative Mojave Desert vegetative communities with a diversity of both annual and perennial native components and reduces conditions favorable to exotic invasive species.

- A diverse annual and perennial native plant community benefits the desert tortoise and other herbivores in two primary ways:
 - a) it provides a better choice of nutritive species and portions of selected plants that stimulate faster growth and promote a better health profile; and
 - b) a more diverse plant community translates to "overstory" diversity, which, along with rodent burrows at the base of coppice mounds, assists hatchlings and juveniles to escape solar temperature extremes and predator detection.
- Hatchlings and juveniles who have an effective "buffet choice" of native annual and perennial plant species will grow faster and healthier, taking them out of the vulnerable small size class sooner. Other age/size classes benefit from more nutritive food availability, possibly making them more resistant to diseases and allowing them to reproduce more and possibly at an earlier age
- Individuals in a population that are quicker to "grow out of" the period of higher predation-vulnerability may also enter the sexually mature size class sooner, allowing them to begin contributing to population recovery sooner.
- Removal or minimization of known anthropogenic impacts to the desert tortoise, particularly

those leading to adult mortality, will yield the most rapid gains in increasing population recovery potential.

The schematic model in Figure 4.1 illustrates some additional benefits that accrue to the tortoise from soil stability and vegetative diversity, namely the ability of a tortoise population to reach a stable or increasing recruitment scenario. This will drive the recommendations for many of the major land uses, and should be the basis for most tortoise management decisions in DWMAs. Figure 4.2 indicates the more focused relationships of anthropogenic influences on desert tortoises, both direct and indirect. Specifically, those factors which impact a population's ability to move freely within or between, suitable habitat patches and which cause the loss of individuals at various life stages, are described. Managers can address those areas where management actions can possibly alleviate negative drains on the population to increase the likelihood of achieving a positive population growth curve necessary for recovery.

Soils and Vegetation Relationship to Hatchling Survival & Population Recovery

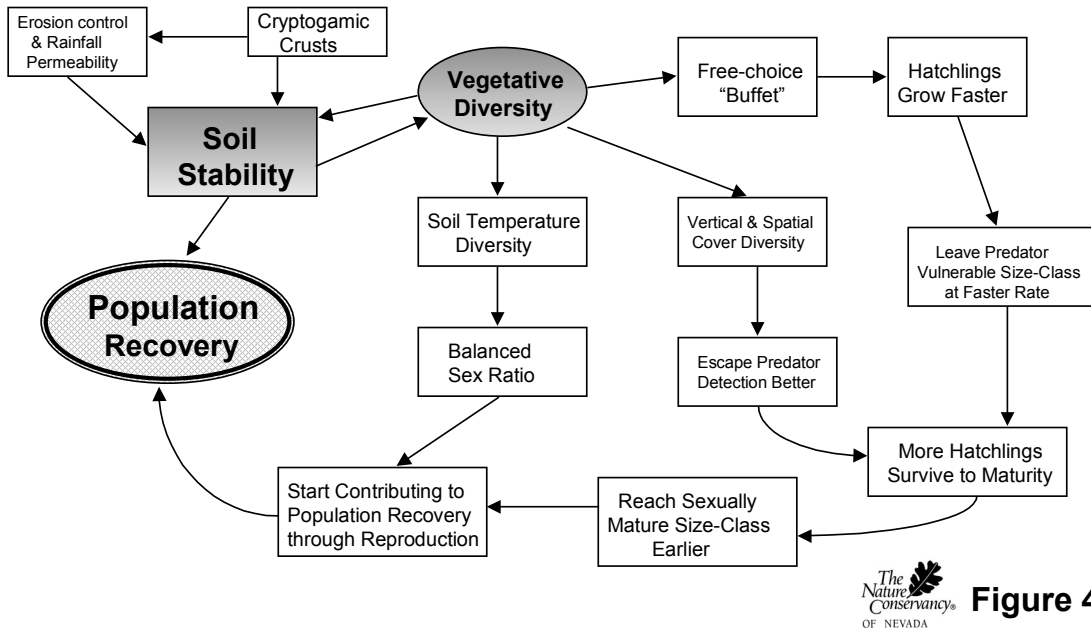


Figure 4.1

Desert Tortoise Ecology & Human Impacts

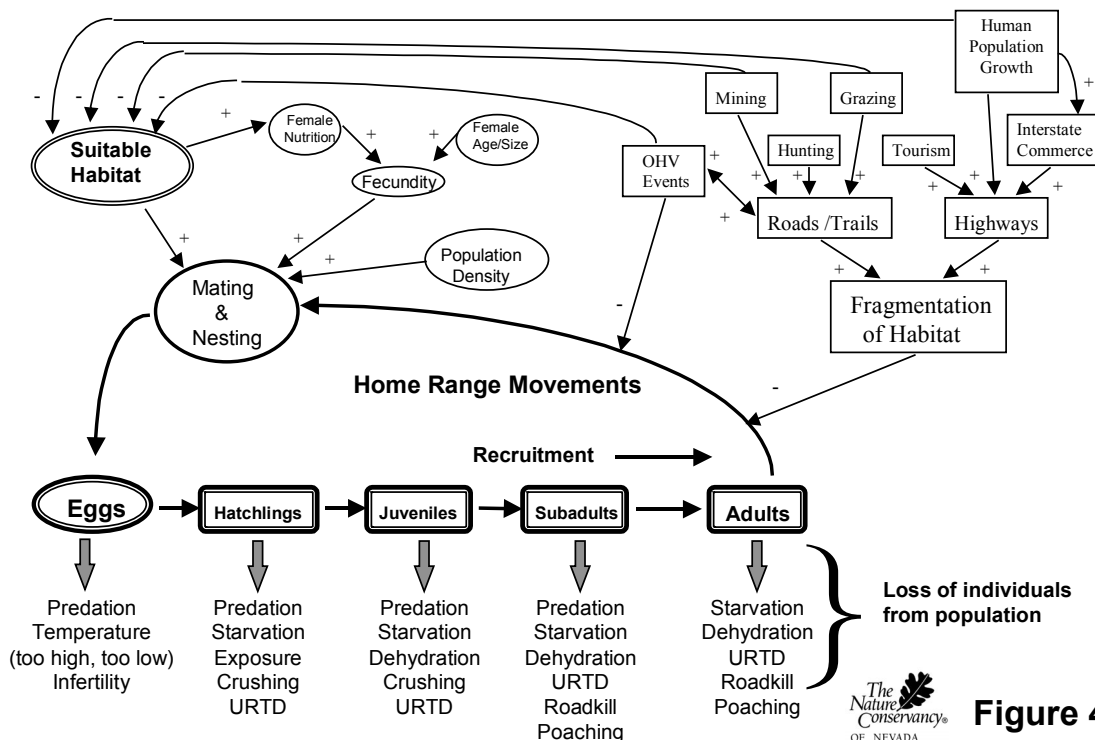


Figure 4.2

Stresses: Altered habitat structure

Past grazing practices have altered the vegetation in desert tortoise habitat to a great degree. Large shrubs remain, as do less palatable perennials, but the native perennial bunch grasses are sparse to absent. In many areas, seed sources for native perennial grasses can only be located on rocky slopes or wash edges where cattle and burros were unable to graze (personal communication to author by Gayle Marrs-Smith 2002; unreferenced, see Acknowledgements). In the spaces between shrubs, non-native annual weeds have been introduced, such as red brome (*Bromus rubens*), cheatgrass (*B. tectorum*), split or Mediterranean grasses (*Schismus arabicus* and *S. barbatus*), Sahara mustard (*Brassica tournifortii*), filaree (*Erodium cicutarium*) and Russian thistle (*Salsola iberica*). These weeds compete with native plants for resources, making it unlikely that natives will be able to re-establish within areas with high densities of non-native weeds (D'Antonio and Vitousek 1992).

The structure of the vegetative community has been altered by the replacement of native bunch grasses by non-native weeds. Red brome and split grass are small and fine in structure, while native perennial grasses are taller and form substantial clumps of vegetation. Young desert tortoise require vegetative cover to avoid detection by predators (FWS 1994). Also, shrub cover is important for burrow sites used by all age classes of desert tortoise (Berry and Turner 1984, 1986).

Stresses: Altered food plant availability

Desert tortoises must balance their intake of potassium, protein and water very carefully. During times of abundant rainfall, tortoises may achieve this balance by drinking water, but in dry years all water intake is via ingested plant materials. During years with little or no rainfall, tortoises achieve this nutritional balance by choosing food plants to allow for maximal excretion of potassium while still allowing for intake of water and proteins for metabolism (Ofstedal 2002). Alteration of the vegetation community composition directly impacts desert tortoises by altering their available food choices. Rather than the "buffet" of native plant species with which the desert tortoise evolved, tortoises are faced with fewer native perennial grasses and more abundant non-native weeds. During years when choice plants are not available in adequate numbers, desert tortoises rely on internal stores of water and protein to survive (Henen 1997, 1994). Young tortoises may not have developed large stores to utilize over long periods of drought, and would seem to be made particularly vulnerable from a decrease in choice food plants (Ofstedal 2002).

At this time, studies to determine direct relationships between food availability and juvenile survivorship and maturation rates have not been conducted. It seems likely that desert tortoise maturation rates and survivorship would be reduced by a decrease in the abundance of nutritious foods and an increase in inferior food plants, particularly during years of low or unmeasurable winter rainfall. It is also uncertain how the invasion of non-

native plants such as split grass, red brome, and filaree impact tortoise survivorship, particularly during severe drought years when tortoises consume dry senescent materials from Mediterranean grasses and native big galleta grass (*Hilaria rigida*) (Esque 1994).

Stresses: Habitat fragmentation

The planning area contains many roads, both paved and graded dirt roads. Roads provide no cover for animals to avoid detection by predators, and many animals avoid open areas such as these. Thus, these linear disturbances partition the available habitat by reducing wildlife movement across the path of the road (Trombulak and Frissell 2000).

Stresses: Direct mortality

Desert tortoises which are able to traverse roaded areas are at risk of being crushed by moving vehicles. Because desert tortoises move relatively slowly and are well camouflaged, it is difficult for drivers to detect tortoises in their path on unpaved roads. On paved roads, drivers are often moving too fast to dodge tortoises in their path. Nicholson (1978) showed a 1 kilometer zone of desert tortoise population depression on either side of paved roads. This decrease in tortoise population is most likely due to direct mortality caused by collisions with vehicles. Desert tortoises may also have depressed numbers in these areas due to

casual collection of live animals by motorists for use as pets (Nicholson 1978).

Stresses: Introduced or stress-facultative pathogens

The incidence of upper respiratory tract disease (URTD) has not been studied in this population, but as growth in Mesquite and other local municipalities continues, the likelihood of pet tortoise releases into the Gold Butte Pакoon desert tortoise population and subsequent infection of resident desert tortoises increases. If URTD is a natural but stress-related phenomenon, then the impact of other stresses may be to increase the incidence or severity of URTD outbreaks.

Stresses: Altered predator regime

Common Raven, coyote and dog populations from nearby municipalities impose an increased predation rate upon the desert tortoises within the planning area.

Common Ravens in particular can pose a serious threat to juvenile tortoises, particularly in areas with reduced vegetation cover. Dogs are increasingly being recognized as a significant threat to all age classes of desert tortoises. Not only do feral dogs prey upon desert tortoises, but unleashed dogs molest and often kill desert tortoises that are encountered.

Table 4.1 Stresses impacting Desert Tortoise in Gold Butte Pakoön

Stresses	Severity Rank	Geographic Scope Rank	Overall Stress Rank
Altered habitat structure	high	high	High
Altered food plant availability	high	high	High
Habitat fragmentation	high	high	High
Direct mortality/removal	very high	medium	Medium
Introduced pathogens	medium	very high	Medium
Altered predator regime	high	medium	Medium

B. Creosote-Bursage Scrub

Federal / State Status: N/A

Global Rank: G4G5

Clark County MSHCP Status: N/A

Creosote-bursage scrub is the dominant biotic feature of the planning area. In conjunction with soil stability, the extent and condition of this vegetation type is the most important factor governing the health of the species that utilize this

landscape, including the desert tortoise. This community type occurs from the shores of Lake Mead to an elevation of 3800 feet. It is composed primarily of creosote (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*). Associated shrub species include blackbrush (*Coleogyne ramosissima*), Mormon tea (*Ephedra* spp.), indigo bush (*Psoralea fremontii*), shadscale (*Atriplex confertifolia*), hopsage (*Grayia spinosa*), desert thorn (*Lycium* spp.),

Table 4.2

Species of interest nested within Creosote Bursage system target occurrence

Species	Common Name	MSHCP Status	Global Rank
<i>Gopherus agassizii</i>	desert tortoise	covered	G4
<i>Callisaurus draconoides</i>	zebra-tailed lizard	n/a	G5
<i>Cnemidophorus tigris</i>	whiptail	n/a	G5
<i>Coleonyx variegatus</i>	banded gecko	covered	G5
<i>Crotaphytus insularis</i>	Great Basin collared lizard	covered	G5
<i>Dipsosaurus dorsalis</i>	desert iguana	covered	G5
<i>Eumeces gilberti</i>	western red-tailed skink	covered	G5T4
<i>Gambelia wislizenii</i>	large-spotted leopard lizard	covered	G5
<i>Heloderma suspectum</i>	banded Gila monster	high-priority evaluation	G4T4
<i>Phrynosoma macleayi</i>	horned lizard	n/a	G5T5
<i>Sauromalus obesus</i>	western chuckwalla	covered	G5
<i>Uta stansburiana</i>	side blotched lizard	n/a	G5
<i>Crotalus cerastes</i>	sidewinder	covered	G5
<i>Crotalus mitchellii</i>	speckled rattlesnake	covered	G5
<i>Crotalus scutulatus</i>	Mojave green rattlesnake	covered	G5T5
<i>Astragalus geyeri</i> var. <i>triquetrus</i>	threecorner milkvetch	covered	G4?T2T3
<i>Penstemon bicolor</i> ssp. <i>bicolor</i>	yellow twotone beardtongue	high-priority evaluation	G3T2Q

ratany (*Krameria parvifolia*), burro bush (*Hymenoclea salsola*), honey mesquite (*Prosopis glandulosa*), and brittlebush (*Encelia farinosa*). Other associated species include Joshua tree (*Yucca brevifolia*), Mojave yucca (*Yucca schidigera*), cholla (*Opuntia* spp.), and beavertail cactus (*Opuntia basilaris*).

This target captures two systems identified in the Clark County Multiple Species Habitat Conservation Plan (RECON 2000); Mojave Desert Scrub and Salt Desert Scrub. Table 4.2 lists the species within this target that are of special interest to land managers.

Stresses: Altered composition and structure

The creosote-bursage scrub community is a relatively static system, not usually prone to large, natural fluctuations of either plant community composition or soil condition. However, the quality and quantity of the scrub community in the Mojave has been subject to significant alteration resulting from human induced alteration in soil stability (Vasek 1983). Most notably, the creosote-bursage community continues to be substantially altered by opportunistic invasive species such as cheatgrass (*Bromus tectorum*), filaree (*Erodium cicutarium*), and red brome (*Bromus rubens*). These nonnative plants are not well adapted to germinating in the thick, undisturbed desert crusts that cover much of the Mojave. However, disturbance of soil crusts by livestock or other

anthropogenic activities (see Chapter 6 – Sources of Stress), permits entry of nonnative seeds into the underlying, looser soils. There is some evidence that in certain situations non-natives may be able to germinate and establish upon intact soil crust (DeFalco and others 2001), further emphasizing the need to reduce the spread of weed seeds into less disturbed environments.

Stresses: Altered soil nutrient cycles

The soils within the creosote bursage community throughout the Mojave Desert have been significantly altered by anthropogenic disturbances. Few examples remain of intact biological soil crust within this community. The resulting loss in soil stability impacts not only the germination of natives/non-native plant species, but also reduces infiltration of moisture from rain events and the fixation of nitrogen (BLM 2001).

Areas with intact biological soil crust have been shown to support significantly more robust plant growth (Harper and Belnap 2001). The time necessary for recovery of soil crusts has been estimated in decades (BLM 2001). Recovery of the integrity of the native vegetation in the planning area would be enhanced by no further reductions in biological soil crust cover.

Stresses: Habitat fragmentation

This community occurs on gently sloping bajadas throughout the planning area and extends to the shores of Lake Mead. Recreational users travel the existing roads, and occasionally extend those roads illegally to reach Lake Mead. The resulting network of roads and road incursions throughout the creosote bursage community is extensive and likely to increase.

Unpaved roads and road incursions are linear disturbances with reduced

vegetative cover. Animals that venture into these areas are at greater risk of predation, and some animals have been shown to avoid entering unpaved road areas (Baur and Baur 1990, Merriam and others 1989, Oxley and others 1974). With increasing use, the risk of mortality by crushing of animals on the road surface or in their burrows increases. The most heavily used roads can become barriers to dispersal and movement between habitat patches for many animals (Trombulak and Frissell 2000).

Table 4.3
Stresses impacting Creosote-Bursage system in Gold Butte Pagoon

Stresses	Severity Rank	Geographic Scope Rank	Overall Stress Rank
Altered composition/structure	high	very high	High
Soil disturbance	medium	medium	Medium
Habitat fragmentation	medium	medium	Medium

C. Blackbrush - Joshua Tree Systems

Federal / State Status: N/A

Global Rank: N/A

Clark County MSHCP Status: N/A

Blackbrush (*Coleogyne ramosissima*) and / or Joshua tree (*Yucca brevifolia*) dominate these shrub communities which occur from 3800 to 5200 feet. Joshua trees tend to dominate in sandier soils and blackbrush dominated communities are found on more rocky and sloped soils. Associated species include shadscale (*Atriplex confertifolia*), sagebrush (*Artemisia tridentata*), spiny hopsage (*Grayia spinosa*) Mormon tea (*Ephedra* spp.), creosote (*Larria tridentata*) and snakeweed (*Xanthocephalum* spp.). Other associated species include juniper

(*Juniperus osteosperma*), pinyon pine (*Pinus monophylla*), catclaw (*Acacia greggii*) and yucca (*Yucca baccata*).

This target captures two systems identified in the Clark County Multiple Species Habitat Conservation Plan (RECON 2000); the Blackbrush and Salt Desert Scrub Ecosystems. Table 4.4 lists the species within this target that are of special interest to land managers.

Table 4.4
Species of interest Within Blackbrush-Joshua Tree system target occurrence

Species	Common Name	MSHCP status	Global Rank
<i>Gopherus agassizii</i>	desert tortoise	covered	G4
<i>Callisaurus draconoides</i>	zebra-tailed lizard	n/a	G5
<i>Cnemidophorus tigris</i>	whiptail	n/a	G5
<i>Coleonyx variegatus</i>	banded gecko	covered	G5
<i>Crotaphytus insularis</i>	Great Basin collared lizard	covered	G5
<i>Eumeces gilberti</i>	western red-tailed skink	covered	G5T4
<i>Gambelia wislizenii</i>	large-spotted leopard lizard	covered	G5
<i>Heloderma suspectum</i>	banded Gila monster	high-priority evaluation	G4T4
<i>Phrynosoma playtrrhinos</i>	southern desert horned lizard	high-priority evaluation	G5T5
<i>Sauromalus obesus</i>	western chuckwalla	covered	G5
<i>Uta stansburiana</i>	side blotched lizard	n/a	G5
<i>Crotalus mitchellii</i>	speckled rattlesnake	covered	G5
<i>Crotalus scutulatus</i>	Mojave green rattlesnake	covered	G5T5
<i>Astragalus mokiensis</i>	Mokiak milkvetch	medium-priority evaluation	G2G3
<i>Dudleya pulverulenta</i> ssp. <i>arizonica</i>	chalk live-forever	watch list	G4G5T4T5
<i>Penstemon bicolor</i> ssp. <i>bicolor</i>	yellow twotone beardtongue	high-priority evaluation	G3T2Q

Stresses: Altered composition and structure

The understory of this community has been heavily altered by a reduction in native grasses and other species favored as forage by cattle and burros. Invasive non-natives such as red brome and schismus have also spread throughout the community, carried by livestock and humans. Red brome growth appears to be favored by conditions expected if air pollution increases and global warming trends continue (Smith 2001).

Once established, exotics can displace both native perennial and annual species. The Pakoan Basin has areas of former black brush that have been converted to annual grasslands, dominated by non-native red brome and schismus. Particularly alarming is the way in which invasive annuals promote a cycle of continuing invasion by altering natural processes within their growing environment (see below).

Stresses: Altered Fire Regime

The degree to which invasive species have displaced native annual grasses and forbs is unknown since no baseline pre-livestock condition has been documented. However, it is known that the current situation creates a significant fuel load for sweeping brush fires - an unnatural process to which the native plant community has not evolved adaptations (D'Antonio and Vitousek 1992; Vasek 1980; Tratz & Vogel 1977; Reynolds and Bohning 1956).

Mortality resulting from heat and smoke are the most obvious direct negative impacts on desert flora and fauna by fire. However, indirect effects such as

habitat changes that occur in a fire's wake pose a more long-lasting and extended threat to fire-intolerant plants and wildlife in the Mojave Desert. Fire induced habitat changes can cause deleterious impacts to growth, survivorship and recruitment of resident species (Whelan 1995). Recent studies in the Ivanpah Valley and the Arizona Strip, indicate that such fires seriously impact the natural plant community. Blackbrush, creosote, and succulents such as yucca and cacti species are effectively selected against by fire and replaced by short-lived desert shrubs such as brittle bush (*Encelia farinosa*) (Esque 1999; Brown and Minnich 1986; Vasek 1983). It is not known yet whether any regeneration of native perennials will occur in these scorched portions of the Mojave as has been seen in some other desert areas (Brown & Minnich 1986; O'Leary and Minnich 1981).

Compounding the problem, invasive annuals promote what is known as fuel continuity. As species such as red brome carpet a landscape, they form a continuous matrix between perennial shrubs. Where isolated ignitions in the past may have been confined to single shrubs or trees, this newly established matrix allows fire to sweep through the entire landscape (Esque 1999).

Because blackbrush-Joshua tree communities tend to have denser understories, up to 65% blackbrush cover in some instances, the invasion of fine, flashy non-native annual grasses has had a significant impact on the fire regime. Red brome and Mediterranean grasses have invaded the shrub interstitial spaces and connected the naturally occurring fuel load to an unnatural degree. This allows fire starts

to carry much further than they would have before the annual grass invasion. These non-native grasses are also better able to spread into burned areas, compounding the invasive weed problem.

Ultimately, invasion of blackbrush – Joshua tree communities and other Mojave Desert habitats by alien annuals such as cheat grass, schismus grass and red brome, contributes to an increasing grass/fire cycle (D’Antonio and Vitousek 1992). It is characterized by an increasing incidence of fire and subsequent selection against perennial native vegetation in favor of re-colonization by alien annuals. These annuals contribute to a significantly higher fuel load on the landscape, increasing the likelihood of future fire events.

In extreme cases, repeated fires can convert Blackbrush-Joshua Tree communities to a non-native weed dominated Asian Steppe community. Red brome, filaree and Indian wheat (*Plantago insularis*) dominate this non-native steppe community. This has occurred in several locations within the Pakoon Basin, where the inundation of the Colorado River has impacted the local climate. The creation of Lake Mead has created a lake effect, increasing the average annual precipitation and number of lightning strikes, favoring the establishment and spread of non-native invasive plants adapted to burned areas.

Stresses: Altered soil nutrient cycles

Blackbrush-Joshua tree communities also support soil crusts which promote soil processes identical to those discussed in the creosote bursage system section of this document. Areas with sandier soils are particularly at risk for increased soil instability and erosion if the crust layer is lost or damaged.

Stresses: Habitat fragmentation

The stresses to this system are identical to those discussed for the creosote bursage system.

Stresses: Direct Mortality

In areas with severe or repeated wildfires, blackbrush and Joshua trees are often killed. If fires are halted, these long lived shrubs take many years to reach maturity and to acquire the structure present prior to the alteration of the fire regime.

Compounding the slow growth of these key species, it has been shown that blackbrush does not uniformly reestablish within burned areas, but appears only in a 5-10m front advancing from the periphery of intact areas (Todd Esque pers com 2001). Studies are currently underway to determine whether rodent activity is a key mechanism in the dispersal and establishment of blackbrush (personal communication to author by Todd Esque 2001; unreferenced, see Acknowledgments).

Table 4.5
Stresses impacting Blackbrush-Joshua Tree systems in Gold Butte Pakoon

Stresses	Severity Rank	Geographic Scope Rank	Overall Stress Rank
Altered composition/structure	high	very high	High
Altered fire regime	high	high	High
Altered soil nutrient cycles	medium	medium	Medium
Habitat fragmentation	medium	medium	Medium
Direct Mortality	very high	medium	Medium

D. Mojave Desert Wash

Federal / State Status: N/A

Global Rank: N/A

Clark County MSHCP Status: N/A

The most significant dry washes running through the planning area are part of the Grand Wash system (Map C). Many other smaller washes drain from the slopes of the Virgin Mountains and southern ridges.

Ephemeral or dry wash habitats are characterized by sandy soils and loose gravel substrates with intermittent but established stands of desert willow (*Chilopsis linearis*), catclaw (*Acacia greggii*), desert peach (*Prunus fasciculata*) and where the water table is sufficiently shallow, mesquite (*Prosopis glandulosa*). Associated shrubs include non-native

tamarisk (*Tamarix ramosissima*), saltbush (*Atriplex canescens*), quailbush (*Atriplex lentiformis*), wolfberry (*Lycium* spp.), arrowweed (*Pluchea sericea*), and creosote (*Larrea tridentata*).

Ephemeral washes capture and concentrate sheet flow during intense summer rain events. As runoff is collected, moisture infiltration in wash soils exceeds infiltration on the surrounding uplands allowing washes to sustain comparatively higher densities of vegetation over longer periods of time.

In general, the loose soils of dry wash beds of desert washes allow for subterranean excavations of a variety of small mammals and reptiles. For example, the highly eroded bank edges

Table 4.6

Species of interest nested within Mojave Desert Wash system occurrence

Species	Common Name	MSHCP status	Global Rank
<i>Athene cunicularia</i>	Burrowing Owl	high-priority evaluation	G4
<i>Phainopepla nitens</i>	Phainopepla	covered	G5
<i>Lasionycteris noctivagans</i>	silver-haired bat	covered	G5
<i>Antrozous pallidus</i>	pallid bat	n/a	G5
<i>Macrotus californicus</i>	California leaf-nosed bat	n/a	G4
<i>Vulpes macrotus</i>	kit fox	high-priority evaluation	G4
<i>Gopherus agassizii</i>	desert tortoise	covered	G4
<i>Coleonyx variegatus</i>	banded gecko	covered	G5
<i>Crotaphytus insularis</i>	Great Basin collared lizard	covered	G5
<i>Dipsosaurus dorsalis</i>	desert iguana	covered	G5
<i>Eumeces gilberti</i>	western red-tailed skink	covered	G5T4
<i>Heloderma suspectum</i>	banded Gila monster	high-priority evaluation	G4T4
<i>Sauromalus obesus</i>	western chuckwalla	covered	G5
<i>Crotalus cerastes</i>	sidewinder	covered	G5

of ephemeral washes provide excellent substrates for burrows and dens utilized by kit fox, burrowing owl, and desert tortoise. The vertical structural diversity supplied by catclaw acacia and desert willow also benefits passerine bird species by supplying rare, shady foraging and nesting sites in the otherwise uniform desert scrub dominated landscape. Faunal richness and vegetative structural diversity in washes particularly benefit predatory species such as banded Gila monster which use the washes to prey on eggs, ground nesting birds, small mammals and other reptiles. In addition, two bat species are considered to be wash-obligates in Nevada, the pallid bat (*Antrozus pallidus*) and the California leaf-nosed bat (*Macrotus californicus*) (Altenbach and others 2002). Both of these bats are likely to be found in this planning area, but systematic studies of bat diversity are lacking in this portion of the Mojave Desert (Williams, pers. comm. 2002).

Catclaw acacia and mesquite contribute significantly to the community by fixing nitrogen in the soil and producing seeds that are heavily utilized by wildlife. Mesquite seeds were also an important food source for Native Americans in the past.

Several bee species are known to rely upon mesquite for pollen which is gathered and fed to nesting young (Griswold and others 1999). Mesquite is also important to many other desert dwellers because it produces pollen at a time when most other species are not flowering. In addition to the above values, washes function as corridors through which vertebrates and invertebrates alike can move through the desert landscape.

This target system includes Clark County MSHCP (RECON 2000) washes and catclaw mesquite ecosystems.

Stresses: Altered composition and structure

In some areas, native plants are being displaced by tamarisk (*Tamarix* spp.) This central Asian tree consumes vast amounts of water and deposits large quantities of salts on its foliage. When this foliage drops throughout the year, it increases the salinity of the surrounding soils, and reduces the growth and germination of other plant species.

Tamarisk is currently not a major source of stress to the majority of washes in the Gold Butte Pagoon area, but it is present in the planning area. While wildlife do utilize tamarisk when it is present, as noted above it displaces native tree and shrub species as well as understory species. Some native species, such as mesquite, produce pollen and other resources at key times of the year. The lifecycles of insects and other species may be timed to take advantage of these resources. Displacement of native species by invasives such as tamarisk could put many other species at risk. Other non-native, invasive species are likely to be introduced into wash systems at the shore of Lake Mead.

Stresses: Harvest

Mesquite wood is a favorite source of firewood for recreational users and local community members. At this time the harvest pressure is not great, but as use of the area continues to increase, wood harvest can be expected to increase as well.

Stresses: Altered soil layers

While wash systems are dynamic and subject to periodic scouring during flood events, anthropogenic changes to the structure of the wash corridor can be detrimental. Downcutting of wash walls and disturbance or compaction of fine textured soils in smaller washes can alter the system.

In some areas, the steep walls of the wash corridor have been worn down by repeated use as egress into the wash by vehicles and or livestock. The impacts this may have on the hydrology and

stability of the wash corridor are unknown.

Because washes are cut through the surface geology, the soil types may be quite different throughout the length of the wash. Washes which cut through finer textured soils are more prone to rutting and compaction throughout repeated vehicular traffic. Compaction of the soils degrades their value as burrow sites for animals, and decreases the likelihood of germination of wash-adapted plant species.

Table 4.7
Stresses Impacting Mojave Desert Wash systems in Gold Butte Pakoon

Stresses	Severity Rank	Geographic Scope Rank	Overall Stress Rank
Altered composition/structure	high	high	High
Harvest	high	medium	Medium
Altered soil layers	high	low	Low

E. Mixed Conifer / Mountain Shrubland Systems

Federal / State Status: N/A

Global Rank: N/A

Clark County MSHCP Status: N/A

The Virgin Mountains rise up from the creosote bursage and blackbrush-Joshua tree systems to reach a height of 8075 feet on Virgin Peak. The Virgin mountain range spans the Nevada-Arizona state line, and houses several stands of a relictual white fir (*Abies concolor*) - Douglas fir (*Pseudotsuga menziesii*) - ponderosa pine (*Pinus ponderosa*) system. These communities are found in rocky, north-east facing slopes below the Virgin Peak Ranges, Black Rock Mountain and Mount Bangs above 7000 feet. These patchy occurrences are relicts of a time when the communities were more widespread in the region. The rocky north facing slopes produce a microclimate that is colder on average than other parts of these desert mountain peaks. Other associated plant species include mountain mahogany (*Cercocarpus ledifolius*), buckbrush (*Ceanothus greggii*), manzanita (*Arctostaphylos* spp.) and snowberry (*Symphoricarpos* spp.) These communities are somewhat different from the white fir dominated communities found in the Spring Mountains and Sheep Mountains, as there are fewer associated conifer species in the Virgin Mountains. The American Peregrine Falcon (*Falco peregrinus anatum*), silver-haired bat (*Lasionycteris noctivagans*) and western red-tailed skink (*Eumeces gilberti*) all utilize these fir and pine stands. Ponderosa pine was apparently extirpated from the Nevada portion of

the Virgin Mountains during wildfires which occurred in the 1940s (Niles and others 1996), but persists in several stands on the Arizona side.

Below these relictual fir-pine communities at elevations between 3600 and 7400 feet is a system comprised of single-leaf pinyon (*Pinus monophylla*), Utah juniper (*Juniperus osteosperma*), and mountain shrub communities.

Above 5000 feet the Virgin Mountains are dominated by a mountain shrub community composed primarily of manzanita (*Arctostaphylos mexicana* and *A. pringlei*), oak (*Quercus gambelii*), mountain mahogany, silktassel (*Garrya flavescens*), and buckbrush. This shrub community forms a wide band on the mountain tops and surrounds the fir and pine community. The primary components of the shrub community form a very dense overstory about three feet in height.

Pinyon and juniper dominated communities occur below the mountain shrub community from 3600 to 7400 feet. The mountain shrub and pinyon-juniper communities do not form a strict boundary and mix freely within their ecotone. The pinyon-juniper community is dominated by a mix of single-leaf pinyon and Utah juniper. Mountain mahogany is a primary associated tree species. Sagebrush, rabbitbrush, oak, alder leaf mahogany (*Cercocarpus montanus*), bitterbrush (*Purshia tridentata*), little leaf mountain mahogany (*Cercocarpus intricatus*), and cliffrose (*Cowania mexicana*) are shrubs associated with the pinyon-juniper community.

One occurrence of a community strongly dominated by single-leaf pinyon has been recorded below Azure Ridge at Summit Springs.

Dispersed Utah juniper dominated plant communities can be found at lower elevations in the Virgin Mountains and on some of the southern ridges. Primary associated shrub species include sagebrush (*Artemesia* spp.), rabbitbrush (*Chrysothamnus* spp.), and blackbrush.

Several scattered single-leaf pinyon dominated communities can be found at higher elevations on the Virgin Mountain Range. Primary associated shrub species include sagebrush, blackbrush and Fremont mahonia (*Mahonia fremontii*).

Several animals reside in both the mountain shrub community and the pinyon-juniper communities. These include the speckled rattlesnake (*Crotalus mitchelli*), the large-spotted leopard lizard (*Gambelia wislizenii*), and the American Peregrine Falcon which nests on high rocky outcrops within these communities. Other species are found in the pinyon-juniper communities but not the mountain shrub community. Examples include the silver-haired bat, western red-tailed skink. The banded gecko (*Coleonyx variegatus*) inhabits the mountain shrub and pinyon communities but has never been seen in purely juniper habitats.

This target system includes Clark County MSHCP (RECON 2000) mixed conifer and pinyon-juniper ecosystems.

Table 4.8

Species of interest nested within the Mixed Conifer / Mountain Shrubland

Species	Common Name	MSHCP status	Global Rank
<i>Falco peregrinus anatum</i>	American Peregrine Falcon	covered	G4T3
<i>Viero vicinior</i>	Gray Vireo	medium-priority evaluation	G4
<i>Lasionycteris noctivagans</i>	silver-haired bat	covered	G5
<i>Vulpes macrotis</i>	kit fox	high-priority evaluation	G4
<i>Coleonyx variegatus</i>	banded gecko	covered	G5
<i>Crotaphytus insularis</i>	Great Basin collared lizard	covered	G5
<i>Eumeces gilberti</i>	western red-tailed skink	covered	G5T4
<i>Gambelia wislizenii</i>	large-spotted leopard lizard	covered	G5
<i>Heloderma suspectum</i>	banded Gila monster	high-priority evaluation	G4T4
<i>Phrynosoma platyrhinos</i>	southern desert horned lizard	high-priority evaluation	G5T5
<i>Crotalus mitchellii</i>	speckled rattlesnake	covered	G5
<i>Lampropeltis pyromelana</i>	Black Mountain kingsnake	n/a	G5T3
<i>Hesperodoria scopulorum</i>	Grand Canyon evening daisy	n/a	G4
<i>Lomatium graveolens</i> var. <i>clarkii</i>	Clark parsley	medium-priority evaluation	G4
<i>Townsendia smithii</i>	Blackrock ground daisy	n/a	G1

Stresses: Altered fire regime

This system is quite remote and inaccessible, thus fires are most likely caused by lightning strikes or wildfires creeping up the mountain side from lower elevation vegetation. The invasion of the blackbrush-Joshua tree system by fine flashy fuels will likely impact the fire regime of these adjacent higher elevation communities, in particular the pinyon-juniper system.

Stresses: Altered composition and structure

Past grazing has likely introduced non-native plants into the understory of the higher altitude systems. What alterations have been or might be caused by these non-native plants are not known at this time.

Table 4.9
Stresses Impacting Mixed Conifer/ Pinyon-Juniper systems in Gold Butte Pakoon

Stresses	Severity Rank	Geographic Scope Rank	Overall Stress Rank
Alteration of fire regime	medium	high	Medium
Altered composition and structure	medium	very high	Medium

F. Spring Communities

Federal / State Status: N/A

Global Rank: N/A

Clark County MSHCP Status: N/A

In a water-limited environment such as the Mojave Desert, springs and seeps are important for wildlife and often support a suite of plants unable to establish in drier areas. Springs with perennial flows may also support aquatic species of plants and animals. Common spring adapted plants include sedge (*Carex* spp.), bulrush (*Scirpus* spp.) and spike-rush (*Eleocharis* spp.). Perennial springs at higher elevations support currant (*Ribes cereum*), coyote willow (*Salix exigua*), rose (*Rosa woodsii*), cottonwood (*Populus fremontii*) and arrow-weed (*Pluchea serecia*) (Niles and others 1996).

Animals from surrounding habitats will travel to springs for the abundant water and lush vegetation, including Nelson's desert bighorn sheep, birds, predators and other wildlife. Bats are also attracted to springs by abundant insects and open water which they can drink on the wing at spring brooks with open

canopied vegetation (Altenbach and others 2002). Amphibians can also often be found at spring systems.

There are several springs and seeps throughout the planning area. Two springs in particular are quite large; Juanita and Tassi/Seven Springs. All springs in the planning area have been significantly altered for livestock and other human uses. The Grand Wash springsnail (*Pyrgulopsis bacchus*) is the only endemic spring species known from the planning area.

While the relict leopard frog (*Rana onca*) is not currently known from the planning area, the potential exists for populations to be sustained in refugia within the planning area. Historic water improvements (livestock watering tanks) could prove to be critical refugia in the short term for this candidate species.

Additional information on each of the springs in the Nevada portion of the planning area is being compiled by the Clark County MSHCP Low Elevation Springs Technical Working Group.

Table 4.10
Species of interest nested within spring system target occurrence

Species	Common Name	MSHCP status	Global Rank
<i>Lasionycteris noctivagans</i>	silver-haired bat	covered	G5
<i>Bufo microscaphus micoscaphus</i>	Arizona toad	high-priority evaluation	G3G4
<i>Bufo punctatus</i>	red-spotted toad	n/a	G5
<i>Rana onca</i>	relict leopard frog		
<i>Pyrgulopsis bacchus</i>	Grand Wash springsnail	n/a	G1
<i>Pyrgulopsis deserta</i>	desert springsnail	n/a	G2

Stresses: Modification of outflow

Every spring in the planning area has been altered for livestock grazing within the last 100 years. Spring outflows have been piped and diverted into ponds or tanks to provide predictable water sources. These diversions have in some cases completely eliminated spring communities. In other locations, the extent of spring vegetation has been severely reduced by the reduction of water flow.

Stresses: Altered composition and structure

Some spring communities persist inside livestock exclusion fencing and where topography limits trampling. Non-native plant species found at seeps and springs in the planning area include California fan palm (*Washingtonia filifera*), tamarisk and Malta star thistle (*Centaurea melitensis*). The extent of non-native species present at privately held springs is uncertain.

Stresses: Nutrient loading

Non-native grazers tend to congregate around water sources. This leads to compaction of soils, trampling of

vegetation, and large inputs of waste products. Such large inputs of waste drastically alter the amounts of available nitrogen and phosphorus in the soils. This excess of nutrients can lead to overly vigorous plant growth when trampling pressures are removed. This unnaturally lush plant growth can choke off the natural spring brook by utilizing all available waters at what appeared to be springs with perennial water flow.

Unnatural nutrient loading may also favor weedy native or non-native plants, creating a less-diverse plant community with a different structure than would be expected at a spring with natural nutrient levels. All of these impacts need to be considered if spring restoration is key to rehabilitation efforts for specific wildlife species.

Stresses: Groundwater depletion

Extraction of groundwater above the spring head may decrease outflow, and thus the extent of vegetation and wildlife supported by the spring. This is most likely to occur in the Virgin Mountains, and would likely only affect a few springs in the planning area.

Table 4. 11
Stresses Impacting Spring Communities in Gold Butte Pagoon

Stresses	Severity Rank	Geographic Scope Rank	Overall Stress Rank
Altered composition/structure	very high	very high	Very High
Modification of outflow	very high	very high	Very High
Nutrient loading	high	high	High
Groundwater depletion	very high	low	Low

G. Sand Substrate Dependent Communities

Federal / State Status: N/A

Global Rank: N/A

Clark County MSHCP Status: N/A

Several areas within the Gold Butte Pakoon area have significant depth of sand or sand predominated soils. These areas support unique communities of plants and animals, many of which are adapted to the high rates of water percolation and in some cases the natural movement of sandy soils. There are two types of sand dominated communities in the Gold Butte Pakoon area. The sandstone outcrops in the area have been eroded over time and significant deposits of this “red” sand occur in valleys throughout the area. The two most significant areas of red sand deposition are the St. Thomas Gap and the Coda Circus area. Along the shores of the Virgin River and Lake Mead, “white” silty sand has also been deposited. These white sand areas support a different suite of plant species, and presumably different animal species as well. Virgin River thistle (*Cirsium virginense*) is a species of interest to land managers which is restricted to these white sand areas.

There are no dominant shrubs that can be used to consistently characterize these communities, rather there are several herbaceous plants that are commonly found on sand dunes and in sandy areas. Three corner milkvetch (*Astragalus geyeri* var. *triquetrus*), Nye milkvetch (*A. nyensis*), Mokiak

milkvetch (*A. mokiensis*), sticky buckwheat (*Eriogonum viscidulum*) and Beaver Dam breadroot (*Pediomelum castoreum*) are species of conservation concern which are restricted to sandy soils. These plants in turn are likely to have specialist pollinators or invertebrates associated with them. The Virgin River perdita bee (*Perdita crotonis caerulea*), spurge-loving perdita bee (*P. euphorbiana*) and Virgin River twilight bee (*P. vespertina*) are all thought to be restricted to sand dunes and the plants that are found there (Griswold and others 1999). Additionally, other bees may require sandy areas for nesting, while they may nectar and gather pollen elsewhere in the area. Rodent communities have not been well inventoried for sandy soils in the northeastern Mojave Desert, but are certainly important in seed dispersal for many native plants. The rodent community is also important as food for native predators, such as the sand-restricted sidewinder (*Crotalus cerastes*) and the Mojave green rattlesnake (*Crotalus scutulatus*). The banded Gila monster (*Heloderma suspectum*) is known to use sandy areas as well.

The Rare Plant Working Group of the Clark County MSHCP is tasked with describing habitat and potential habitat for sand-obligate plant species such as three-corner milkvetch and sticky buckwheat, and developing a suite of management recommendations for these and 7 other covered plants and their habitat in Clark County, Nevada.

Table 4.12

Species of interest nested within the Sand Community target occurrence

Species	Common Name	MSHCP status	Global Rank
<i>Heloderma suspectum</i>	banded Gila monster	high-priority evaluation	G4T4
<i>Crotalus cerastes</i>	sidewinder	covered	G5
<i>Crotalus scutulatus</i>	Mojave green rattlesnake	covered	G5T5
<i>Astragalus geyeri</i> var. <i>triquetrus</i>	three-corner milkvetch	covered	G4?T2T3
<i>Astragalus mokiensis</i>	Mokiak milkvetch	medium-priority evaluation	G2G3
<i>Astragalus nyensis</i>	Nye milkvetch	n/a	G3
<i>Cirsium virginense</i>	Virgin River thistle	low-priority evaluation	G2
<i>Eriogonum viscidulum</i>	sticky buckwheat	covered	G2
<i>Pediomelum castoreum</i>	Beaver Dam breadroot	watch list	G3

Stresses: Altered composition and structure

Sandy communities do not appear to be fragile or biologically productive to most desert visitors, because much of the wildlife is nocturnal or lives within the sand column, rather than on the surface. Sandy areas are frequently quite attractive to some individuals as locations for motorized recreation, and commonly show tracks from past vehicular abuse. Rodent, reptile and insects tend to utilize burrows underneath vegetation. The mounds of sand which form underneath vegetation in sandy areas are targeted by some OHV users for jump ramps. This use crushes both plants and animals as well as burrows, resulting in a decrease in wildlife populations (Luckenbach and Bury 1983).

These vehicular incursions also cause significant damage to the plant community within the tracks of the

vehicle, and resulting changes in soil erosion processes may cause further damage to neighboring areas. All areas subject to vehicular traffic are likely points of invasion by non-native weeds such as Mediterranean grass (*Schismus arabicus* and *S. barbatus*), red brome, and Sahara mustard (*Brassica tournefortii*). Non-native weeds, such as Sahara mustard, may be able to exclude native plants by locking up available moisture in their vegetative structures (Bossard and others 2000).

Stresses: Altered soil dynamics

Another consideration for sandy communities is the degree of stabilization of the sand deposit. Actively moving and growing dune areas will need to have their sand source and sand transportation corridor protected as well. It does not appear that this is a consideration for the sandy areas within the planning area, but more study of the individual sand deposits

should be conducted to ensure that active dunes are not cut off from their sand source(s).

Unnatural stabilization of actively moving sand can drastically alter the dynamics of the entire community. Mediterranean grasses have been seen to establish in relatively mobile sand. These non-native species have very persistent, fine roots which continue to stabilize the sandy soil even after the plant dies. This unnatural stabilization of sandy soils can allow additional non-native species to invade, including Sahara mustard. Such an invasion of non-native weeds also adds to the alteration of the composition and structure of the sand community.

Stresses: Habitat fragmentation

The St. Thomas Gap Road splits a significant sand system in half, and is a continuing source of stress to this system. Any wildlife that crosses the road is a greater risk of predation or crushing by vehicles. It is highly unlikely that this road will ever be

closed or re-routed, because this road is one of two entrances to the newly designated Grand Canyon Parashant National Monument.

In addition, sandy areas are frequently attractive areas for motorized activities such as hill climbs and other recreational activities. Repeated incursions can create a linear disturbance which fragments the system, reducing movement of animals between the fragments. The presence of OHV activity also significantly inhibits wildlife movement.

Stresses: Habitat destruction or conversion

If any of the sandy areas in the Gold Butte Pakoon area rely on sand sources located outside of the planning area, it is possible that those sources will be blocked in the future. This alteration of sand input could cause an eventual decrease in extent or destruction of the sandy habitat, as existing sands are dispersed and depleted.

Table 4.13
Stresses Impacting Sand Substrate Communities in Gold Butte Pagoon

Stresses	Severity Rank	Geographic Scope Rank	Overall Stress Rank
Altered composition/structure	medium	high	Medium
Altered soil layers	high	medium	Medium
Habitat fragmentation	medium	low	Low
Habitat destruction or conversion	very high	low	Low

H. Gypsophilic Community

Federal / State Status: none

Global Rank:

Clark County MSHCP Status:

Gypsum dominated soils have driven the evolution of a suite of edaphically endemic species. Plants and animals have adapted to the unique conditions of gypsum soils, and are tightly interwoven with ecological needs/functions. Perhaps the most important biotic component of the gypsum outcrops is the soil crust. Biological soil crusts are composed of many small to microscopic fungi algae and other soil species and are easily overlooked in a plan that is accustomed to listing species, not conglomerations of species from different kingdoms not easily seen with the naked eye, and for which there are no vocal advocacy groups.

The crust performs many essential functions in the gypsum soil community. Moisture retention and aiding in deep percolation of rainwater that would otherwise run off in surface flow is a key function of biological soil crusts (BLM 2001). Soil crusts also appear to be a major source of nitrogen fixation in desert environments as well (BLM 2001). The topography of the soil crust creates microclimates and fissures for seeds to potentially lodge in and germinate as well.

The Las Vegas bearpoppy (*Arctomecon californica*) is covered under the Clark County MSHCP and is perhaps the most well publicized denizen of gypsum soils in the Mojave desert. The poppy is restricted to the gypsum outcrops, along with another Clark County MSHCP

covered plant, the sticky ringstem (*Anulocaulis leisolenus*). Other gypsum restricted species found in Gold Butte Pakeon planning area are the Las Vegas buckwheat (*Eriogonum* sp.), sunray (*Enceliopsis argophylla* var. *grandiflora*) . Indigo bush (*Psoralea fremontii*) and Parry sandpaper plant (*Petalonyx parryi*) are most commonly found on soils with gypsum content. Several bee species are also known to be associated upon the gypsum restricted plants. The dalea blister bee specializes on indigo bush, and the Mojave poppy bee (*Perdita meconis*) specializes on two species of *Arctomecon* poppies and occasionally visits *Argemone* prickly poppies. (Griswold and others 1999) The Mojave poppy bee may be an important pollinator for the Las Vegas bearpoppy, but is not known from all populations of the bearpoppy. It is possible that the bee's nesting requirements are not met near all bearpoppy locations. More knowledge of the bee's role in the pollination of the bearpoppy, and the bee's nesting biology would allow land managers to make better decisions about land uses near gypsum outcrops to protect this bee, and probably enhance the viability of Las Vegas bearpoppy populations in the planning area.

The Mojave gypsum bee (*Andrena balsamorhizae*) is only known to collect pollen from the sunray, which is a gypsum soil specialist (Griswold and others 1999). It is likely that the Mojave gypsum bee is an important pollinator of the sunray due to this foraging fidelity. The nesting requirements of this bee are also unknown. Without knowledge of the nesting requirements of this important bee, it is difficult for land managers to effectively protect the bee and thus the sunray.

The Rare Plant Working Group of the Clark County MSHCP is tasked with describing habitat and potential habitat for gypsophilic plant species such as Las Vegas bearpoppy and sticky ringstem, and developing a suite of management recommendations for these and 7 other

covered plants and their habitat in Clark County, Nevada.

Table 4.14
Species of interest nested within the Gypsophilic Community target occurrence

Species	Common Name	MSHCP status	Global Rank
<i>Andrena balsamorhizae</i>	Mojave gypsum bee	high-priority evaluation	n/a
<i>Perdita meconis</i>	Mojave poppy bee	high-priority evaluation	n/a
<i>Anulocaulis leioselenus</i>	sticky ringstem	covered	G4
<i>Arctomecon californica</i>	Las Vegas bearpoppy	covered	G3
<i>Enceliopsis argophylla</i> var. <i>grandiflora</i>	silver-leaf sunray	high-priority evaluation	G2G3
<i>Eriogonum corymbosum</i> var. <i>aureum</i>	Las Vegas buckwheat	high-priority evaluation	G5T?
<i>Petalonyx parryi</i>	Parry sandpaper plant	n/a	G2G3

Stresses: Extirpation of pollinators

Because little is known of the life history requirements of any of the suspected pollinators of rare plants such as Las Vegas bearpoppy, silver-leaf sunray, and sticky ringstem, land managers must make assumptions about the actions required to maintain pollinator populations. It is likely that increased use of the planning area will lead to accidental reductions or even local extirpations of key pollinator populations.

Stresses: Altered composition and structure

As in sand substrate communities, gypsum soils are attractive to some off road vehicle users. Hill climbs on gypsum soils crush plants and destroy the fragile soil crusts which are key components of this system.

Red brome has been seen on some gypsum soils, but does not appear to be a threat to these systems. The harsh nature of the gypsum soils inhibits establishment of most non-native invasive plants.

Stresses: Habitat destruction or conversion

Gypsum soils are quite fragile, and the plant community is dependent upon the stabilizing presence of soil crusts. Damage caused by heavy off-highway vehicle use and undirected hiking can lead to deep rutting and soil erosion that effectively reduces the extent of available, secure habitat (Nakata 1983).

Also, the possibility remains of soil disturbance and removal via gypsum mining in the future.

Stresses: Direct mortality or removal

Crushing of plants by off highway vehicles can lead to reduced seed set or mortality of damaged individuals. Also, some poaching of showy plants by uninformed visitors also occurs. Removal of mature plants reduces the population and disturbs the soil crust, which could lead to greater erosion of soils in that general area. Additionally, to the dismay of collectors, virtually 100% mortality of the specimen is assured (Teri Knight, pers comm 2001).

Stresses: Altered soil nutrient cycle

In those areas where the surface soil crust is removed, nutrient cycling and water infiltration is reduced. This minimizes plant productivity in the area. Light damage to soil crusts can be restored, but it can take many decades for soil crusts to fully recover (BLM 2001) and approach former levels of nitrogen fixation and rates of water infiltration.

Table 4.15
Stresses Impacting Gypsophilic Communities in Gold Butte Pagoon

Stresses	Severity Rank	Geographic Scope Rank	Overall Stress Rank
Extirpation of pollinators	very high	high	High
Altered composition/structure	high	medium	Medium
Habitat destruction or conversion	very high	medium	Medium
Altered soil nutrient cycle	high	low	Low
Direct mortality/removal	very high	low	Low

CHAPTER 5

SITE GOALS

Goals for the planning area and its conservation targets provide the direction for management and set benchmarks by which success can be measured. Though this section of the plan precedes a discussion of ecological processes and feasibility assessment, the development of benchmarks is an iterative process that depends heavily on these analyses. Goals were established for targets based on their relevance and contribution to fulfilling the proposed overall vision for the planning area. The feasibility of achieving goals (including the compatibility with goals already set by relevant land management agencies) and the ability to measure success or failure in achieving goals were also taken into account.

Goals for the Gold Butte Pakoon planning area:

1. *Maintain stable and/or increasing populations of desert tortoise and other native plant and animal species. Where effective population monitoring techniques and baseline data are absent, efforts should be focused on protecting known habitats and processes that sustain these species (see goals 2, 3, 4, and 5 below).*
2. *Maintain or increase current extent of undisturbed and unfragmented sand, gypsum, creosote-bursage scrub, and blackbrush-Joshua tree communities.*
3. *Maintain, and where possible, re-establish connectivity of linear ephemeral wash habitats within the planning area in order to provide for critical habitat and movement of target species.*
4. *Maintain or increase current extent of functioning spring communities throughout the planning area.*
5. *Maintain current extent of lower montane systems and their component species.*
6. *Decrease or maintain current extent of converted Asian steppe non-native grassland communities*

CHAPTER 6

SOURCES OF STRESS

Responsible Use of Recognized Roads

The stresses contributed by the responsible use of recognized, existing roads is limited to those roads which currently exist, and are discussed below. Stresses caused by new road incursions are discussed in the section on misuse of vehicles off of roads.

Stress Contribution:

Direct Destruction and Removal of Individuals / Targets

Research into the effects of roads and highways on desert tortoise populations indicates that these features exert a depressive influence on tortoise populations over time. The effect is detectable anywhere from 1.6 kilometers (Nicholson 1978) to more than 4.5 kilometers away from the edge of the road (Marlow and Hoff 1993) depending on traffic levels and amount of time the road has been in place.

Habitat Fragmentation

Roads fragment habitat according to the degree to which individual organisms are unable to traverse roadways without being struck by vehicular traffic and to the degree to which the road represents a swath of "non-habitat" that an organism is unwilling to enter. Habitat fragmentation has a cascade of negative impacts on species including limiting access to food sources and reproductive

opportunity, disruption of seasonal migrations, and prevention of genetic exchange between populations (Nicholson 1978). Further research is required to determine what volumes of traffic and at what widths roads become effectively impassable to a variety of species of concern.

Habitat Destruction / Degradation / Removal

The cumulative impact of replacement of Mojave Desert scrub by the gravel and asphalt of roadbeds can amount to a significant loss of natural habitat (Vasek 1975). Soil disturbance incurred during road construction often creates the opportunity for non-native invasive plants to take root in the otherwise impenetrable desert soil crust (Zink and others 1995). The process of blading road shoulders during regular road maintenance maintains this artificial disturbance regime. Alien grasses and other opportunistic invasive plant species such as Sahara mustard (*Brassica tournifortii*), red brome (*Bromus rubens*), cheatgrass (*B. tectorum*), Mediterranean grass (*Schismus arabus* and *S. barbatus*), and Russian thistle (*Salsola kali*) along road edges subsequently serve as a proximate seed source for proliferation into the adjacent disturbed areas of creosote scrub vegetation.

The use of gravel borrow pits in road maintenance adds to the net loss of creosote scrub habitats in the planning area. These material sites and the roads into them may have footprints from one

to five acres and are rapidly colonized by red brome and Russian thistle.

Secondary county roads and OHV dirt tracks also contribute to cumulative habitat loss. The process of blading these routes completely denudes them and soil compaction from traffic ensures that these roadways remain barren. While the proliferation of dirt roads may constitute a significant acreage, it is likely that these rough bladed roads do not represent a complete loss of habitat since wildlife may still make use of them. In fact, reptilian species can often be found warming themselves or foraging on exposed roadways (Artz 1989). However, this scenario can and often does contribute to an increase in direct mortality from vehicle crushing. In addition, the network of roads and trails further encourages human exploration of previously unattainable areas within conserved landscapes. This human exploration can introduce non-native weeds, lead to new road incursions, and increase the incidence of wildfire. Over time, the exponential effect of such unmanaged human activities can render these landscapes non-functional with respect to the intended goal of habitat and species conservation.

Alteration of natural fire regimes

The introduction of non-native species such as red brome can dramatically alter the natural fire regimes of Mojave Desert communities. Blackbrush and Joshua tree communities in a natural condition are estimated to have a 35-100+ year fire return interval with small areas of fire spread. The introduction of red brome, a fine flashy fuel which persists past its growing season, has not only significantly increased fuel continuity among infested blackbrush

communities, but has reduced the fire return interval to 8-10 years. Not only do roadways encourage the spread of non-native weed seeds along the roadways, they encourage off road incursions that increase the possibility of spread into more pristine areas. The likelihood of fire ignition also increases with human recreation in these formerly remote areas. Because red brome easily establishes in burned areas, a cycle of invasion and burning with subsequent expansion of the weed population is a serious threat to native communities with long-lived shrubs which do not easily reestablish after fires (Todd Esquepers comm 2001).

Urgency:

Highways and Roads

The Gold Butte Pakoona area has two major roads; the New Gold Butte Road in Nevada (a BLM designated Back Country By Way), and Clark County Road 113 which continues into the Grand Canyon Parashant National Monument in Arizona. Several other roads make much of the area fairly accessible for recreation. Use of this area has been steadily increasing, and this trend is expected to continue as the Las Vegas metropolitan area continues to grow and local communities such as Mesquite experience growth.

Roads within the Lake Mead National Recreation Area have been inventoried and road designations are complete. The extent of roads within the Nevada BLM portion of the planning area have been inventoried with the assistance of a local non-profit organization, Partners in Conservation. A road inventory is also being conducted in the Arizona BLM portion of the area. Because the

road designation process is not complete within the BLM managed portions of the planning area, the proliferation of road incursions has been and continues to be a major source of stress to the species and natural communities within the planning area.

Many of these roads pass through desert tortoise habitat through creosote bursage and blackbrush dominated communities. While the New Gold Butte Road has been designated a Back Country By Way and is slated to be maintained in it's current fairly primitive state, portions of the road are paved and pressures will likely grow for improved maintenance and the addition of traveler amenities as use of the road continues to increase.

Compounding the potential for biological damage along the Grand Wash Road is its path through parts of the Grand Wash. At several locations, the road travels through gullies and Mojave Desert wash habitat. Fauna that migrates along these wash corridors will eventually intersect the road, increasing the likelihood of traffic related wildlife mortality. Further, where a road crosses a wash, it creates the opportunity for drivers to leave the road and to drive through the wash. If this occurs frequently enough, a new road will be *de facto* created through sensitive habitat.

Secondary Dirt Roads and OHV Trails

At this time, the Gold Butte Pakoon area is subject to relatively moderate OHV recreational activity. However, several locations in the planning area have experienced a proliferation of roads that run in parallel, intertwine and have a number of off-road spurs emerging

from them. This problem is apparent in and around the Whitney Pockets area near the Gold Butte Road. Similar unnecessary road proliferation can be found in some parts of the southern portion of the planning area in and around the site of Gold Butte. These roads provide access to otherwise roadless and pristine areas and introduce a variety of impacts to the area as described previously. Enforcement of the existing, recognized roads is extremely difficult as road designations have not yet been completed.

Misuse of Vehicles Off of Recognized Roads

OHVs and their use in the desert have been the subject of intense scrutiny by the scientific community as well as the general public. There is substantial concern about the effects such intensive recreation is having on the fragile desert ecosystem. Studies published since the 1970's have consistently pointed towards the lasting effect that vehicular travel has on fragile desert ecosystems (Adams and others 1981; Webb and Wilshire 1983; Wilshire and Nakata 1976; Luckenbach 1975; Stebbins 1974). The impacts that OHVs exert on various natural resources are also well documented in the Desert Tortoise (Mojave Population) Recovery Plan (FWS 1994). The plan provides a good synopsis of the published literature on OHV recreation impacts on the desert ecosystem as well as both direct and indirect impacts that this activity exerts on desert tortoises.

Stress Contribution:

Direct Destruction and Removal of Individuals / Targets

Recent studies on OHV activity have concentrated on desert tortoise and have indicated that direct negative impacts include significant rate of mortality resulting from crushing of individuals or collapsing of occupied burrows (Burge 1983, Bury et al 1977, Bury 1987, Woodman 1983). Additionally, OHV activity invariably increases the opportunity for vandalism of resources and poaching of wildlife species.

Habitat Destruction / Degradation / Removal

Recent studies have demonstrated that OHV activity has a wide range of negative impacts on desert tortoise habitat. Habitat destruction and degradation includes the crushing of burrows and nests, and the removal of vegetation tortoises use for food and cover (Burge 1983, Bury et al 1977, Bury 1987, Woodman 1983).

OHV activity is also a potentially devastating source of new weed infestations along each new road incursion. This alteration of the native vegetation composition can render the landscape non-functional with respect to the intended goal of habitat and species conservation in the planning area.

Habitat Fragmentation

The degree to which OHV activity contributes to habitat fragmentation is outlined under the discussion of secondary roads found above under

Sources of Stress: *Responsible Use of Recognized Roads.*

Urgency:

Recreational use of the Gold Butte Pagoon area has been increasing steadily. Even in the portion of the planning area where road designations have been completed by the National Park Service, off road incursions are common (NPS 1999). The burgeoning population of Clark County combined with increasing OHV restrictions in traditional OHV use areas will likely increase recreational pressures in the Gold Butte Pagoon area. The designation of the Grand Canyon-Parashant National Monument has generated increased recreational interest in this area. Municipal development and human populations along Interstate 15 in the cities of Mesquite, Overton, and Logandale NV and Littlefield, UT further increase the urgency of addressing this threat in the near future. Enforcing the recognized, existing roads and restricting off road incursions is made difficult by the incomplete inventory and road designation process in the BLM portion of the planning area.

Non-Motorized Recreational Activities

Recreational activities such as hiking, picnicking, camping and mountain biking also have impacts on the planning area. In most cases, these activities take place in conjunction with a vehicle pull over adjacent to a roadway, and are thus not completely separate from vehicular use of the planning area.

Stress contribution:

Altered Predation Regime

Recreational users often bring items that may be left in the planning area such as food wrappers or leftover food items which can provide sustenance for Common Ravens, feral dogs and / or coyotes. This additional source of food for these opportunistic predators could increase predator population levels to such a degree that native species, such as desert tortoises, are negatively impacted.

Additionally, some recreational users bring unleashed dogs into the planning area. Unleashed dogs present a source of disturbance and even predation upon smaller native wildlife such as rodents, lizards and desert tortoises.

Habitat Destruction / Degradation

It should be noted that intensive mountain bike use would represent a significant erosive force on the landscape were it to become a popular pursuit in the planning area as it has in neighboring Southern Utah communities. Additionally, the random cumulative impacts to soils and vegetation resulting from vehicular pullovers and parking by hikers and campers could become problematic if appropriate measures such as planned staging and parking areas are not undertaken. Also, recreation users accessing the planning area via Lake Mead by boat are an additional source of weed invasions in the planning area.

Altered Fire Regime

The presence of humans in backcountry areas of the planning area will increase

the potential for wildfire. The ignition sources are varied, with campfires representing the most obvious opportunity for accidental ignition of a grass fire. Vehicle emission control devices (catalytic converters) present an additional potential ignition source. Recreational users are also likely sources of new weed invasions which can alter the fire regime.

Urgency:

Hiking, mountain biking and other non-motorized activities are gaining popularity with the urban populace of Southern Nevada. Boaters also access the planning area via Lake Mead and engage in non-motorized recreational activities. However, these forms of recreation have so far been minimally developed in the planning area. Distance from Las Vegas and the availability of closer and better-known recreation areas such as Red Rock Canyon and Valley of Fire State Park, ensure the continued low profile of the Gold Butte Pakoon area only in the short term. Mountain biking groups have expressed concerns about potential use restrictions in the Grand Canyon Parashant National Monument in the recent past, and a group mountain biking endurance event is proposed for the southern portion of the planning area in the fall of 2002. As is the case with vehicular recreation, municipal growth that will likely occur along Interstate 15 in Nevada and Utah could increase non-motorized recreational pressures in the fairly near future.

Incompatible Grazing Practices (Map F)

Since 1885, livestock grazing has been practiced in the Mojave Desert in Arizona (BLM 1999b) and southern Nevada (BLM 1998). The Taylor Grazing Act of 1934 was created as an attempt to “stop injury to public lands by preventing overgrazing and soil deterioration.” The effects of this historic grazing excess are still evident in changes in soil stability, plant structure and composition of the vegetative community (Fleischner 1994; Belsky 1987; Laycock 1967; Ellison 1960).

All grazing allotments within portions of the planning area managed by the Las Vegas Field Office have been administratively closed by the BLM as directed by the Las Vegas RMP (BLM 1998). However, there are approximately 100 head of trespass cattle remaining on the Bunkerville allotment (see Map F). These cattle tend to congregate around springs in the northwest slopes of the Virgin Mountains on the Nevada side of the area.

Grazing allotments remain open in most of the Arizona Strip, as per the MDAASRMP (BLM 1999b). However, the MDAASRMP directed closure of portions of the Pakoon Springs and Pakoon allotments, as well as the entire Tassi and Mosby-Ney allotments. The Mosby-Ney allotment closure is currently under appeal and grazing continues pending a court decision. Cattle also remain on the closed Tassi allotment although no appeal of the closure decision was ever filed. Allotments within the Virgin Slope

ACEC boundaries are to remain open to livestock grazing from October 15 to March 15 of each year.

There is also an active burro herd management area on the Nevada BLM managed lands, with a goal of maintaining 100 head of burros. The herd management area on the Arizona BLM lands has been “zeroed out” and is managed for a zero population level. Lake Mead National Recreation Area has had a burro herd in the past, but is also zeroed out at this time. Burros frequently cross from BLM lands to LMNRA to water at the shores of Lake Mead, despite fencing designed to keep them out of NPS lands. The burro herd has also impacted gypsum habitat at the northern end of Lime Ridge on BLM lands

Berry (1978) provides a good overview of the relationships, both direct and indirect, of historic livestock grazing practices and current grazing operations on the ecological processes significant to desert tortoise reproduction and survival. A summary of this work is provided below.

Stress Contribution:

Habitat Destruction / Degradation

Soil disturbance, consumption of native flora and the introduction of alien grass seed sources, all contribute to the alteration of the native annual plant community in grazed areas. Webb and Stielstra (1979) estimated that livestock grazing in the Mojave Desert scrub of California has resulted in a 60% reduction in above-ground biomass of annuals and from 16-29% decrease in cover of perennial shrubs. Spring areas used by cattle for drinking water are

often severely trampled, compacted and devoid of vegetation. The removal of overstory vegetative shrub cover impacts desert tortoise and other vertebrates by decreasing available cover serving as protection from both predator detection and solar radiation. Additionally, in the wake of livestock disturbance, alien annual grasses introduced by feed supplies and plant material transported on livestock hides, can quickly become established. Consequently, native plant composition is replaced by exotic "weedy" species (Lovich and Bainbridge 1999). The extent to which this change in vegetative composition alters nutritional balance and fire regime is discussed below.

Burros also likely compete with desert tortoise and other native wildlife for forage, but this has not yet been documented. The burro herd has also impacted gypsum habitat at the northern end of Lime Ridge on BLM lands

Habitat Fragmentation

Grazing contributes to habitat fragmentation through the creation of roads and trails to service grazing operations (corrals, water troughs, and pipelines). These roads if heavily used by ranchers, livestock and OHV recreationists, have the potential of isolating fragments of habitat and terrestrial vertebrates from the larger planning area (see below, Sources of Stress: *Linear Features*).

Altered soil nutrient cycles

As noted in Chapter 4, the soils throughout the planning area have been significantly altered by anthropogenic

disturbances. Few examples remain of intact biological soil crust within the planning area. The resulting loss in soil stability reduces infiltration of moisture from rain events (BLM 2001). Also, biological soil crusts and the lichens associated with them are key to the fixation of nitrogen (BLM 2001) and the uptake of other vital plant nutrients (Harper and Belnap 2001).

In areas long used by cattle and burros for watering, waste inputs from the urine and feces of these grazers can be quite high. Such unnaturally high levels of nutrients can significantly alter the vegetation community structure and composition when restoration of the site begins. This unnatural lush growth of vegetation due to unnaturally high levels of nutrients can choke off water flow from the spring during periods of low flow (Jim Moore pers comm 2002).

Direct destruction and Removal of Individuals / Targets

The direct impacts on Mojave Desert flora and fauna from grazing include the trampling of soft-shelled, young age-class tortoises, the crushing of burrows (sometimes with inhabitants still inside) and the trampling and/or consumption of plant species important for forage or cover, and the severe soil compaction near springs and other watering sites.

Altered Fire Regime

By contributing to the proliferation of alien annual grasses through soil disturbance and seed introduction, livestock grazing leads to alterations in Mojave Desert fire regimes as discussed in Chapter 4, *Targets: Creosote-Bursage Scrub*.

Altered Nutritional Availability

Nutritional competition between livestock and desert tortoise has been demonstrated by USGS-BRD studies which showed dietary overlap between tortoise and cattle by up to 38%. These studies also demonstrated that grazing pressures impact tortoise nutrition by limiting the availability of a preferred forb (*Malacothrix californica*) and forcing tortoises to feed on exotic annuals like split grass (*Schismus barbatus*) (Avery 1999, Oftedal 1994).

In addition to direct nutritional competition, the propensity of grazing to promote the invasion of alien grasses into the native creosote leads to reduced nutritional variety for tortoise. The availability of a variety of nutritional choices is believed to be an essential component to the recovery and continued viability of tortoise and other herbivore populations in the Mojave (see Chapter 4, Conservation Targets.)

Urgency:

Impacts from past grazing in the area will likely continue for decades. Native species must contend with introduced weeds, altered nutrient cycles and reduced extent of protective biological soil crusts. This will make recovery of native vegetation a slow process in a water limited environment such as the Mojave Desert.

All grazing allotments within the planning area which are managed by the Las Vegas District Office of the BLM have been administratively closed, as directed by the RMP (BLM 1998), but trespass cattle do remain. Grazing allotments in the Arizona portion of the

planning area which are currently open are to remain open to grazing subject to seasonal utilization restrictions identified in Biological Opinion File No.: 1-5-98-F-053 (FWS 1998). All open Arizona BLM allotments below 3500 feet are designated for limited, ephemeral usage (BLM 1999b). The burro herd in the Nevada portion of the planning area is managed for 100 head of burros (BLM 1998).

Continued trespass cattle, burro population levels and livestock grazing in various portions of the planning area will continue to have negative direct and indirect impacts on native species and natural communities within the planning area.

Mining, Mineral, and Material Entry

Stress Contribution:

Habitat Destruction / Degradation / Removal

Desert tortoises will return to sand and gravel pits where mining operations have been completed, and they will utilize the berms on the perimeter of the pits for burrow construction (Sid Slone and Jeannie Cole, BLM wildlife biologists, pers. comm. 1994). However, this may merely represent re-colonization of a now less-productive habitat, and it is unlikely that these disturbed areas do anything to augment or promote recovery of the population. The typical invasion of Russian thistle and other opportunistic, invasive, exotic plants in the remaining pit area should not be considered as rehabilitated, suitable habitat for desert tortoises. The topographic features, annual and

perennial plant community, soil composition and function, and resident vertebrate and invertebrate communities have been effectively and perhaps permanently, altered or eliminated from the ecosystem.

Direct destruction and Removal of Individuals / Target

A substantial increase in road building, subsequent vehicular traffic, and off-road driving can be expected to accompany any new mine development. The increase in vehicular traffic proportionally increases the risk of terrestrial vertebrates being hit, crushed or trapped in collapsed burrow sites. If mining activity is not appropriately mitigated (i.e. fenced and patrolled), mine sites, particularly open pits, can act as depressive population sinks on local vertebrates. Individuals that wander into the midst of mining operations stand a high probability of being killed by machinery or other related mine activities. This one-way movement of individuals can become a drain on a population if mitigation measures such as fencing are not undertaken at the outset.

Introduction of Toxicants

New heap leaching technologies employed by the gold mining industry pose a potential toxicological threat to the surrounding landscape and ecosystem. If not properly impounded, cyanide wastes generated during the heap leach process may be incidentally transported off-site by intense rain events (Lovich and Bainbridge 1999). The impact of such chemical releases, which would be likely to flow into the dry wash systems, is at this time difficult to predict. Similarly, the

probability of impoundment failure is unknown. Nonetheless, introduction of highly concentrated and mobile elements with known toxic impacts to biota should be carefully considered in the consultation process of future mining applications.

Altered Hydrology

Many mining processes require large volumes of water for on-site mineral and material processing. To the extent that this water is removed from local aquifers, there is the potential for water table draw down. Such withdrawals may dry up surface springs and may deprive phreatophytes such as mesquite and catclaw acacia, of a stable ground water supply.

Urgency:

In the Wilderness and WSA lands within the planning area, no surface disturbance activities are currently permitted. In the newly designated National Monument, only the existing wilderness areas have fluid leasing restrictions. ACECs are open to fluid mineral leasing subject to “no surface occupancy” stipulations. No fluid leases are currently held in the area, nor is the area considered as having a high potential to yield such resources in the future.

Hard rock mineral mining does not occur in the planning area and heap leach technology is not currently a source of stress. There are active plans of operation for several mines within the planning area which use other methods for extracting locatable minerals. The natural communities that were once present where material excavation is taking place have been irrevocably removed from the

ecosystem and additional stresses (invasion by non-native species, soil erosion) may continue to be exerted offsite. The degree to which these mines withdraw water from groundwater that supplies springs in the planning area is unknown. Dust and noise generated from the mining operation may also negatively impact the nearby dry wash and mesquite woodland communities. Drift of terrestrial and avian species onto the mine site may result in the direct take of individual organisms.

There are several active mining notices on public land in the planning area. The potential for future mineral, material and fluid extraction enterprises in the planning area is yet unknown. The planning area has not traditionally been considered as having a high potential for profitable mineral exploration. The Las Vegas RMP has mandated withdrawal of ACEC designated lands from mineral and material entry subject to valid existing claims. Although the withdrawal process is long and expensive, the costs must be weighed against the risk of a new discovery being made in the planning area. Segregation and withdrawal of the ACECs in the NV portion of the planning area may be accomplished through proposed federal legislation (US Senate 2002). Portions of the planning area within the Grand Canyon Parashant National Monument have been withdrawn from locatable mineral mining through the Monument designation proclamation process.

The Las Vegas RMP established that free use permits may be permitted for government entities within 0.5 miles of county roads, if they provide for public benefit. Further stipulations regarding material site surface disturbances may

be found in the Las Vegas RMP (BLM 1998). In the Nevada portion of the Gold Butte Pakoon planning area, free use permits are permitted along all major county roads.

In the Arizona portion of the planning area, the MDAASRMP (BLM 1999b) directs that no new material site ROWs be permitted, and that existing ROWs not be renewed within ACECs. ROW permits are allowed outside ACECs with restrictions similar to Nevada BLM lands. More details can be found in the MDAASRMP (BLM 1999b).

Mineral material borrow pits tend to be small but their cumulative effects may constitute a significant loss of Mojave Desert scrub and/or a further impediment to movement of terrestrial vertebrates across the landscape. The demand for sand and gravel in particular puts ephemeral washes and the species that utilize them at risk. These materials are deposited in large, accessible quantities in dry washes and may be targeted for quick and easy removal.

Rights of Way

On federal lands, private entities may apply for and receive rights to use the federal lands without obtaining any fee title to those lands. Utility lines, towers, pipelines, communication sites and road access to facilities, private lands or mining claims are all instances of rights of way (ROWs) granted on federal lands. All of these rights of way create at least temporary and often permanent linear disturbances across the landscape. While utility towers and communication sites in and of themselves represent discrete points of disturbance,

maintenance and access roads to these sites represent linear disturbances on the landscape that may stresses to a wide variety of native species. The impacts of all roads and trails is discussed on page 6-1, and the discussion below will focus on utility line ROW stress contributions.

Stress Contribution:

Habitat Destruction / Degradation / Removal

The footprint created during the construction of a major utility line includes wire pulling sites, marshalling yards, tower anchors, tower footings, or trenches for buried lines, and the roadways built to access those sites. Construction activity may result in the direct loss of vegetation, soil compaction or at other times, erosion (Vasek and others 1975). Caliche caves, rock coversites and other tortoise burrow habitat may be crushed by heavy equipment, or destroyed during blasting activity. Other projects authorized through the granting of ROWs have similar impacts.

The total footprint of impacted terrain for an existing power line may seem minimal relative to the surrounding undisturbed areas. Nonetheless, the cumulative acreage of tower footings and maintenance roads from several power lines could constitute a major loss of habitat from the landscape. Temporary disturbance areas used during construction and maintenance also contribute to the degradation of the surrounding habitat, even after restoration actions are completed. Maintenance roads also contribute to habitat degradation by providing new

recreational vehicular access routes into previously undisturbed habitats.

Habitat Fragmentation

A lengthy array of utility tower bases and associated maintenance roads can create a significant linear obstacle to wildlife migration in the planning area. Utility lines and roads constitute swaths of land with minimal vegetative cover, increased vehicular traffic, and superb predator habitat. It seems likely that this combination could pose a substantial barrier to terrestrial vertebrate movement over time (Nicholson 1978). Unfortunately, little data is available regarding the relationship between utility line disturbance width and animal movements. Traffic levels on maintenance roads, both from periodic maintenance and casual public use, would be another important determinant of the single ROW or a designated corridor's total ROWs impact as a true barrier.

Direct Mortality or Removal of Individuals

Construction activities including blading of roads and tower footings, associated traffic, and blasting all contribute to the direct loss of individual organisms along utility corridors (Lovich and Bainbridge 1999). Heavy machinery in particular may crush burrows and directly kill burrow occupants or entrap and suffocate them. Plants may be crushed or mechanically removed from the construction site and road path.

Altered Predator Regime

Numbers of opportunistic predators such as coyotes, Common Ravens and dogs may increase as a result of the human presence in the area while utility construction is underway. Of more long-term significance are predator regime alterations stemming from the use of high towers as perch sites by Common Ravens. Transmission towers would form a network of platforms throughout the utility corridor's length, from which Common Ravens could increase the effectiveness of prey detection and capture (Boarman 1999). Studies conducted on the behalf of the Clark County DCP in the Eldorado Valley found significant deposits of juvenile tortoise carcasses below Common Raven perch sites (McCullough 1995). Utility towers also provide a well distributed supply of potential nesting sites for Common Ravens.

Habitat Destruction / Degradation

Not only do the tower footprints of above ground utility lines destroy habitat, but associated maintenance roads remove linear swaths of available habitat for native species.

Altered Composition / Structure

Areas that are restored after utility line construction are quite different in plant community composition. Non-native species are also afforded an opportunity for invasion both during construction and as adjacent maintenance roads are used by utility crews and the general public. This difference in vegetative composition makes these areas less suitable habitat for desert tortoises and other native species. Perhaps more importantly, however, these areas differ in the vertical structure provided by the

plant community. Within restored areas, plants are commonly smaller and more widely spaced, leaving open areas for animals to traverse at greater risk of predation.

Urgency:

No utility ROWs are currently located within the planning area (see Map E), however, the possibility does exist for ROWs to be granted in the future. Although the Las Vegas RMP and MDAASRMP consider ACECs to be right of way avoidance areas, new utility lines and pipelines and expansions are possible within existing corridors, and may not be totally contained within designated utility corridors. Notably, the MDAASRMP does not direct avoidance of ROWs within the Virgin Slope ACEC (BLM 1999b). The possibility of a ROW being granted in this ACEC is therefor much higher than in other ACECs. New construction as well as expansion and maintenance of existing lines/pipelines are subject to restoration requirements, but restored areas are not equal in habitat value to undisturbed lands.

Alteration of spring outflows

Stress Contribution:

Altered Composition / Structure

When spring flows are reduced, riparian vegetation is reduced in extent. Some riparian vegetation may be eliminated from springs that no longer produce enough water flow at key times of the year. Alterations of spring outflow

coupled with invasion by non-native species such as tamarisk degrade the value of springs as habitat for native wildlife, particularly for the Grand Wash Springsnail, endemic to the Gold Butte Pakoon area.

Modification of natural water flows

Reduction or elimination of spring brooks and natural ponds decreases the extent of riparian/spring vegetation and may render the habitat useless to some wildlife as either a water or food source.

Urgency:

All of the springs in the planning area have been altered to varying degrees in the past 100 years. Many of the springs in the planning area have been totally diverted from all portions of their natural spring brooks, and are currently contained in cattle troughs, tanks or piped off to drier areas to serve as “range improvements” to facilitate livestock operations. Native spring and riparian vegetation is absent.

This significant alteration of spring flows does have some benefit to wildlife as bats are able to utilize the open waters to drink on the wing, and potentially some of these range improvements may serve as short-term refugia for declining populations of the relict leopard frog (*Rana onca*).

CHAPTER 7

THREATS ANALYSES

A “threat” is actually a combination of a stress and a source of stress. When determining corrective action, the *source* is the thing on which land managers should focus their *threat abatement strategies*. This is based upon the assumption that abatement of the source will alleviate the stress and result in higher viability and health of the conservation target(s). In those cases where it is not feasible to abate a source, or when the stress persists after the source is removed, land managers should consider *restoration strategies* to directly maintain, enhance, or restore the viability of the conservation target(s).

Threats were assessed for the Gold Butte Pagoon planning area using a three step process. First, for each conservation target, a threat rank is calculated for each stress-source combination. Next, again for each conservation target, the threat ranks for each source are combined across stresses into a combined threat rank. Finally, for each source of stress, the combined threat ranks are

consolidated across conservation targets into a critical threat rank of “Very High”, “High”, “Medium”, or “Low”. The results of these analyses are represented in table 7.1. Criteria for ranking can be found in Appendix II. The complete set of tables and rankings that generated the final critical threats table can be found in Appendix III.

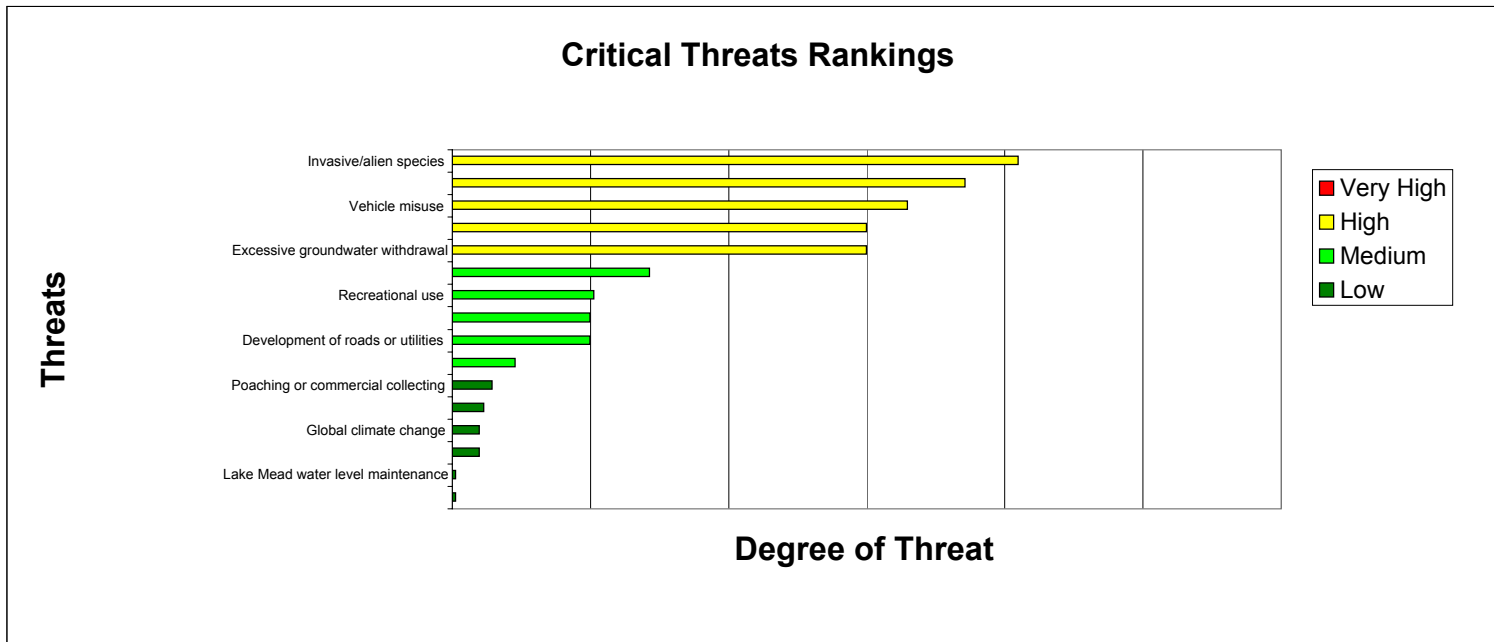
This matrix is designed only as a tool to help put stresses and sources of stress in perspective throughout the landscape. Rankings are qualitatively based and do not represent absolutes. Rather they reflect the sum of expert opinion and data available in current literature regarding the planning area and other landscapes of similar character. Because the relative importance of threats across the landscape is expected to change over time as threat abatement and restoration strategies are implemented, this matrix may be updated periodically according to the criteria in Appendix II.

Summary of Active Threats

(Threat Rank Across Systems)

Gold Butte

Active Threats Across Systems	Creosote- Bursage Community	Gypsophilic Community	Blackbrush/ Joshua Tree Community	Sand Substrate Communitie s	Spring Communitie s	Washes	Mixed Conifer / Pinyon- Juniper System	Desert Tortoise	Overall Threat Rank	Total Score
Invasive/alien species	-	-	High	-	Very High	-	Medium	High	High	4.10
Incompatible Grazing practices	Medium	Low	-	-	Very High	High	-	Medium	High	3.72
Vehicle misuse	Medium	Medium	High	Medium	-	High	-	High	High	3.30
Operation of ditches, dikes, drainage or diversion systems	-	-	-	-	Very High	-	-	-	High	3.00
Excessive groundwater withdrawal	-	-	-	-	Very High	-	-	-	High	3.00
Responsible use of open roads	Medium	-	High	Low	-	Low	-	Medium	Medium	1.43
Recreational use	Low	-	High	-	-	-	-	-	Medium	1.03
Ignorance leading to loss of pollinator	-	High	-	-	-	-	-	-	Medium	1.00
Development of roads or utilities	-	-	-	-	-	-	-	High	Medium	1.00
Mining practices	Low	Medium	Medium	Low	-	-	-	-	Medium	0.46
Poaching or commercial collecting	Low	Low	Low	-	-	Medium	-	-	Low	0.29
Oil or gas drilling	Low	-	Medium	-	-	-	-	-	Low	0.23
Global climate change	-	-	-	-	-	-	Medium	-	Low	0.20
Utility lines	-	-	-	-	-	-	-	Medium	Low	0.20
Lake Mead water level maintenance	-	-	-	Low	-	-	-	-	Low	0.03
Fire suppression techniques	-	-	-	-	-	-	Low	-	Low	0.03
Threat Status for Targets and Site	Medium	Medium	High	Low	Very High	High	Medium	High	High	



CHAPTER 8

STAKEHOLDER ASSESSMENT

An analysis of entities with an interest in the Gold Butte Pakoon planning area was an important step in conservation strategy development. Identification of those parties who have a stake (either by law, mandate, or management directive) in how the planning area is managed was facilitated by the following guiding questions:

- Who would benefit if the recommended actions were undertaken and/or if the goals for the Gold Butte Pakoon planning area were met?
- Who would be harmed, or might believe they would be harmed if the recommended actions were undertaken and/or if the goals for the Gold Butte Pakoon planning area were met?
- Who has the authority to make decisions affecting the management of the Gold Butte Pakoon area?

Stakeholders may include private landowners, industry, elected officials, land management agencies, and government entities.

After identifying those parties who have a stake in how the planning area is managed, two essential questions were addressed for each. First, how will the stakeholder affect plan implementation? Secondly, how will plan implementation affect the stakeholder? A stakeholder analysis for the Gold Butte Pakoon area is found in table 8.1.

Table 8.1.
Stakeholder Analyses for the Gold Butte Pakoon Planning Area

STAKEHOLDER	IMPACT OF STAKEHOLDER ON PLAN IMPLEMENTATION	IMPACT OF PLAN ON STAKEHOLDER	UNKNOWNNS
Federal Agencies			
Bureau of Land Management	Chief Land Manager—management actions will be primarily carried out by this agency	- Carrying out recommended management actions will place increased demands on budgets and personnel - Potential for increased agency conflict with county commissions, town boards and users in the planning area	- Are resources available to implement plan? - Is there the political will to implement? - Who will pay for minerals withdrawal process?
National Park Service	Land Manager—management actions will be carried out by this agency	Carrying out recommended management actions will place increased demands on budgets and personnel	Are resources available to implement plan?
Fish and Wildlife Service	Section 7 and 10 consultations will precede surface disturbance development on desert tortoise critical habitat below 5000 feet in planning area.	Conservation of species proposed for coverage in an HCP affects decisions regarding authorization of take permits.	- Which species will be covered under the Clark County MSHCP or Lincoln County HCP? - Results of section 7 consultations

CHAPTER 8 • STAKEHOLDER ASSESSMENT

STAKEHOLDER	IMPACT OF STAKEHOLDER ON PLAN IMPLEMENTATION	IMPACT OF PLAN ON STAKEHOLDER	UNKNOWN
State Agencies			
Arizona Fish and Game	- Responsible for managing wildlife resources in the planning area. - Will be an important participant in plan implementation and monitoring.	Plan may increase demands on agency resources and increase conflict with land users	Degree to which plan target species and communities overlap with agency goals for game management
Nevada Division of Wildlife	- Responsible for managing wildlife resources in the planning area. - Will be an important participant in plan implementation and monitoring.	Plan may increase demands on agency resources and increase conflict with land users.	Willingness to commit to plan recommendations in the face of various political forces at the state and county level.
Nevada Department of Transportation	Road construction, maintenance and use of material rights of way along Highways may have negative impacts on targets.	Recommendations on construction, maintenance and use of material rights of way have the potential of restricting or increasing costs of roadwork.	- Future road/highway developments? - Which material sites will be needed and when?
Arizona Department of Transportation	Road construction, maintenance and use of material rights of way along Highways may have negative impacts on targets.	Recommendations on construction, maintenance and use of material rights of way have the potential of restricting or increasing costs of roadwork.	- Future road/highway developments? - Which material sites will be needed and when?
Nevada Division of Minerals	Influence mineral withdrawal process in ACECs and WSAs.	Plan recommendations may affect mineral withdrawal designations.	What are the long-range interests in the rare earth minerals in the planning area?

CHAPTER 8 • STAKEHOLDER ASSESSMENT

STAKEHOLDER	IMPACT OF STAKEHOLDER ON PLAN IMPLEMENTATION	IMPACT OF PLAN ON STAKEHOLDER	UNKNOWN
County Government			
Clark County Commission	Implementation of Plan and future research in the planning area should be funded in part by Clark County development mitigation funds.	Conservation actions in Gold Butte DWMA provide protection for MSHCP species and helps guarantee their covered status and keep the Section 10 permit valid..	Willingness of Clark County to facilitate exchange of private inholdings in the planning area for other lands in Clark County?

CHAPTER 9

AREA SPECIFIC MANAGEMENT RECOMMENDATIONS

Map G

Introduction

The following recommendations are organized according to 6 zones. These zones represent discreet areas within the planning area that have common management needs. These commonalties may stem from shared conservation targets, shared ecological

processes, shared threats, shared land management authority or any combination of the above. Zones 1 through 6 are depicted in Map G. Within each zone, threat prevention and mitigation strategies are discussed and evaluated according to their potential benefit, feasibility, and cost.

ZONE 1

Zone 1 (Figure 9.1) consists of the private inholdings that have the potential for future municipal or industrial development.

ACQUISITION/EXCHANGE

In the interest of efficiency, acquisition and exchange strategies are considered together. Both strategies share the result of shifting the ownership of private property out of the hands of development interests and into public ownership.

Benefits: Acquisition or exchange of isolated private lands would bring benefit to conservation targets in the planning area since potential threats stemming from municipal and industrial development would be removed from these site.

Judging from BLM land exchange efforts in the past, acquisition or exchange would be a time consuming process taking at least two to three years if not longer. However, threat alleviation would essentially begin from the start of negotiations provided the process was carried through to its intended end.

Probability of Success: The political climate for land acquisition and exchange has improved since the passage of the Southern Nevada Public Lands Management Act (SNPLMA 1998). This legislation allows for the disposal of public lands through auction and/or exchange with proceeds from sales being partially applied to offset environmental damage caused by development within Las Vegas Valley.

These proceeds might be applied to the purchase of the private inholdings within the Nevada portion of the Gold Butte Pakoon planning area. In addition to proceeds from the SNPLMA, financial resources may also be found in the Clark County MSHCP fund.

The exchange option would be complicated by difficulties in finding suitable exchange lands. It seems probable that suitable exchange lands could be identified in Clark County. The willingness of the land owners to either sell or exchange their lands is unknown at this time.

Costs: While a dollar amount is not currently available, the financial cost of purchasing a majority of these properties would be significant. Even if sufficient monies were identified, the purchase would consume a portion of the pool of resources which would then be unavailable to other regional conservation projects. In the case of exchange, it should likewise be recognized that exchange lands within the Las Vegas Valley have considerable value and the use of these lands in the exchange process represents an opportunity cost to the BLM.

EASEMENT

This management option involves engaging each landowner and negotiating an easement in which the owner is compensated for restricting the scope and degree of development that occurs on the property. Minimum easement conditions would preclude municipal development in favor of limited industrial development with stringent minimization and mitigation requirements imposed.

Benefits: This option has significantly less benefit for conservation targets in the planning area than acquisition and/or exchange. Nonetheless, localized industrial use would pose fewer threats to the DWMA than residential /recreational development. Further, negotiating an easement may be achievable in a shorter timeframe than either acquisition or exchange.

Probability of Success: Numerous examples exist in the southwest and elsewhere of successful conservation easements. The Boulder City Conservation Easement also provides a precedent for the successful negotiation of a conservation easement over large tracts of private land in Southern Nevada. The Fish and Wildlife Service and Clark County, working through the MSHCP process, presumably retain the same necessary personnel and resources that were required in the Boulder City example, which could be deployed to assist in negotiations of conservation easements over several smaller tracts.

A commitment of monies or possibly exchange lands to offer as compensation for imposing easement restrictions and conditions will be required. Additionally, law enforcement and land management resources will be essential far in the future in order to ensure that the terms of easements are being honored. It is possible that these resources could be made available through the Clark County HCP process. Ultimately, the success of each easement option would depend on whether the needs of the conservation targets in the DWMA could be balanced with the landowners needs to develop the properties in an economically practical manner. There is a moderate

probability that these two competing interests cannot be reconciled.

Cost: In this zone, easements could be implemented at a fraction of the cost of acquisitions. Nonetheless, considerable compensation would likely be required for the settlement of easements if any reasonable protection to conservation targets were to be achieved. Maintenance of long-term easements also require the extended deployment of resources for law enforcement and potential litigation of easement violations. The financial burden of mitigation and minimization measures may also be substantial but still minor compared to the cost of acquisition.

ZONE 2

The contiguous extent of creosote-bursage and blackbrush-Joshua tree vegetation in Gold Butte Pakoon forms the basis for this zone (figure 9.2). The creosote-bursage community in this area represents the highest quality habitat for desert tortoise in the planning area. Additionally, this zone focuses management attention on the larger ecological backdrop of vegetation and soils which constitute important habitat for a great many plant and animal species but which are otherwise shrinking throughout the Mojave Desert. Because this zone represents the bulk of the planning area, strategies that have impacts on the entire area, regardless of zone, are generally presented here.

INTEGRATED RESOURCE MANAGEMENT

While politically separated by the Arizona Nevada state line, the Gold Butte and Pakoon Basin are naturally linked by the Virgin Mountain Range and the lower elevation communities in the St. Thomas Gap area. Both wildlife and public land users cross frequently over land management boundaries. The Gold Butte Back Country Byway is expected to be one of the main gateways for visitors to the Grand Canyon Parashant National Monument (GCPNM). Critical desert tortoise habitat is found on both sides of the St. Thomas Gap, and consistent management of this area would enhance recovery of desert tortoise and other species of concern in this area.

These issues and numerous others support enhancement of the

coordination between land managers in the Gold Butte Pakoon area. Creation of a structure or guiding document to enhance cooperative management by Bureau of Land Management (BLM) Nevada, BLM Arizona, and National Park Service (NPS) Lake Mead National Recreation Area (LMNRA). An integrated management plan for the area is one avenue that would allow for this enhanced cooperation. Cooperative and coordinated road designation processes for both the GCPNM and the Gold Butte area would lead to more consistent road designations and increased public understanding of the importance of this area.

Benefits: This area is of critical importance to recovery of desert tortoise and other species of concern, and a high potential exists for successful conservation of habitat in this planning area. Coordinated management of the Gold Butte Pakoon planning area would improve this potential for conservation success by providing for consistent land use designations, public outreach materials, a coordinated road designation process and more efficiencies in implementation of land management activities.

Feasibility: BLM Arizona and NPS LMNRA are currently coordinating the planning process for the GCPNM, and will continue to coordinate management of this area. BLM Nevada could build upon and enhance this partnership. In particular, there is currently an opportunity to coordinate the public road designation process for GCPNM and the Gold Butte area.

Benefits: Implementation of a coordination process would incur some administrative costs, but these would

likely be offset through the many efficiencies gained in implementation of the public review process for road designations and in public outreach/law enforcement coordination in the future.

ROAD MANAGEMENT & ENFORCEMENT

The most efficient means for managing casual vehicular use in the planning area is to designate secondary roads as open or closed. Designation should be based on the current use patterns of the road, its function, and the sensitivity of the environment through which the road traverses. Roads which pass through sensitive or fragile habitats, such as gypsum soils or washes, should be rerouted or closed.

The proliferation of unauthorized road incursions in this zone is significant and likely to increase as Las Vegas and Mesquite's population grows. Significant cultural sites and access to the shores of Lake Mead for recreation are strong motivation for vehicle users to "punch in" roads a bit further each time they visit an area. To reduce the number and extent of road incursions, and proper signage and enforcement should continue coupled with prompt rehabilitation of unauthorized incursions, and a public outreach and education campaign in Las Vegas and local communities.

This entire area should be put through the BLM and/or Clark County Multiple Species Habitat Conservation Plan (MSHCP) road designation process as soon as possible, with input solicited from stakeholders to designate open roads as soon as possible. This process

takes into account roads which are useful to the community and/or land managers and seeks to rehabilitate redundant and damaging road segments. Road designations in these areas will be accomplished through the public process, involving local government, interest groups, citizens, and local communities. These participants will work with BLM, NPS and Clark County MSHCP to identify both open roads as well as duplicate, unnecessary, and environmentally unsound roads. Through this process, roads will be designated as either open or closed to motorized use. All closed roads should be restored in a timely manner and the efficacy of restoration monitored over time.

Roads that cannot be closed by consensus and which do not appear to be causing any immediate damage to surrounding habitat should remain open and be subject to monitoring of vehicular use over the years via ground patrols, traffic counters and aerial photography. If monitoring indicates that road use is changing over time, either by volume or by type of use, follow-up actions of review, closure, and rehabilitation may be required.

The following criteria for road signage were developed by the BLM Ely Field Office in the Caliente Management Framework Plan Amendment (BLM 2000). Although the Gold Butte Pakeon area is not within that plan's geographic scope, the criteria are recommended for use in this planning area.

- Post entry portals or major intersections with signs that read "Vehicle Travel Limited to Designated Roads and Trails".

- Sign all designated routes open.
- All roads designated as “closed” should be signed, “Restoration in Progress”, and should be restored in a timely manner.

Benefits: Once the road designation process is complete, it will be clearer to all parties which roads are open for use and which are new incursions. This will enable proper education and signage about the uses of open roads, and facilitate quick detection and restoration of new incursions. Vehicular trails and dirt roads have proliferated, and are still proliferating in the planning area. It is probable that increasing population pressures stemming from development in the planning area and in nearby Las Vegas may intensify this proliferation to the point where significant habitat destruction and fragmentation result. Before such pressures build, it is important that unnecessary and duplicative roads be closed. It is especially important to document baseline use of these roads now in order to detect potentially harmful trends in road usage in the future. In addition, secondary roads that travel through biologically sensitive areas should be reviewed for closure or alternative management to minimize impacts to the sensitive habitat.

Feasibility: Much of Zone 2 is contained within either the LMNRA, the GCPNM), or a BLM Area of Critical Environmental Concern (ACEC). The Gold Butte ACEC is administered by the BLM’s Las Vegas Field Office and the Virgin Slopes and Pakoos Basin ACECs are administered by the Arizona Strip Field Office. Road designations in this areas will be accomplished through the

public process, involving local government, interest groups, citizens, and local communities. These participants will work with BLM to identify both open roads as well as duplicate, unnecessary, and environmentally unsound roads. Through this process, roads will be designated as either open or closed to motorized use. All closed roads should be signed, “Restoration in Progress” and restored in a timely manner and the efficacy of restoration monitored over time. A similar road designation process will be followed during the review of the GCPNM management plan and environmental impact statement. The Pakoos Basin ACEC will be addressed in this planning effort. Road designations in Lake Mead National Recreation Area are complete.

Access from main roads onto closed roads can be discouraged by installing physical barriers, or through landscape re-contouring in an effort to camouflage the presence of formerly open access points. BLM law enforcement would be largely responsible for enforcing restrictions and while law enforcement resources are already stretched thin, detection of vehicular violations should not be difficult with periodic surveillance. Where violations transgress BLM and NPS boundaries, law enforcement from BLM and NPS should cooperate to enforce land use restrictions and provide public education on responsible use.

If necessary, agreements with county and local governments to allow cross-deputization should be pursued to ensure both the safety of the public and the natural resources.

Cost: As mentioned in the previous recommendation, *Integrated Resource Management*, the costs of both the road designation public process, public outreach (signage) and law enforcement could be greatly reduced through coordination between BLM Arizona, BLM Nevada and NPS LMNRA.

Costs of completing separate road designation processes include hiring a community outreach coordinator for the BLM Las Vegas Field Office and working with local community members to complete the BLM/Clark County MSHCP road designation process. GCPNM managers would also incur the cost of a separate road designation process, working with many of the same local community members. Also, the ongoing costs of signage, education, enforcement and restoration of inevitable new incursions must be considered. Road surveys, restoration/re-contouring, posting, and enforcement all have associated costs. However, these expenditures are insubstantial compared to the costs that would be incurred attempting to reduce deleterious vehicular activity in the future if such recreation gains a popular foothold in this zone. It is far more prudent expending funds in the near-term when recreational use is light, than to try to impose rational management restrictions on the planning area in the future when opposition would be greater. This guarantees that even if vehicular popularity rises in this area, the degree and scope of the activity will remain compatible with planning area goals and objectives.

BLM law enforcement would be largely responsible for enforcing restrictions and while law enforcement resources are already stretched thin, detection of

vehicular violations should not be difficult with periodic surveillance. If chronic violations are apparent, resources for additional law enforcement in the Nevada portion of the planning area may be available through Clark County MSHCP mitigation funds. In the past, budgets for additional enforcement such as BLM Rangers have allotted \$55,000 for each additional ranger required. This 1997 price estimate includes vehicle costs.

Where violations transgress state, BLM or NPS boundaries, law enforcement resources should be brought to bear in cooperation with all entities.

Resources for sign posting and restoration are largely in place for the BLM and NPS lands and may be further supplemented with Clark County MSHCP mitigation funds and funding for the GCPNM.

GRAZING ALLOTMENT ACQUISITION AND MANAGEMENT

Trespass cattle in the planning area are unmanaged and causing significant damage to the natural communities where they congregate. Trespass cattle should be removed from the planning area as soon as possible.

Several BLM grazing allotments remain open and active in the Arizona Strip portion of the planning area. Acquisition and/or administrative closure and restoration of these areas to native vegetation is the most effective means of improving these areas for native species. If this is not feasible, continuation and expansion of the

innovative “Grass Bank” is strongly recommended.

The Grass Bank provides relief for permittees when ranges must be temporarily closed, or rested, such as after wildfire. The biological opinion (FWS 1998) for the Mojave Desert Amendment to the Arizona Strip Resource Management Plan (MDAASRMP; BLM 1999b) requires that any tortoise habitat which is burned must be rested from grazing for a minimum of two years. The Parashant allotment is made available for cattle removed from resting allotments. Currently, this is the only allotment available to permit holders through the Grass Bank. Due to severe infestation of non-native fine flashy fuels in the Pakoon Basin, wildfires will likely become more frequent, severe and spread further than in the past. The increased acreage required to accommodate cattle from resting ranges will quickly surpass the capacity of the Parashant allotment. Indeed, this capacity is already being stressed, as it is not economically feasible for permittees to keep cattle in the Parashant for time periods long enough for adequate recovery of range vegetation.

Range improvements in all closed allotments should be evaluated for removal and surveyed for cultural significance. The continued presence of these structures encourages visits by the public and off-road activity. Because the improvements are not being maintained they pose a hazard to both the public and wildlife. Removal of these improvements would allow for restoration of the surrounding disturbed areas. In particular, the areas around water tanks and corrals could be decompacted and restored to native

vegetation. Consideration should be given to the possibility of some of the water tanks being used as short-term refugia for the relict leopard frog (*Rana onca*), and discussions between FWS, BLM, NPS and The Nature Conservancy continued.

Feasibility: Support for closure of additional BLM grazing allotments is not strong at this time, but support for removal of trespass cattle in the Nevada portion of the planning area is growing. It is uncertain if administrative closure of any allotments will be recommended in the management plan for the GCPNM.

The Grass Bank is supported by BLM management and permittees, however, it's expansion is hindered by one provision of the Desert Tortoise Recovery Plan (FWS 1994). As part of the implementation of the Recovery Plan by the BLM Arizona Strip Field Office, BLM agreed to “retire allotments... whenever the preference-holder requests or when the grazing preference is acquired for tortoise conservation” (BLM 1999b). Land managers must seek balance between the gains of retiring allotments outside of desert tortoise critical habitat and the opportunity to allow additional rest to other ranges and allotments in desert tortoise critical habitat. Re-examination of this specific provision of the Desert Tortoise Recovery Plan (FWS 1994) and the appropriate portion of the MDAASRMP (BLM 1999b) might show that in some cases, greater benefit to desert tortoise conservation would be derived from use of some portion of BLM acquired grazing preferences to expand the Grass Bank.

Some resistance to removal of range improvements may arise from members of the public sympathetic to permittees whose allotments were closed. However, hazards to the public and wildlife from unmaintained range improvements should outweigh this resistance.

Cost: Cost of removal of trespass cattle would include some degree of public outreach, either before or after roundups. If trespass cattle are widely dispersed, several roundups may be required.

Costs of expanding the Grass Bank would be consistent with current costs of using the Parashant allotment as a relief to permit holders. The economic losses to permit holders who might not be able to take advantage of the Grass Bank would be considerable.

Before range improvements are altered or removed, an inventory and cultural resources survey by BLM staff would be required. Removal of range improvements such as barbed wire, posts, water impoundments, water tanks and pipe would require a contract for these services. Cost estimates for removal would not be accurate prior to completion of an inventory.

HERD MANAGEMENT AREA CLOSURE AND MANAGEMENT

The herd management area (HMA) for burros in the Nevada portion of the planning area is currently managed for 100 head of burros as directed by the Las Vegas RMP (BLM 1998). Management of this HMA is difficult due to the remoteness of the area and the propensity of the herd to cross

fenced boundaries onto NPS lands. Censuses and monitoring are very difficult, and trespass by this herd onto NPS managed lands causes a management conflict. Significant damage to gypsum soil communities on Lime Ridge and the creosote bursage community in southern Gold Butte has occurred from current and past herd overpopulation (Gayle Marrs-Smith pers. comm. 2002).

Closure of this herd management area to reduce conflicts with neighboring lands, ACECs and MSHCP goals should be considered.

Benefit: Closure of this HMA and removal of all burros would eliminate a source of stress to the gypsum communities and the creosote-bursage communities in the southern portion of the planning area. Closure of this HMA would also eliminate management conflicts with Arizona Strip BLM managed lands and LMNRA.

Feasibility: An evaluation of the Appropriate Management Level (AML) for this herd is possible under the Las Vegas RMP (BLM 1998), and an AML of zero is one possible outcome. Closure of the HMA would require an amendment to the Las Vegas RMP.

Cost: Costs would include evaluating the AML for this burro herd and possibly amending the Las Vegas RMP. If the HMA is to be managed for a zero population level or closed, at least one burro gather would be necessary. More gathers would be necessary if the herd were dispersed throughout the planning area. The remote nature of this area complicates estimates of cost for a burro gather (Ross Haley, NPS, pers. comm. 2002). The cost to BLM of handling,

housing and adopting out all of the animals is estimated at \$300 per animal.

WEED SURVEY AND ABATEMENT

Throughout the planning area weed infestations have been established, and more are a certainty. Along roads, mineral material and mining operation sites, off-road incursions and along the shores of Lake Mead and the Virgin River, new weed species and infestations will be an ongoing stress to the planning area. Monitoring and surveys for new infestations are key to managing this ongoing threat to native species and communities. Timely abatement of weeds is imperative to halt expansion of existing weed infestations.

Benefit: Weed surveys and timely abatement are an accepted best management practice for controlling non-native and invasive species.

Feasibility: Land managers are aware of the urgency of this issue, and mechanisms exist through the agencies and the Clark County MSHCP to monitor and abate weed infestations.

Cost: The Clark County MSHCP Weed Technical Working Group is developing methods and cost estimates for coordinated weed abatement which can be applied to efforts within the Gold Butte Pakoon planning area.

CAMPING MANAGEMENT

Within all BLM managed portions of the planning area, campground designation and management will become more important as use of the area increases. A cultural resource survey is the first

step to identifying and planning for official camp sites.

Benefit: The designation of well planned, official campsites would move camping traffic away from biologically and culturally sensitive areas. The designation of official campsites would also allow for enforcement of camping rules, and for the rehabilitation/restoration of closed camping areas. Properly designed and maintained trash collection facilities at official campsites could decrease the attractiveness of these areas for opportunistic predators such as coyotes, unleashed dogs and Common Ravens. Official campsites could also serve as locations for interpretive signage and public outreach which focuses on the unique natural and cultural resources in the planning area.

Feasibility: The framework and procedures for designating official campsites are well established for this area. If improved campsite facilities for trash collection and fire pits are included at the official campsites, public resistance to these designations should not be great, presuming the official campsites offer similar characteristics to any closed, unofficial campsites.

Cost: Staff time to complete cultural areas inventories of the planning area and to identify sensitive natural resource avoidance areas will be required before official campsites can be planned for.

PUBLIC OUTREACH

The first step towards developing an effective public outreach program is to understand the motivations and values of the audience. A public land users

survey, such as those being conducted for BLM Arizona by Arizona State University and Northern Arizona University, could determine what public land users value in their experience, and what changes they would or would not prefer to see occur. Once completed, such a survey could inform not only the design of a public outreach program, but also assist in the allocation of limited recreation planning funds. For the Nevada portion of the planning area, the Public Information and Education committee of the Clark County MSHCP should be consulted in the design and implementation of such a study.

The next public education priority in the planning area should be to install bullet-proof educational/interpretive kiosks at the entry points to Zone 2 in Nevada and in Arizona. One heavily fortified kiosk should be placed at the northern end of the Gold Butte Back Country ByWay, positioned for motorists traveling south into the planning area. The second kiosk should be placed on the south side of Littlefield for motorists entering the Grand Canyon Parashant National Monument. These kiosks should illustrate that the area they are entering is a conglomerate of lands of varying protection status that together form a single contiguous ecological landscape, vital to the preservation of Mojave Desert wildlife and the continued enjoyment of tourists.

An additional kiosk placed near the St. Thomas Gap road will allow education about desert wildlife and specific information pertinent to management of the sandy communities found there. This kiosk could also highlight the important connection this area provides

to wildlife on both sides of the Arizona Nevada stateline.

Concurrent with the installation of kiosks should be a review of the road designation signing to evaluate effectiveness of message, durability of the actual signs, and clarity of locations to eliminate confusion over which roads are open and which closed.

Another potentially effective avenue for the dissemination of conservation messages would be through public service messages on local highway radio stations that broadcast throughout the Mojave Desert region, both AM and FM. This would reach the greatest number of motorist tourists, truckers, and vehicular participants traveling through the desert.

Outreach programs targeted at key user groups, such as OHV enthusiasts, could prove beneficial to the protection of the Gold Butte Pakeon planning area and Mojave Desert habitats in general. Ride Safe pamphlets coupled with information on appropriate use of vehicles on public lands, road etiquette as well as detailed information on dedicated OHV recreation areas could funnel users onto areas with appropriate amenities.

Additionally, all damaged or downed signage within the planning area should be promptly repaired or replaced. Prompt repair of signs demonstrates to land users that the area is regularly patrolled and maintained.

Benefits: A well informed public should be able to grasp the rationale behind many of the recommended management actions such as signage, law enforcement, the absence of

vehicular racing, and prohibitions against collecting or damaging the natural resources. Understanding the rationale behind these impositions may garner support or at least respect for the conservation efforts being undertaken in the region. At the same time, speedy repair of signs is an important step in tackling the predictable initial negative reaction to these symbols of control and authority.

Feasibility: Partners In Conservation, the Muddy River Restoration and Environmental Information Action Committee and other organizations are currently working with the Clark County MSHCP Public Information and Education committee to conduct public education campaigns in Clark County and the City of Mesquite. Public land user surveys are currently planned for BLM lands in Arizona, and these could be used as a model for the Las Vegas area.

Some effective radio spots were developed for the Clark County Short-term Habitat Conservation Plan, but were dropped in the transition to the MSHCP. They focused primarily on messages that attempted to change attitudes and behavior of Las Vegas Valley residents who visit or recreate in the desert. The messages contained the common theme of “Respect, Protect, and Enjoy your Mojave Desert”. This type of positive reinforcement should be revived and expanded to reach the larger motoring public throughout the Mojave.

Ride Safe pamphlets and other existing recreation materials could easily be ordered and disseminated to key OHV dealerships and groups.

All signs that have been torn down, shot, run over, or defaced, should be replaced as soon as possible, with sufficient backups on hand to insure speedy replacement again and again as they are intentionally destroyed or removed. Funding for such upkeep should be solicited from the Clark County MSHCP mitigation fund as well as from NPS and BLM maintenance budgets.

Costs: A public land users survey could be funded with Clark County MSHCP funds. Public service announcements might be produced in part with pro bono services, and outreach to OHV dealerships and user groups could be accomplished via volunteers. Replacement of signage should be considered a regular cost of doing business in the Mojave Desert.

Kiosks constructed for the Piute-Eldorado planning area cost between \$7,000 and \$9,000 each. Total cost of three kiosks for Gold Butte Pakeon would be between \$14,000 and \$18,000.

GREEN STICKER OHV LICENSING

California has implemented a “Green Sticker Program” to license all off-highway vehicles. A per-vehicle fees is collected annually and the funds are used to provide recreation facilities on public lands. A similar program in Arizona and/or Nevada would allow land management agencies to provide better facilities at designated OHV recreation areas. Funds generated by a Green Sticker Program could also be used to restore off road incursions, as well as fund road inventories,

maintenance and signage on public lands.

Feasibility: The support of several agencies, as well as the State of Nevada and State of Arizona, would be required for creation and implementation of a Green Sticker Program. It is uncertain if this is possible in the current political climate.

Costs: The political and public will to implement a Green Sticker Program would likely require a significant amount of compromise. Also, fee-paying users typically gain more political power than other users, and could lead to an imbalance in public input, and a resulting imbalance in use/management of public lands.

MINERAL AND MATERIAL ENTRY WITHDRAWALS

To the extent that Zone 1 overlaps with BLM ACEC designated lands, the proposed withdrawal of these areas from mineral entry should be pursued immediately. Withdrawal would require that existing claims be subject to validity exams, and those found valid would retain their rights. However, holders of existing rights would have to submit mining plans of operation and would be subject to Section 7 approval of the FWS before operations could begin.

Alternatively, more cost-effective segregation and withdrawal of federal lands from locatable mineral entry may be accomplished through federal legislation.

Saleable material sites are prohibited in ACECs by the Las Vegas RMP.

Placement of these material sites outside of ACEC boundaries should avoid other sensitive habitats as well, such as sand communities likely to harbor rare plants and animals, such as the three-cornered milkvetch (*Astragalus geyeri* var. *triquetrus*). Major wash communities should also be avoided when locating saleable material sites.

Benefits: The time and cost of withdrawing these lands from mineral entry must be weighed against the future risk that a major mining operation will start up in the planning area. While mining pressures are currently quite low in the planning area, changes in commodity prices could suddenly make current known deposits of resources such as gypsum more attractive for extraction. A single large mine could have a significant and widespread impact on all conservation targets in the planning area. Initiation of the withdrawal process would allow for segregation of the area, halting new claims as the withdrawal process moved forward. This would provide some measure of protection to the area during the withdrawal process. Permanent withdrawal from locatable mineral mining in the planning would add an important layer of conservation certainty in the face of future uncertainties regarding future mineral and material demand.

Feasibility: Withdrawal can be a complex, time consuming and expensive process. However, the designation of much of Zone 2 as BLM ACEC lands provides a management framework under which these withdrawals could be completed. The Las Vegas RMP has mandated withdrawal of ACEC designated lands from locatable mineral entry (subject to

valid and existing rights), and a similar directive should be included in the management plan amendment for the GCPNM. Since few claims currently exist in the planning area, and the potential for locatable minerals is fairly low throughout much of the area, resistance to withdrawal should be moderate. Additionally, the Clark County MSHCP process has created an atmosphere in which the political will is currently in place to proceed with withdrawal. The process of withdrawal includes completion of mineral reports outlining the ACECs past and potential future value as a mineral producing area, multiple notification of claim holders, and completion of an Environmental Impact Statement. In addition to BLM budgets, Clark County MSHCP mitigation funds should be solicited to support the withdrawal process within Clark County.

The proposed Clark County Conservation of Public Land and Natural Resources Act of 2002 (S 2612; US Senate 2002) provides for the segregation and withdrawal of all ACECs designated for such in the Las Vegas RMP (BLM 1998). This withdrawal exempts valid and existing rights. If passed in current form, this would segregate and withdraw the Nevada ACECs from locatable mineral entry at substantial cost savings to the BLM.

Cost: Cost of the withdrawal process in BLM staff time to complete the necessary steps for withdrawal would be difficult to estimate. Included in this process are validity exams by BLM staff for all existing claims in the area proposed for withdrawal. A previous estimate of \$0.50 per acre (Sid Sloan, BLM, pers. comm. 1999) can be used to

set a minimum cost per acre. However, passage of S 2612 in its current form would accomplish withdrawal at a substantial cost savings to BLM.

The loss of revenues to both the mineral industry and to the public (in the form of royalties and lease revenues) resulting from withdrawal is highly dependent on variables in commodity prices and therefore extremely difficult to predict.

ORGANIZED OHV REGULATION

No organized OHV (vehicular) events, competitive, speed or otherwise, should be permitted in any portion of the planning area. If organized vehicular use cannot be prevented, minimization efforts should be focused on restricting the event footprint to the roadbed of authorized event routes. Spectator areas are not allowed in ACECs within this zone. A dramatically increased law enforcement presence may be required during events to ensure impacts are contained. Monitoring of events should be aimed at detecting impacts emanating from both participants and spectators outside of the designated route.

Benefits: Closure of the planning area to organized vehicular activity should effectively relieve the entire planning area from impacts that are incurred by concentrated recreational vehicular traffic. Complete closure, even to non-speed organized events, would alleviate the need for potentially expensive monitoring, implementation of minimization measures, and the permit review process.

Feasibility: Potential vehicular routes in fall largely upon ACEC and national monument designated lands—all of which have already been proposed as off-limits to vehicular events. The proximity of designated event routes in nearby Mormon Mesa combined with the current low use of the planning area as an organized vehicular destination, may be the only protection available for this zone.

Cost: Revenue lost by race organizers would be negligible considering that the planning area is not currently used as an organized vehicular route. Closing the zone to events completely would require an amendment of the Las Vegas RMP and inclusion of a similar designation in the management plan amendment for the GCPNM. Closure of the planning area to all organized OHV events without the buy-in of that user group would incur a political cost, as such an action would alienate a traditionally organized and vocal group. However, monitoring of any permitted organized events and minimization /restoration measures that must be implemented in conjunction with an event would be expensive.

UTILITY RIGHTS OF WAY

No rights of way (ROWs) for utility lines, either above ground lines or buried pipelines, should be approved within the planning area. No ROW corridor has been designated in the planning area, and no ROWs are currently within the planning area. The ACECs within the planning area are all designated ROW avoidance, areas, however, the proximity of the Interstate 15 corridor makes future applications possible.

Benefits: Refusal of ROW applications within the planning area would ensure that no habitat fragmentation, habitat disturbance, or further alteration of the predator regimes would impact the planning area from this source. The remoteness and peninsular nature of the planning area offers a unique opportunity for conservation success and attainment of Clark County MSHCP goals, GCPNM goals, and the goals set forth in this document. Utility ROWs within the planning area could compromise this opportunity.

Feasibility: The FWS and BLM are equipped with the necessary resources to make recommendations on the granting and routing of utility ROWs. However, recommendations concerning utilities are complicated by the impact such restrictions may have on interstate commerce. Political, regulatory and economic forces have the potential to outstrip the ability of the FWS and BLM to manage ROWs for the benefit of conservation targets. Federal statutes against stacking of power lines are just one example of the complex issues at stake.

Costs: Re-routing of proposed ROWs might lead to an increase in the cost of delivery to power customers, but this is unlikely due to the proximity of an existing ROW corridor outside of the Gold Butte Pakoon planning area, north of Interstate 15.

ANIMAL AND PLANT COLLECTION MORATORIUM

Commercial and casual collection of both plant and animal species should be prohibited throughout the planning area. Exceptions should be made for scientific study, use in restoration projects, and limited, individual, personal animal husbandry.

Benefits: Animal and plant collection pressures may currently be light, nonetheless increasing human populations and collection restrictions elsewhere in the region could focus new collection activities in the planning area. Taking a clear and enforceable position regarding collection now, will provide an essential hedge against the uncertainties surrounding future collection threats.

Feasibility: Prohibition of commercial collection has been made possible under the ACEC designation framework in the Nevada portion of the planning area, and a similar management directive should be included in the GCPNM. The Las Vegas District RMP prohibits commercial collection of flora in designated ACECs. The Las Vegas RMP also requires that NDOW complete either a credible study or investigation demonstrating that commercial collection of wildlife does not adversely impact affected species or their habitat before commercial collection is authorized (BLM 1998).

Unfortunately, due to the remote nature and vast acreage of this region, it is impossible to know the extent of the illegal poaching of both animals and plant material. Current law

enforcement efforts funded by the Clark County HCP are recognized as inadequate to prevent these activities. Further, there is a need to ensure uniform law enforcement throughout the planning area. Patrols by BLM law enforcement from the Arizona Strip and Las Vegas Districts as well as NPS law enforcement staff need to be coordinated to ensure maximum frequency and coverage of patrols while minimizing costs.

Costs: The most significant costs involved in regulating animal and plant collection is accrued in enforcement of those regulations. In the past, budgets for additional enforcement such as BLM law enforcement have allotted \$55,000 for each additional law enforcement personnel required. This price 1997 includes vehicle costs.

ZONE 3

Zone 3 consists of the many sand and gypsum soil dependent communities scattered throughout zone 2. The extent of these communities in Clark County, Nevada is currently being mapped by the Biological Resources Research Center in an effort to better describe the components of these communities. While both sand and gypsum communities will benefit from all management recommendations discussed for zone 2, their delicate soils and attractiveness for recreational use requires special mention of two management recommendations.

ROAD DESIGNATION

Whenever possible, roads which pass through these areas should be closed or re-routed. Where this is not feasible, signage and fencing should be installed to protect the fragile soil crusts from damage caused by road use, road incursions, and from human trampling.

Benefits: Reduction or elimination of off road incursions would greatly reduce damage to the vegetation, animal burrows and soil crusts in these communities caused by the vehicle or hikers and the subsequent erosion of soils. Roads are also a primary means of weed seed spread, and rerouting of roads would reduce the likelihood of new weed invasions in these sensitive habitats.

Feasibility: The road inventory and designation process which has commenced for the BLM portions of the planning area make it possible for roads which threaten these systems to be closed or rerouted.

Costs: See Zone 2, Road Designation for a discussion of associated costs.

MINERAL AND MATERIAL ENTRY

Sandy habitats likely to support rare or special status plants or animals, such as the three-corner milkvetch (*Astragalus geyeri* var. *triquetrus*), should be avoided for saleable material entry.

Feasibility: The Clark County MSHCP has provided for no net unmitigated loss of habitat for covered species, such as the three-corner milkvetch, even if their habitat falls into multiple-use managed areas, but only if the majority of the species' habitat is represented in such multiple use managed areas (RECON 2000). Surveys to establish the locations of sandy habitats which support or are likely to support sand-obligate, covered species such as the three-corner milkvetch should be conducted.

Benefits: Sandy habitats supporting rare and/or special status species would be better and more efficiently protected in a functioning, intact ecosystem.

Costs: The loss of revenues to both the saleable material industry and the public (in the form of lease revenues) would be minimal, because sufficient mineral material deposits exist outside of the planning area in both Nevada and Arizona.

ZONE 4

Zone 4 is composed of the many springs in the planning area. All of these springs have been altered in the past 100 years, and are under a mix of private and public management. Springs in Clark County Nevada are being mapped and evaluated for conservation action by the Springs Technical Working Group of the Clark County MSHCP process. Action at springs within the Gold Butte Pakoon planning area should be evaluated in light of priorities on all lands managed by NPS and BLM.

ACQUISITION/EXCHANGE

In the interest of efficiency, acquisition and exchange strategies are considered together. Both strategies share the result of shifting the ownership of these private lands out of the hands of development interests and into public ownership.

Benefits: Acquisition or exchange of the most biologically important, privately held springs and associated water rights would potentially bring maximum benefit to conservation targets in the planning area if these springs were later restored or modified for wildlife use.

Judging from BLM land exchange efforts in the past, acquisition or exchange would be a time consuming process taking at least two to three years if not longer. However, threat alleviation would essentially begin from the start of negotiations provided the process was carried through to its intended end.

Probability of Success: The political climate for land acquisition and exchange has improved since the passage of the Southern Nevada Public Lands Management Act (SNPLMA 1998). This legislation allows for the disposal of public lands through auction and/or exchange with proceeds from sales being partially applied to offset environmental damage caused by development within Las Vegas Valley. These proceeds could most certainly be applied to the purchase of the Juanita Spring lands and / or water rights, if the owners became willing sellers. In addition to proceeds from the SNPLMA, financial resources may also be found in the Clark County MSHCP fund.

The exchange option could be complicated by difficulties in finding suitable exchange lands. It seems probable that suitable exchange lands could be identified in Clark County.

Costs: While a dollar amount is not currently available, the financial cost of purchasing the spring properties and water rights would be feasible. In the case of exchange, it should likewise be recognized that exchange lands within the Las Vegas Valley have considerable value and the use of these lands in the exchange process represents an opportunity cost to the BLM.

EASEMENT

This management option involves engaging the current property owners and negotiating an easement in which the owner is compensated for restricting the scope and degree of development or type of use that occurs on their property. Minimum easement conditions would preclude further development in favor of limited

agricultural uses, while ensuring the maintenance of the status quo for the spring communities.

Benefits: This option has significantly less benefit for conservation targets in the planning area than acquisition and/or exchange. Nonetheless, localized agricultural use would pose fewer threats to the planning area than residential /recreational development. Further, negotiating an easement may be achievable in a shorter timeframe, and prove less expensive than either acquisition or exchange.

Probability of Success: A commitment of monies and/or exchange lands to offer as compensation for imposing easement restrictions and conditions. Additionally, law enforcement and land management resources will be required far in the future in order to ensure that the terms of the easement are being honored. It is possible that these resources could be made available for parcels in Clark County through the Clark County MSHCP process. Ultimately, the success of an easement option would depend on whether the needs of the conservation targets in the planning area could be balanced with the landowners needs to develop the property in an economically practical manner. There is a high probability that these two competing interests cannot be reconciled.

Cost: In this zone, an easement could be implemented at a fraction of the cost of acquisition. Nonetheless, considerable compensation would likely be required for the settlement of the easement if any reasonable protection to conservation targets were to be achieved. Maintenance of a long-term

easement would also require the extended deployment of resources for law enforcement and potential litigation of easement violations. The financial burden of mitigation and minimization measures are still minor compared to the cost of acquisition.

REMOVAL OF TRESPASS LIVESTOCK AND BURRO HERD

Removal of trespass cattle in closed allotments and management of the remaining burro herd for a zero population level is strongly recommended. These non-native herbivores are not actively managed to move between ranges or to minimize damage to spring vegetation. The trespass cattle are imparting severe damage to springs on the slopes of the Virgin Mountains. The burro herd is imparting damage to the gypsum soil communities on Lime Ridge and to the creosote bursage communities on NPS and BLM lands.

Benefits: By permanently removing the trespass cattle and zeroing out the burro herd on BLM land managed by the Las Vegas District Office, direct impacts to spring communities would be alleviated. Additionally, individuals of the burro herd frequently cross management boundaries to access the shores of Lake Mead. Because LMNRA is managing for zero head of burro, continued management of the Nevada BLM herd for 98 head causes impacts to NPS land as well, and necessitates the maintenance of miles of fencing.

Feasibility: A recent auction of trespass cattle by BLM proved very controversial, with much media

coverage of protestors. It is likely that similar protests and attention would result from the removal and auctioning of the Gold Butte trespass cattle.

The Las Vegas RMP directs that the Gold Butte Herd Management Area be managed for 98 head of burro. Further, BLM is directed to maintain zero burros in portions of the HMA that overlap with the Gold Butte ACEC. This combination may not be a feasible management direction given current capacity. Managing this HMA for a zero population level may prove more feasible in the long term.

Cost: See page 9-9 for cost details.

REFUGIA

US Fish and Wildlife Service has recently listed the relict leopard frog (*Rana onca*) as a candidate for listing under the Endangered Species Act due to declines in population levels. Some of the altered spring systems in the Gold Butte area may be appropriate refugia for this amphibian. Water improvements currently owned by land managing agencies and conservation interests (The Nature Conservancy) should be evaluated and discussions initiated between FWS, NPS, BLM and The Nature Conservancy.

Benefits: Establishment of refugia for relict leopard frog in existing water tanks would maintain the status quo for impacted spring communities, and alleviate stress on populations on a species of great concern to land managers.

Feasibility: Establishment of refugia for relict leopard frog in existing water

improvements would meet the goals of all parties to protect populations of native species.

Benefits: Use of existing water improvements, if appropriate, would eliminate the cost of constructing refugia tanks. Also, the remoteness of the tanks would reduce the potential for vandalism, and thus would reduce the need for patrols by law enforcement staff.

DEVELOP BALANCED SPRING RESTORATION TECHNIQUES & IMPLEMENT SPRING RESTORATION

Springs which have experienced significant nutrient loading as a result of decades of livestock use are often overgrown with vegetation upon restoration. This switch from an open water tank to no open water is very stressful for key animal species including bighorn sheep and bats. Techniques to maintain open water while restoring natural spring flows and riparian values are needed to provide for the needs of all native species. This strategy is also mentioned in Chapter 10: Research and Monitoring Needs.

All springs in the planning area should be evaluated and ranked for restoration priority, and restoration begun in a timely fashion. The Springs Technical Working Group of the Clark County MSHCP is currently evaluating and prioritizing spring restoration for all of Clark County, Nevada.

Benefits: The methods developed will benefit land managers tasked with restoring springs across Clark County and in other parts of the southwest

where livestock grazing is no longer a prominent land use. Development and deployment of spring restoration techniques which provide open waters will free up a portion of the resources currently expended to install and maintain guzzlers and other water developments for wildlife species. Spring restoration provides benefit to many forms of wildlife.

Feasibility: Funds for research to develop and test spring restoration techniques can be sought from the Clark County MSHCP funds.

Funding for spring restoration using existing, proven techniques may also be sought from Clark County MSHCP funds and from funds for the GCPNM. Proceeds generated from the Southern Nevada Lands Management Act should also be viewed as a high potential funding source.

ZONE 5

The upper elevation mixed conifer/mountain shrubland systems on the Virgin Mountains and the southern ridges of the planning area constitute Zone 5 (figure 9.3). Many of the management recommendations made for Zone 2 will have a direct benefit for the mixed conifer/mountain shrubland system, but some specific considerations are worth highlighting apart from other strategies suggested for the rest of the planning area.

FIRE MANAGEMENT

Current fire management consists of immediate suppression of all man-started and lightning strike fires. As more information becomes available about the natural fire regimes in these community types and the impact that non-native weeds such as brome and schismus have on fire regimes, a change in fire management may be appropriate.

Land managers should take every opportunity to learn about the role of

fire in these important natural communities, and consider carefully what impacts immediate suppression may have on wildlife and the native flora.

Benefits: It is possible that these upper elevation communities would benefit from a return to more natural fire regimes, with fires of a more natural intensity.

Feasibility: Though the review of management plans and management plan amendments, it will be possible to review existing and new information on desirable fire regimes and management prescriptions for pinyon-juniper, mountain shrubland and white fir-mixed conifer communities.

Cost: Costs would be minimal if management direction changes were made in conjunction with plan reviews and amendments.

ZONE 6

The long narrow dry wash corridors that snake through the planning area constitute Zone 6 (figure 9.4). Many of the management recommendations made for Zone 2 will have a direct benefit for the dry washes as well, but some specific considerations are worth highlighting apart from other strategies suggested for the rest of the planning area.

ROAD DESIGNATION/ REROUTING

Ephemeral washes in the planning area provide tempting opportunities for motorists to leave well-established roadways and to enter more remote parts of the planning area. Scoured sandy/gravelly wash beds may also be mistaken for off-highway roads and repeatedly tried as routes until eventually a new roadway is *defacto* established. This impromptu-motorized exploration leads to the proliferation of multiple braided paths and parallel roads through some of the planning area's most important wildlife habitat. It is critical therefore that no new routes be designated through dry washes and that current routes be closed or rerouted if consensus with users can be reached. Further, access to dry washes from more established roadways should be impeded. This last step may involve elevating roadbeds above desert wash channels where the two intersect and installing culverts to ensure that wildlife and hydrological processes can continue along the wash unobstructed by the road and traffic that uses it.

Benefits: Enforcing closure of unofficial routes through desert washes

is a quick and efficient means of providing a necessary precedent for protecting these washes from future increases in OHV activity that will likely occur in the planning area. Elevating roadbeds out of washes not only limits future access to these critical habitats, but it also supplies immediate protection to wildlife and flora that was coming into direct contact with OHV activity.

Feasibility: NPS managed lands contain some of the more productive wash segments in the planning area. Much of the remainder of the planning area is administered by the BLM's Las Vegas Field Office. Road designations in these areas have been accomplished through the public process, involving local government, interest groups, citizens, and local communities. Mechanisms exist to reroute existing open roadways which pass through sensitive habitats, such as washes, in order to protect these areas. However, public resistance to any road route alterations would likely be strong.

NPS and BLM Rangers would be largely responsible for enforcing restrictions and while law enforcement resources are already stretched thin, detection of OHV violations should not be difficult with periodic surveillance. If chronic violations are apparent, resources for additional law enforcement may be available through Clark County HCP mitigation funds. Where violations transgress BLM and NPS boundaries, law enforcement efforts should be coordinated.

Resources for sign posting and rehabilitation are largely in place for the BLM and NPS lands and may be further

supplemented with Clark County HCP mitigation funds.

Cost: Road rehabilitation/ re-contouring, posting, and enforcement all have associated costs. However, these expenditures are insubstantial compared to the costs that would be incurred attempting to reduce deleterious OHV activity in the future if such recreation continues to increase in this zone. It is far more prudent expending funds in the near-term when recreational use is moderated, in order to impose rational management restrictions on the planning area. This guarantees that even as OHV popularity rises in this area, the degree and scope of the activity will remain compatible with DWMA goals and objectives.

PUBLIC OUTREACH

The importance and sensitivity of desert wash habitats should be a particular focus of larger public outreach programs in the region. Access points to wash roads that cannot be closed should be posted with signs highlighting the species that make use of these habitats and the need for motorists to stay on the single specific designated route.

An expanded discussion of benefits, feasibility and cost can be found under Zone Two: Public Outreach recommendations.

MINERAL AND MATERIAL ENTRY

No saleable material sites should be sited in major wash corridors for wildlife and special status species. In particular, Grand Wash should be avoided for mineral material entry.

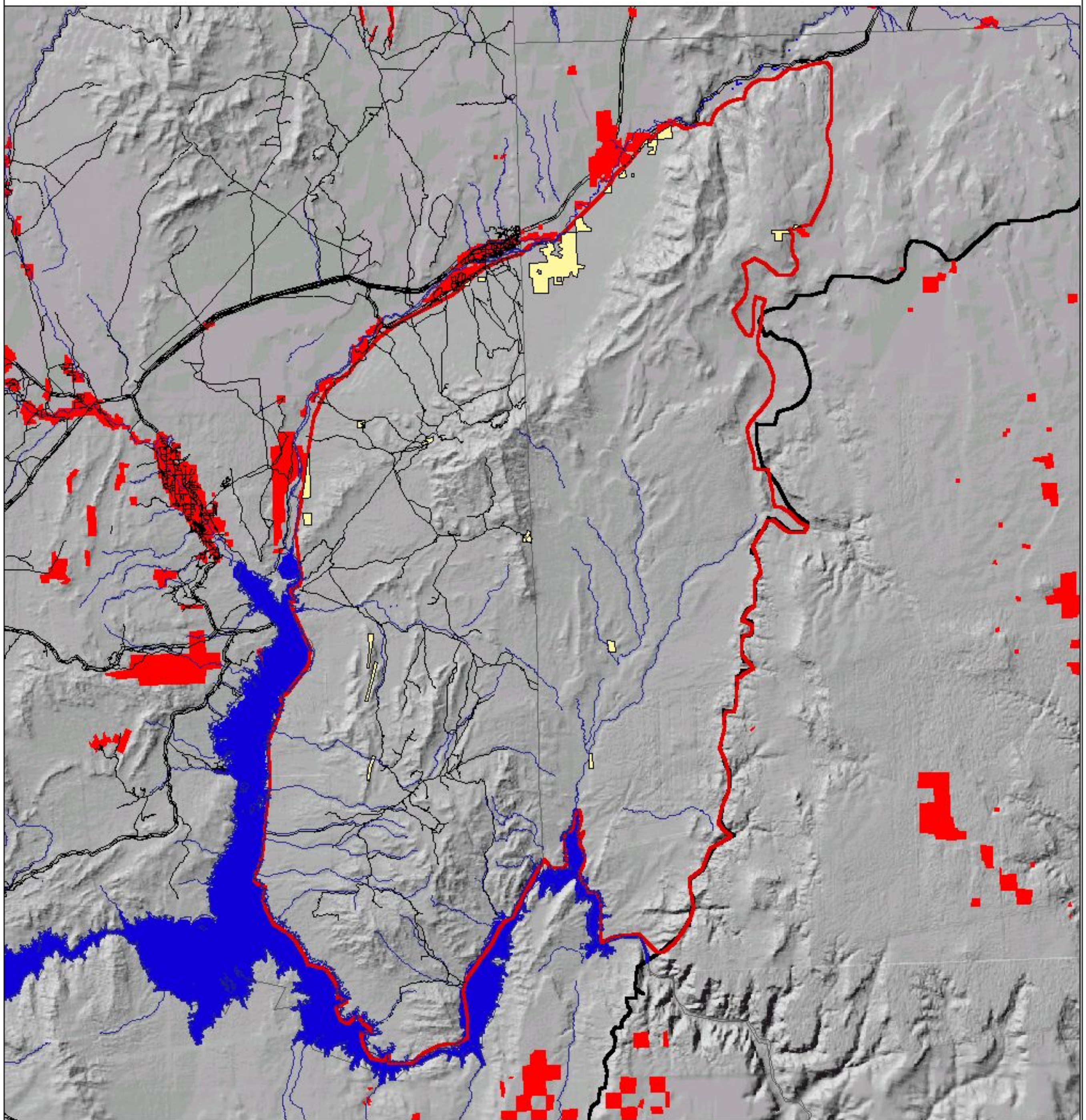
Benefits:

Wash corridors provide shady, resource-rich habitats for a wide variety of Mojave Desert species, and vital transport corridors for wildlife.

Costs:

The loss of revenues to both the saleable material industry and the public (in the form of lease revenues) would be minimal, because sufficient mineral material deposits exist outside of the planning area in both Nevada and Arizona

Figure 9.1 Conservation Zone 1 - Private Lands



Conservation Zone 1 - Private Lands

- Conservation Zone 1 - Private Lands
- Private Lands Not Within Planning Area
- Gold Butte Paoon Planning Area
- Mojave Desert Boundary
- State Boundary
- Major Roads
- Major Rivers and Washes
- Roads
- Major Lakes



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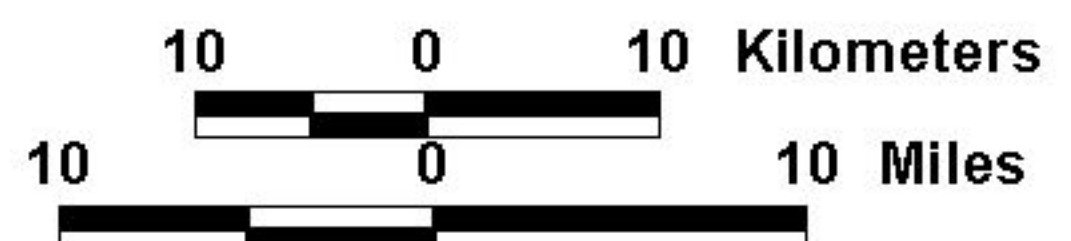
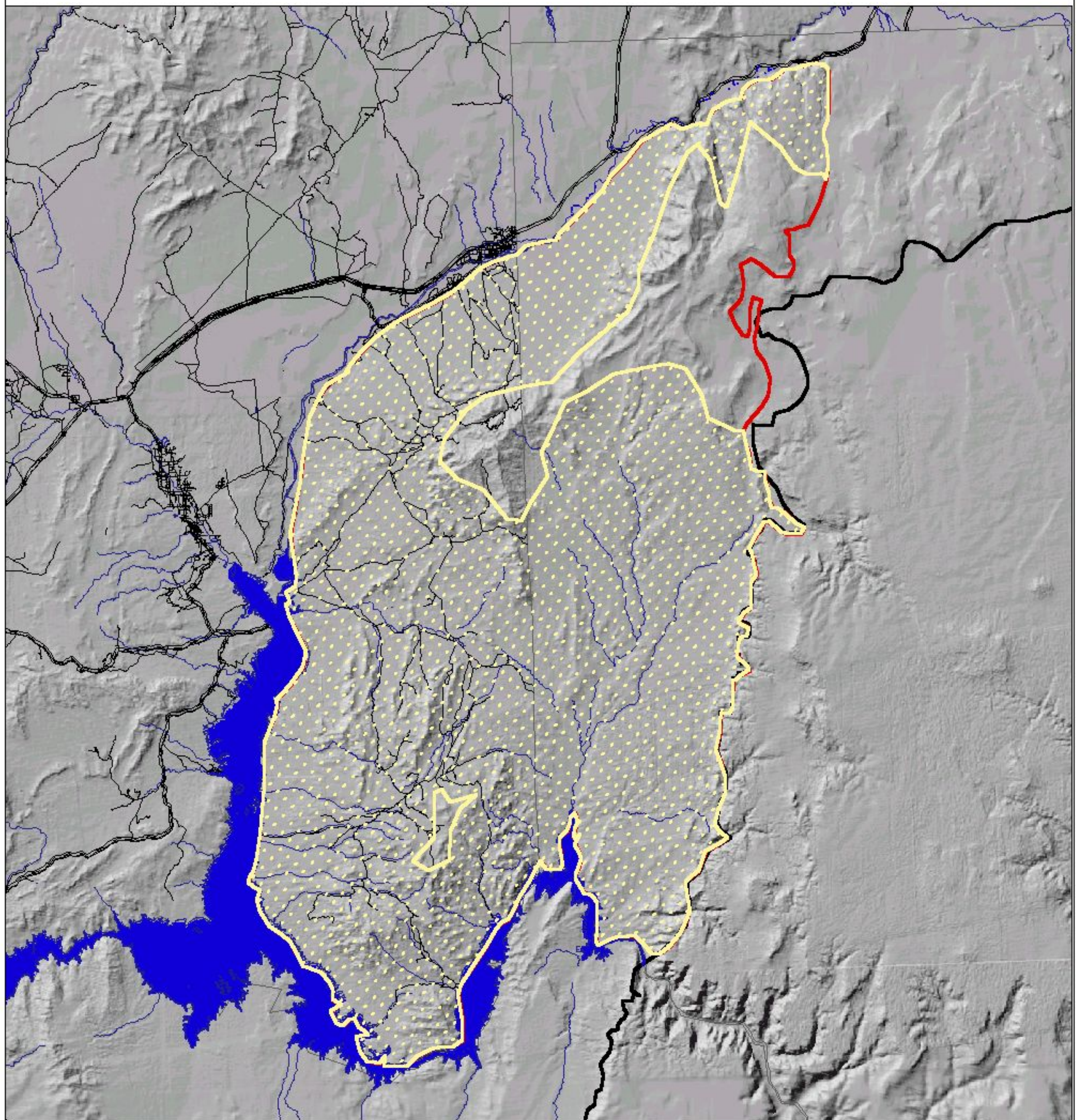


Figure 9.2 Conservation Zone 2 - Creosote - Blackbrush



Conservation Zone 2 - Creosote-Blackbrush Scrub

-  Conservation Zone 2 - Creosote-Blackbrush Scrub
-  Gold Butte Pakoon Planning Area
-  Mojave Desert Boundary
-  State Boundary
-  Major Roads
-  Major Rivers and Washes
-  Roads
-  Major Lakes



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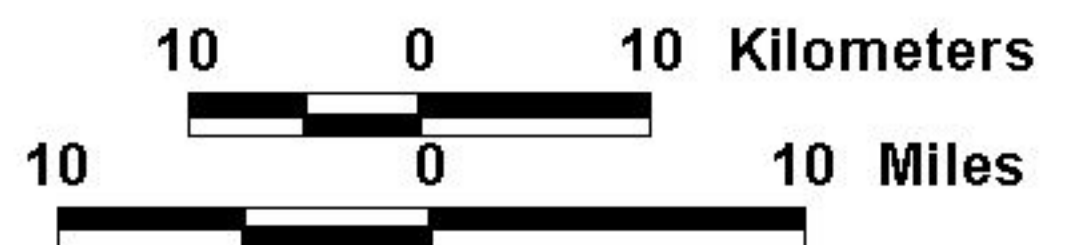
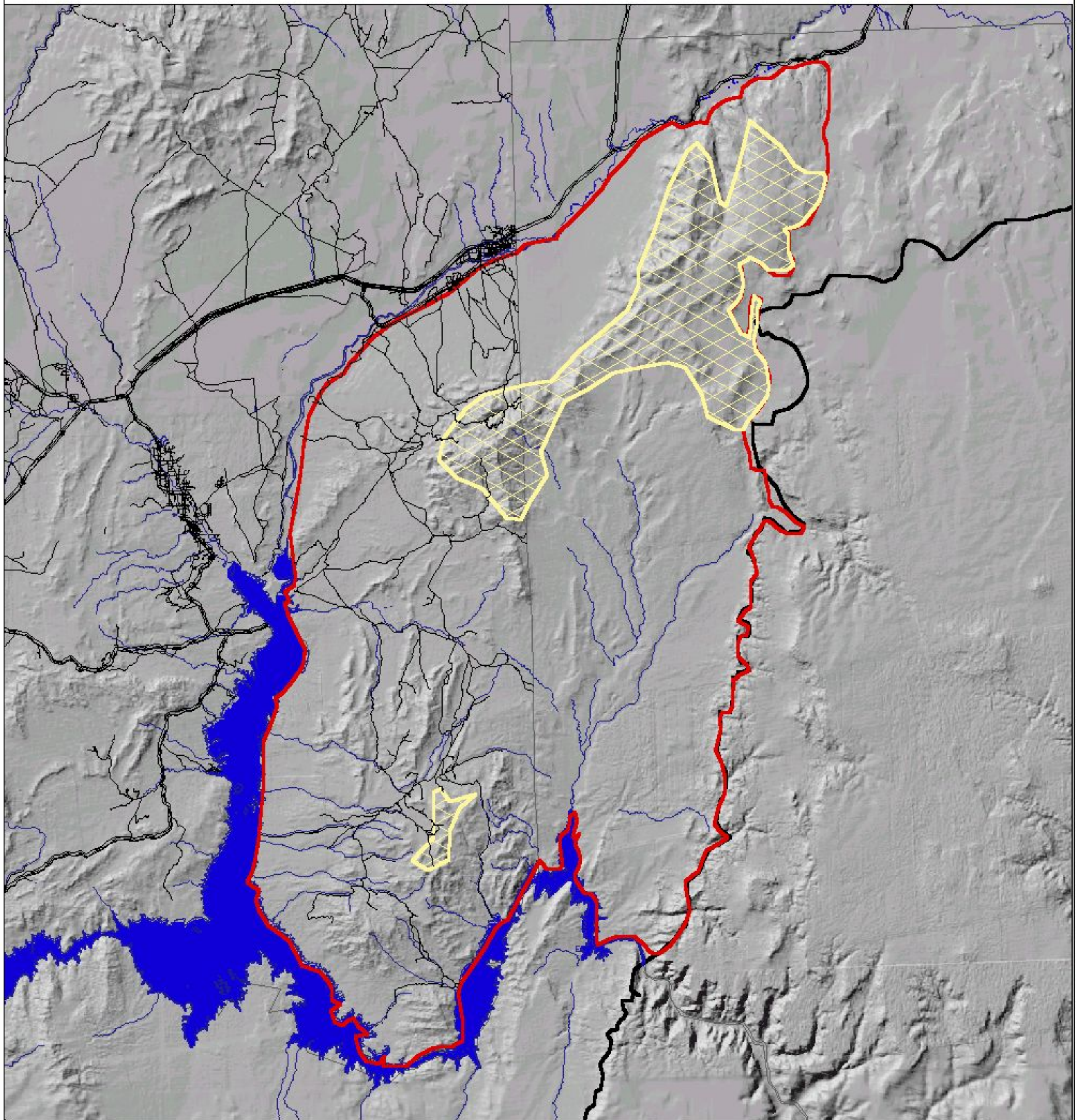


Figure 9.3 Conservation Zone 5 - Mixed Conifer Woodlands and Mountain Shrublands



Conservation Zone 5 - Mixed Conifer and Mountain Shrubland

-  Conservation Zone 5 - Mixed Conifer/Mountain Shrubland
-  Gold Butte Pakoon Planning Area
-  Mojave Desert Boundary
-  State Boundary
-  Major Roads
-  Major Rivers and Washes
-  Roads
-  Major Lakes



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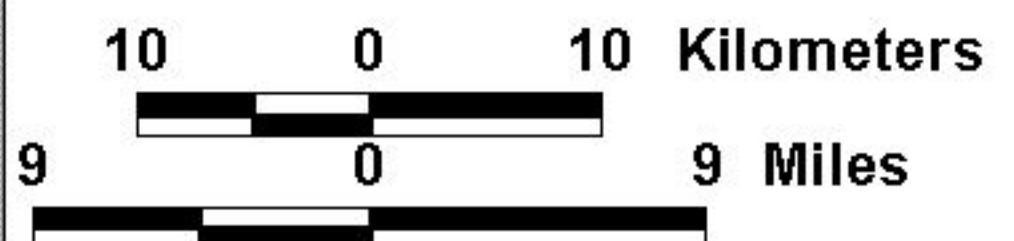
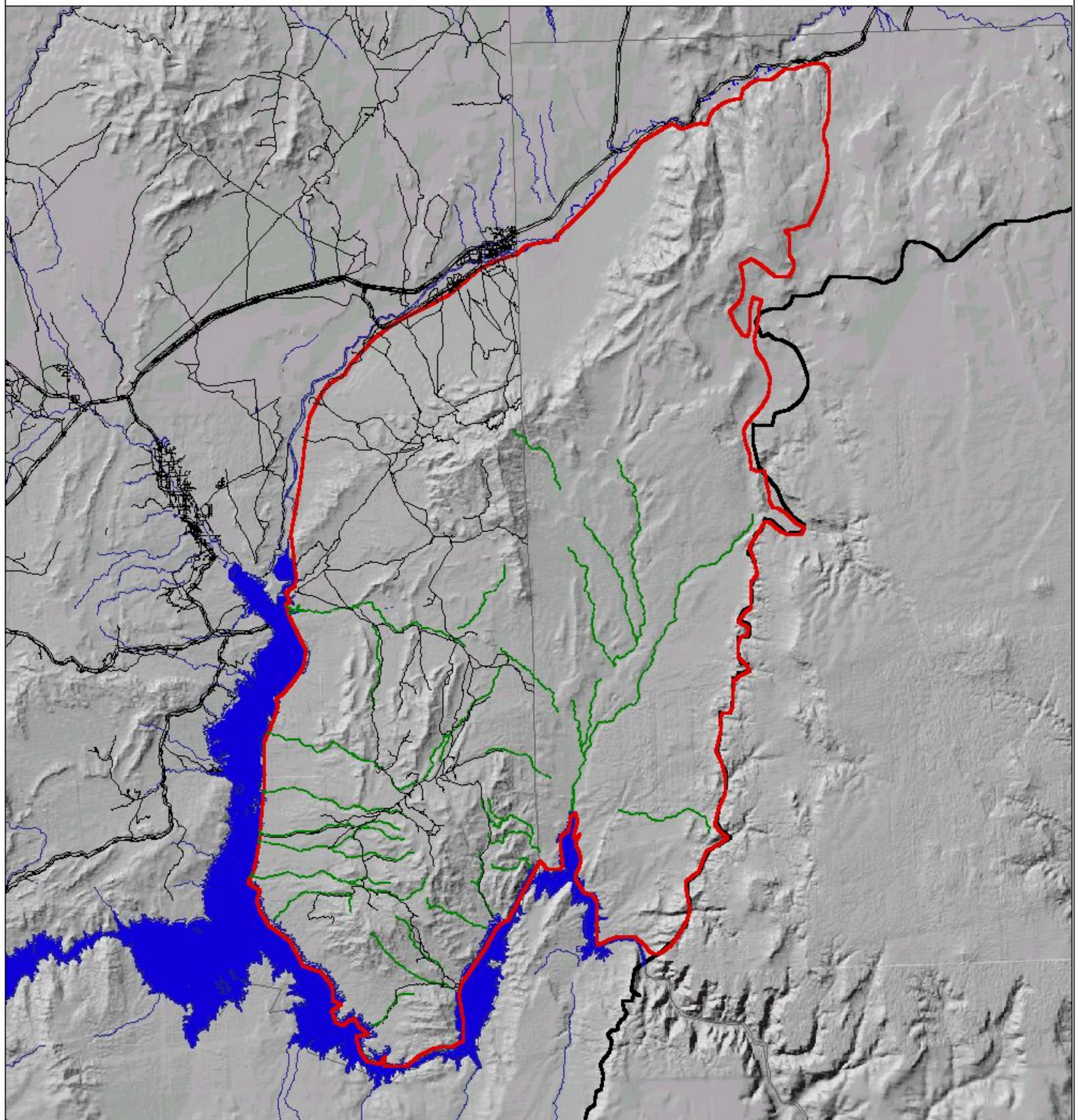
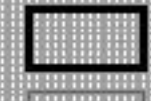
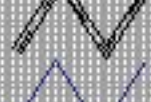


Figure 9.4 Conservation Zone 6 - Mojave Dry Washes



Conservation Zone 5 - Mojave Dry Washes

-  Conservation Zone 6 - Mojave Dry Wash Corridors
-  Gold Butte Pakoon Planning Area
-  Mojave Desert Boundary
-  State Boundary
-  Major Roads
-  Major Rivers and Washes
-  Major Lakes



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CHAPTER 10

RESEARCH AND MONITORING NEEDS

Tortoise Population Monitoring

The Desert Tortoise Recovery Plan recommended a fundamental change from strip transects and mile-square study plots surveyed over 60 to 90 days, to kilometer-square transects. This recommendation sought to reduce the personnel effort required to accomplish a square-mile study plot and to try to institute consistency in timing and duration of study plot censusing. The Recovery Plan also recommend that at least 5 percent of each area, both inside and outside of the DWMA boundaries, be sampled to determine if indeed the proscribed management actions are having a detectable effect on the recovery of desert tortoises in the DWMA (FWS 1994).

In 1994 and 1995, Nevada Division of Wildlife (NDOW), in cooperation with the United States Geological Survey - Biological Resources Division (USGS-BRD) tested kilometer-square and hectare-square study plot methods in the process of conducting their standard square-mile study plot efforts. The preliminary results of this comparative investigation is that the smaller plots are no more effective at determining a realistic picture of the status of the tortoise population and may, in fact, be missing a significant number of tortoises given the patchy distribution of this species throughout the expanse of the Mojave Desert (Brad Hardenbrook, NDOW Biologist, pers. comm., 1995).

There has been debate among the land and wildlife management agencies and academic biologists over the most efficient, cost-effective, and biologically relevant means of censusing tortoise populations over time. Because of the lack of standardized methodology, the Fish and Wildlife Service, Biological Resources Research Center (BRRC), and University of Nevada-Reno (UNR) co-sponsored a workshop in February 1995 on this topic. In 1995 and 1996 the National Park Service and National Biological Service (now USGS-BRD) field tested the primary method discussed at the workshop. Results of the field studies were presented at the Desert Tortoise Management Oversight Group (MOG) Technical Advisory Committee (TAC) workshop in October 1996. Based on the report from the February 1995 workshop and the field studies, the TAC recommended, and the MOG endorsed, using the line distance method to estimate tortoise populations in DWMAs.

Currently, BRRC, UNR, FWS and USGS are monitoring tortoise densities throughout this area using line distance methods. These efforts should continue, and also be expanded to include monitoring of the formerly "sterile" zone near major roadways. This additional monitoring should be designed to detect rates of recolonization of this formerly sterile zone after tortoise-proof fencing has been installed along the roadways. This information will be vital to justify continued funding for tortoise-proof fence installation and maintenance.

Multiple-Species Inventory and Monitoring

Under the Clark County MSHCP, 79 species covered and another 154 are being considered for required conservation actions over the next 30 to 50 years to prevent their likelihood of being listed under the ESA. In the event any of the included species are federally listed, through no fault of the Clark County MSHCP actions, then land owners expect to receive advance assurance from the FWS that they will not be required to do anything above and beyond what they have proposed and implemented under the terms of the MSHCP. This effort has made significant funds available for inventory and monitoring programs that will be required to provide a comprehensive picture of the status of these other taxa in the northeast Mojave Desert.

Although the development of the MSHCP was politically and economically motivated, the conservation measures proposed, and the data gathered from inventory and monitoring efforts, will be valuable in establishing baseline status for each of the target species within the planning area and other protected areas. Once baselines have been set, then future monitoring efforts should be able to assess the effectiveness of management actions, and the results used to tailor future management recommendations and consequent biennial budget requests. Development of baseline biological measures is ongoing.

Predator Population Monitoring

Concerns have been expressed regarding the effects that human activities such as open-pit trash dumping may be having on predator populations in tortoise habitat. Particularly Common Raven and coyote are believed particularly to have benefited from the encroachment of human settlements into the deserts (FWS 1994) because of the presence of reliable food and water supplies in what was otherwise an unpredictable environment (Berry 1985, Knight and Gutzwiller 1994). Higher than normal predator population numbers, including feral dogs, have been implicated as having a negative impact on not only tortoise populations in these areas, but also on other terrestrial vertebrates and invertebrates (Turner and others 1987, Farrell 1989, Swingland and Klemens 1989, Berry 1992).

The Clark County Desert Conservation Plan contracted for a preliminary survey of Common Raven populations in the Piute/Eldorado DWMA to determine if there is any evidence that these birds are targeting the early age classes of tortoises for food items, and, if so, whether they are having any detectable impact on the annual recruitment for these populations (RECON, 1994). A November 1995 summary of the project indicated that approximately 11% of 206 transmission line towers surveyed in the DWMA had evidence of small tortoise carcasses, with only a couple of towers exhibiting a high number of carcasses (17 each). Similar studies should be expanded to other DWMA's in the Northeastern Recovery Unit. To date, no such effort has been initiated to

investigate the status of coyote populations, feral dogs, or other likely tortoise predators. Any management recommendations arising from such research, such as predator control, will have to adhere to state and federal predator control guidelines.

Doak and others, 1994, have cautioned that efforts geared towards reduction of Common Raven numbers in the western Mojave, to decrease the amount of predation on hatchling and juvenile desert tortoises, would be futile. Models they have developed, analyzing variations in age-specific life history characteristics, and their affect on population viability and long-term recovery, indicate that removing Common Raven predation will do little to increase longevity of a tortoise population. On the other hand, if anthropogenic sources of mortality (i.e. highways, OHV races, poaching) of adult females are reduced or removed, then the probability of survival and actual recovery potential of that same tortoise population can be quickly increased. They do, however, admit the limitations of their data set, and provide clear recommendations for those aspects of desert tortoise life history where more information will boost the power of their models.

Effects of Casual OHV Use in Desert Wildlife Management Areas

One of the more frustrating challenges for land managers in desert tortoise habitat has been the issue of casual, but persistent use of OHVs within desert tortoise recovery areas. Throughout the Mojave Desert land managers such as BLM and NPS have had varying success

in removing or redirecting competitive, speed-based OHV events out of desert tortoise critical habitat. However, the casual and organized non-speed OHV uses of the desert habitat have been points of contention between user groups and land managers. This controversy has thwarted some ambitious early regional planning efforts such as the Northern and Eastern Colorado Desert coordinated Management Plan, and the West Mojave Coordinated Management Plan (Alden Sievers, BLM, 1995 and Dick Crowe NPS, 1996 pers. comm.).

Clark County's attempt to deal with this issue has been no less controversial. Poker Runs, rallies and Dual Sport events have arisen, seemingly in response to the removal of speed-based OHV events, but were not considered when management restrictions were proposed under the preliminary definitions of 'conserved habitat'. Attempts to control or further restrict these types of events from the DWMA have been met with significant resistance from both user groups and within BLM management. Since little to no research has addressed the impacts of these type of events on either the desert tortoise or its habitat, there is a prevailing attitude that the events should be allowed to continue until such time as data can show that they have a negative effect. However, it is important to begin to address this issue with some limited, focused research on casual OHV impacts on the tortoise and on other discrete components of the desert ecosystem, such as plant productivity. Any studies that are designed to address this question should be implemented in a limited area on the boundary of the DWMA or within adjacent areas.

R.H. Webb (pers.comm.1998) has recommended that inexpensive studies utilizing sound monitors and dust collection devices should be designed and implemented as soon as possible to close this gap in the empirical knowledge of vehicular impacts on desert environments.

Burro Use Impact Study

The continued maintenance of the 98 head burro herd in the Nevada portion of the planning area has caused significant damage to fragile gypsum soils and creosote bursage communities (Gayle Marrs-Smith, pers comm 2002). Documentation of the impacts caused by the burro herd is required to evaluate the compatibility of this herd management area and it's appropriate management level of 98 with the natural communities, sensitive species and the goals for adjacent land use designations.

Public Land Users Survey

A survey to determine the attitudes, values and needs of the users of public lands in the Mojave Desert would better inform many of the management recommendations in this and other natural resource conservation analysis and planning efforts.

The Phoenix Field Office of the BLM, in cooperation with Arizona State University and Northern Arizona University are conducting surveys which should be considered as possible models.

If public land managers are better informed about the desires, needs and motivations of the users of the public

lands, both natural resource and recreation planning would be improved.

Functionality of Ephemeral Washes as Corridors for Species Diversity and Movement

The critical importance of Mojave dry washes is repeatedly, but informally, discussed among biologists working in the Mojave Desert. Current literature provides little in the way of empirical data indicating the degree to which washes are utilized for migration, foraging or shelter by desert wildlife.

Further questions to address include understanding the threats to wash habitat and functionality. It is particularly important to look carefully at how anthropogenic disturbance affects this naturally disturbance-dependent but biologically-rich habitat. For example, it has often been suggested that using washes as roadways is preferable to using uplands since the wash beds are gravel and frequently denuded by flooding. This assumption may in fact be responsible for concentrating some of the Mojave's most harmful impacts in its most sensitive habitat.

Road Density/Vehicle Frequency Impacts

Research regarding the fragmenting impacts of roads and highways in the Mojave have yet to quantitatively address the scale at which a traffic corridor turns from being a mere hazard to wildlife, to being a complete barrier

to movement. For example, determining the widths and traffic levels at which roadways block tortoise movement would be invaluable for setting fencing priorities in the densely roaded Mojave Desert. Such research could also shed light on the impacts of casual use OHV routes and utility maintenance roads that crisscross the desert landscape. Thresholds are sure to vary from species to species and studies should attempt to account for variations in scale, physiology and behavior that may be factors in determining a species' ability to traverse a roadbed. This information could be used to determine if any additional roads should be fenced with tortoise exclusion fencing.

Fire Impacts in Desert Ecosystems

Increased fire frequency is a rapidly emerging threat in the Mojave Desert and more study is required to grasp the long-term impact such fires are having at the landscape level (Esque 1999). Understanding the way in which fire is changing the Mojave requires better knowledge of how plants, animals and fire interact. Observational studies on fire effects in the past have been hampered by inadequate information concerning pre-fire conditions. To better control their studies, Esque and others have recently begun manipulative fire experiments that are better able to predict the ecological impacts of fire events. These studies examine biogeochemistry, plant physiology, plant/plant interactions, plant /animal interactions and disturbance/restoration ecology. Ultimately, combining data from manipulative and observational

research holds the promise of directing land managers about what steps need to be taken to protect natural landscapes in the Mojave from fire. The impact of invasive weeds on the fire intensity within relatively native community types is key to restoration efforts in the Pakoos Basin.

If manipulative studies are proposed within the planning area, they should be peer reviewed and go through existing channels to obtain approval from the appropriate land management agencies.

Disturbed Areas Analyses

Satellite imagery and remote sensing are now being successfully employed throughout the Mojave Desert to help track changes in land cover resulting from anthropogenic disturbance of the landscape. It is critically important that baseline information is gathered for DWMAs regarding the current extent of undisturbed matrix communities (creosote scrub), so that progress toward goals concerning maintaining natural habitat extents can be measured. Imagery will not yet reveal the more subtle changes in matrix composition and health, but tracking where and when scrub communities are being fragmented and otherwise impacted on the landscape is an important first line of defense. To the degree that higher resolution imagery can be obtained from aerial photography, similar monitoring should be applied to small patch vegetative communities such as sandy soil dependent communities.

Viability Analyses for Patchy Communities

Small, patchy communities such as the sand and gypsum soil dependent communities share common threats. Among these is a lack of knowledge of what constitutes a viable population of key plant species, or what size patch is likely to be viable in the face of natural disturbances. This lack of knowledge makes it impossible to manage these communities most efficiently. A better understanding of the inter-relationships between key plants, pollinators, herbivores, granivores and soil crust components would be helpful in determining what factors are key to the management of these communities.

CHAPTER 11

FUNDING SOURCES

Clark County Desert Conservation Plan/Multiple-Species Habitat Conservation Plan

Clark County, Nevada's Desert Conservation Plan (DCP; RECON 1994) was submitted to the Fish and Wildlife Service (FWS) in December 1994 for consideration, and an incidental take permit was issued by the FWS on 11 July 1995. This incidental take permit was superceded by another incidental take permit issued by the FWS on November 22, 2000. The Clark County Multiple Species Habitat Conservation Plan (MSHCP; RECON 2000) serves as the permittees' habitat conservation plan for this incidental take permit, issued under section 10(a)(1)(B) of the Endangered Species Act (ESA). An integral part of the implementation phase of the MSHCP, in support of the 30-year county-wide incidental take permit, is the expenditure of up to \$1,650,000 per year for the first 10 years and \$1,350,000 annually for the next 20 years for a wide variety of conservation actions ranging from highway fencing to increased law enforcement in Desert Wildlife Management Areas (DWMAs) that benefit the 79 covered species. This mitigation account will continue to generate conservation funds beyond the 30-year period, at an as yet unknown rate. These funds will be applied towards for conservation actions that will be determined in the future after many years of monitoring and adjustments based on the efficacy of

implemented actions outlined in the MSHCP. The response of desert tortoise populations and the whole Mojave desert ecosystem encompassed within the established DWMAs will dictate the direction and intensity of management and fund expenditures in the decades to come.

The preliminary strategy is to expend at least an additional \$1 million dollars annually for the benefit of the covered species and some amount annually to further our knowledge and understanding of the status of more than 150 'evaluation' and 'watch-list' species - those for which sufficient information was lacking to propose meaningful conservation actions.

Fish and Wildlife Service Section 7 Funds

When an action is authorized, funded or carried out by a Federal agency adversely affects the desert tortoise or its designated critical habitat, certain Federal agencies may propose to pay remuneration fees to compensate for the loss or degradation of habitat. Funds generated from these fees are available for implementing management actions that will promote recovery of the tortoise, including habitat acquisition, habitat enhancement, and tortoise research. Similar to the Clark County MSHCP, these fees are calculated based on the number of acres of habitat disturbed as a result of an action. However, unlike the Clark County

MSHCP, these fees also consider whether or not the disturbance occurs in critical habitat, and are adjusted for inflation annually. The Section 7 Fund in southern Nevada is currently administered by Clark County based on an agreement between FWS and the County, but Clark County does not receive any benefit from administering these funds. Section 7 fees are independent of any other fees collected by Clark County for desert tortoise conservation planning, and none of these funds are used to develop habitat conservation plans. All expenditures from the Section 7 fund must be authorized by the FWS's Nevada Fish and Wildlife Office.

When an action adversely affects tortoise habitat, Federal agencies typically propose remuneration fees. Funds generated are available to implement management actions in recovery areas, as well as securing tortoise management areas, habitat enhancement, and tortoise research. Similar to the Clark County MSHCP fee system, mitigation fees are based upon the number of acres of desert tortoise habitat disturbed, and whether or not the disturbance will occur within a recovery area (i.e., critical habitat or a DWMA). Unlike the MSHCP fee, however, the Section 7 fee is indexed for inflation every 2 years. This fund has been administered by Clark County based on an agreement between Clark County and the FWS. All payments from the Section 7 fund have to be authorized by the FWS's Nevada Fish and Wildlife Office.

Section 7 funds are available for securing tortoise management areas, habitat enhancement, and tortoise research. The Desert Tortoise Recovery

Plan (FWS 1994) is used as a guide in evaluating proposals for expenditure of funds. A few exceptions to this have been made for relevant proposals that do not explicitly meet these guidelines. For instance, Section 7 funds have been used to fund maintenance responsibilities at the Desert Tortoise Conservation Center, which houses tortoises removed from projects on Federal lands which have undergone consultation pursuant to section 7 of the ESA.

Thus far, other major projects funded include the 1993 purchase of the Gold Butte grazing allotment by The Nature Conservancy. This allotment was purchased with the intent of retiring it from active livestock grazing and to secure protection over the 23 spring water rights that served it. This former allotment is a part of the Gold Butte DWMA and Lower Gold Butte Area of Critical Environmental Concern (ACEC). In addition, section 7 funds have been expended on an interpretive program at Red Rock Canyon National Conservation Area, and the Large Scale Translocation Project adjacent to Interstate 15.

Section 6 Funds: FWS through NDOW

Financial assistance is also available through the allocation of funds to the State of Nevada (through the Nevada Division of Wildlife (NDOW)) under section 6 of the ESA. This section of the ESA provides for cooperation with state agencies for purposes of conserving endangered or threatened fish, wildlife and plants. These funds could provide assistance for important baseline research and inventory of the non-

tortoise species present in the DWMAs. While funds are theoretically available for species for which inadequate information is available to determine their status (i.e., species of concern), with the amount of funds currently available through Section 6 nearly all funds are allocated toward work on listed, proposed and candidate species.

Recovery Money Earmarked for the Desert Tortoise

Each year the FWS receives an allocation of money for the development and implementation of Recovery Plans for species federally listed as threatened or endangered. In addition, some species, such as the desert tortoise, receive their own appropriation for implementation of conservation actions geared towards recovery of the threatened population. However, these funds are primarily regulatory and little is available for recovery actions. Any activity that is proposed by the Recovery Team and approved or adopted by the FWS would qualify for receipt of these funds, but would probably require significant supplemental sources of funding for full implementation.

State and Federal Agency Land or Wildlife Management Funds

Each of the federal land management agencies, the Bureau of Land Management (BLM) and National Park Service (NPS), have ongoing obligations for management of their respective public land properties that are to be funded based on annual appropriations from Congress. These funds were not to

be supplanted by the Clark County MSHCP funding processes, rather they were to be enhanced to allow for the increased conservation management obligations that were agreed to in the Implementation Agreement. On a biennial basis, each of the agencies must clearly delineate activities funded by their own appropriations and activities for which they seek MSHCP funds. The ultimate goal of the MSHCP, is the coordinated management of public lands within Clark County to ensure complementarity of management decisions and actions carried forth by federal land managers.

Additionally, NDOW has the stewardship responsibility of all wildlife within Clark County, whether on federal, state, or otherwise non-private lands. This state wildlife agency has obligations for management of state listed rare, sensitive or endangered non-plant species, and consequently has an annual budgeting process for funding these obligations. Traditionally, NDOW has relied heavily on the Section 6 funds to carry out most non-game inventory, management or research activities. It is not known whether it is realistic to expect significant state funding of conservation activities for non-game species covered by the Clark County MSHCP.

Transportation Equity Act for the 21st Century (TEA- 21)

The Transportation Equity Act for the 21st Century (TEA-21) was created to provide funding for a wide variety of transportation-related projects nationwide in the 6-year period between 1998 and 2003. In addition to funding

the construction of Federal highways, it authorizes spending on environmental protection and scenic preservation. Funds are available for projects that reduce vehicle-caused wildlife mortality, mitigation of the effects of highway construction and maintenance on wildlife habitat, construction of tourist welcome center facilities, trail construction and the purchase of scenic easements. The impetus for any of these projects must come from the states themselves, rather than the federal government dictating which projects receive funding.

In total, the bill guarantees \$198 billion for surface transportation works. The Surface Transportation Program (STP) is the section of the program most applicable to environmental-related projects, and will receive \$33.3 billion total, over the 6-year funding period. STP provides a flexible source of funds to be used on any surface transportation infrastructure project. These funds are to be distributed among the States based in part on each State's lane-miles of Federal-aid highways and total vehicle-miles traveled on those Federal-aid highways. Once the funds are distributed to the States, 10 percent is set aside for safety construction activities (i.e., hazard elimination and railway-highway crossing improvements), and 10 percent is set aside for transportation enhancements, which encompass a broad range of environmentally related activities.

Applications for funding in Nevada must be passed through the Nevada Department of Transportation (NDOT) and will be evaluated annually in competition with many other statewide projects. Possible Clark County MSHCP-specific projects that could be

submitted for funding consideration to NDOT would be: highway fencing and culvert amelioration or installation, additional roadkill (or population depression) and traffic level research, development of innovative tortoise barriers or movement directing devices (such as new design extruded curbing), and construction of highway overpasses to facilitate bighorn sheep movement. Coordination with the NDOT staff in charge of the TEA-21 proposals should be handled by the MSHCP Administrator or their assistant. It is also important to ensure coordination of these conservation proposals with other transportation-related proposals that Clark County government may be submitting at the same time to prevent cross-competition for funding to the same entity.

Southern Nevada Public Lands Management Act (SNPLMA)

The Southern Nevada Public Lands Management Act (1998) was enacted in an effort to resolve the management problems posed by the BLM's patchwork ownership of land in the rapidly developing Las Vegas Valley. Under the act, BLM parcels identified for disposal in the valley are to be sold or exchanged based on recommendations from local government and the public in a fashion that promotes the orderly and responsible development of the Valley. Eighty-five percent of proceeds from the sales are to be placed in a special fund, and made available for four categories of expenditures. These four categories are:

- Acquisition of environmentally sensitive lands in Southern Nevada,
- Infrastructure needs of federally designated lands in Clark County, including Lake Mead National Recreation Area (NRA), Red Rock National Conservation Area, Desert National Wildlife Refuge, and the Spring Mountains NRA, as well as other areas administered by the BLM in Clark County,
- Parks and trails development, and
- Development of the Clark County MSHCP.

This special fund is administered by the Secretary of the Interior and Secretary of Agriculture. Projections regarding the amount of money to be generated vary, but Clark County has estimated that up to \$60 million per year could be received. Environmentally sensitive lands includes lands which promote the preservation of scientific, historical, cultural, watershed, wildlife and other values contributing to biological diversity and public enjoyment. Acquisition would be based on fair market values working with willing sellers. Acquired lands would be subject to the payment in lieu of taxes program administered by the Department of Interior and the U.S. Forest Service. Local and State governments would be consulted before any purchase in order to assess the impacts acquisition would have at the local or state level.

This fund has a potential to facilitate implementation of conservation strategies in the Gold Butte Pakeon area. In particular, acquisition of the several

privately held spring systems may be feasible if the political will can be mustered to approach this issue, and if the landowners become willing sellers. Monies made available for management of BLM lands could also be applied to ACECs, Wilderness Study Areas and BLM undesignated lands in the planning area that lie within Clark County.

Proposals for expenditure of portions of this fund are solicited annually by the BLM. Each category of expenditure has a subcommittee which reviews qualified proposals and submits a ranked list of recommended projects to a working group composed of the involved federal agencies. This group further reviews the recommended proposals and submits their recommendation to an executive committee composed of the regional managers of BLM, FWS, US Forest Service, and NPS. This committee makes a recommendation to the Secretary of the Interior for funding. The first two years of approved projects expended approximately \$30 million and \$45 million respectively of this fund.

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APPENDIX I

NATURAL HERITAGE NETWORK RANKING SYSTEM

The Natural Heritage Network Ranking System is a method of reporting the relative imperilment, or conservation status, of plants, animals, and ecological communities (elements) on a global, national, and subnational (state/provincial) level. The system was developed by the Natural Heritage Network and The Nature Conservancy. Conservation status ranks are assigned, reviewed, and revised according to standard criteria. Assessing the conservation status of species and ecological communities is the cornerstone of Natural Heritage work. It allows Natural Heritage programs and their cooperators to target the most at-risk elements for inventory, protection, management, and research.

An element is assigned one global rank (called a G-rank), which applies across its entire range; a national rank (N-rank) for each nation in its range; and a subnational rank (S-rank) for each state, province, or other subnational jurisdiction in its range. In general, Association for Biodiversity Information (ABI) scientists assign global, U.S., and Canadian national ranks with guidance from local data centers, especially for endemic elements, and from experts on particular taxonomic groups. Local data centers assign subnational ranks for elements in their respective jurisdictions.

Assessment Criteria

Use of standard ranking criteria and definitions makes Natural Heritage ranks comparable across element groups. Standardization also makes ranks comparable across jurisdictions.

Ranking is a qualitative process: it takes into account several factors, which function as guidelines rather than arithmetic rules. The ranker's overall knowledge of the element allows him or her to weigh each factor in relation to the others and to consider all pertinent information for a

particular element. The factors considered in ranking species and communities are similar, but the relative weight given to the factors differs.

For species elements, the following factors are considered in assigning a rank:

- total number and condition of occurrences
- population size
- range extent and area of occupancy
- short- and long-term trends in the foregoing factors
- threat
- fragility.

For ecological communities, the association is generally the classification level treated as an element and ranked. The primary ranking factors are:

- total number of occurrences
- total acreage occupied by the community.

Secondary factors include the geographic range over which the element occurs, threats to occurrences, and viability of the occurrences. However, it is often necessary to establish preliminary ranks for communities when information on these factors is not complete. This is particularly true for communities that have not been well described. In practice, a preliminary assessment of a community's range-wide global rank is often based on the following:

- geographic range over which the element occurs
- long-term trend of the element across this range
- short-term trend (i.e., threats)
- degree of site/environmental specificity exhibited by the element
- rarity across the range as indicated by subnational ranks.

Relationship of Ranks to Other Status Designations

Conservation status ranks and their documentation are a valuable complement to national and subnational statuses assigned by government agencies (e.g. the United States Fish and Wildlife Service and the National Marine Fisheries Services for status under the U.S. Endangered Species Act). The detailed and extensive information gathered by Natural Heritage data centers provides support for official designations. However, since Natural Heritage lists of vulnerable species and official lists of endangered or threatened species have different criteria, evidence requirements, purposes, and taxonomic coverage, they normally do not coincide completely. For example, a species listed by a subnational jurisdiction as “endangered” may not be ranked S1, and vice versa. Multilevel ranking (using global, national, and subnational ranks), and the use of range ranks (e.g., S2S3) to indicate the degree of uncertainty in status also sets Natural Heritage ranks apart from official status designations.

Global Ranking Definitions

Global Heritage Status Rank Definitions

(Where no distinction is made, definition is identical for species and ecological communities. Acreage and distance measures for global ranking of ecological communities consider typical spatial pattern knowledge of long-term trends in relative extent. Acreage and distance estimates listed in the table refer to G1 and G2 communities that typically occur as discrete patches on the landscape. Communities may occur today with acreage or distance greater than when originally recorded; these occurrences are still ranked G1 or G2 because of strong decline in extent or condition.)

Rank	Definition
GX	Presumed Extinct (species)—Believed to be extinct throughout its range. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered. Eliminated (ecological communities)—Eliminated throughout its range, with no restoration potential due to extinction of dominant or characteristic species.
GH	Possibly Extinct (species)—Known from only historical occurrences, but may nevertheless still be extant; further searching needed. Presumed Eliminated (Historic, ecological communities)—Presumed eliminated throughout its range, with no or virtually no likelihood that it will be rediscovered, but with the potential for restoration, for example, American Chestnut (Forest).
G1	Critically Imperiled—Critically imperiled globally because of extreme rarity or because of some factor(s) making it especially vulnerable to extinction. Typically 5 or fewer occurrences or very few remaining individuals (<1,000) or acres (<2,000) or linear miles (<10).
G2	Imperiled—Imperiled globally because of rarity or because of some factor(s) making it very vulnerable to extinction or elimination. Typically 6 to 20 occurrences or few remaining individuals (1,000 to 3,000) or acres (2,000 to 10,000) or linear miles (10 to 50).
G3	Vulnerable—Vulnerable globally either because very rare and local throughout its range, found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extinction or elimination. Typically 21 to 100 occurrences or between 3,000 and 10,000 individuals.
G4	Apparently Secure—Uncommon but not rare (although it may be rare in parts of its range, particularly on the periphery), and usually widespread. Apparently not vulnerable in most of its range, but possibly cause for long-term concern. Typically more than 100 occurrences and more than 10,000 individuals.
G5	Secure—Common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). Not vulnerable in most of its range. Typically with considerably more than 100 occurrences and more than 10,000 individuals.
G#G#	Range Rank—A numeric range rank (e.g., G2G3) is used to indicate uncertainty about the exact status of a taxon. Ranges cannot skip more than one rank (e.g., GU should be used rather than G1G4).
GU	Unrankable—Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
G?	Unranked—Global rank not yet assessed.

State Ranking Definitions

State Heritage Status Rank Definitions

Species (elements) are assigned a numeric rank of relative imperilment based on standard rank factors applied at national or subnational (state) levels as appropriate. Communities are not currently assigned state conservation status ranks. A subnational rank cannot imply the element is more abundant at the subnational level than it is nationally or globally (e.g., a G1/S2 rank should not occur).

Rank	Definition
SX	Presumed Extirpated--Extirpated from the state (SX) or extinct (GX).
SH	Possibly Extirpated (Historical)--Historical occurrence(s) only, presumed still extant and could be rediscovered.
S1	Critically Imperiled--Critically imperiled due to extreme rarity, imminent threats, or and/or biological factors.
S2	Imperiled--Imperiled due to rarity and/or other demonstrable factors.
S3	Vulnerable--Rare and local throughout its range, or with very restricted range, or otherwise vulnerable to extinction.
S4	Apparently Secure--Apparently secure, though frequently quite rare in parts of its range, especially at its periphery.
S5	Secure--Demonstrably secure, though frequently quite rare in parts of its range, especially at its periphery.
S#S#	Range Rank--Range of uncertainty in a numeric rank.
SU	Unrankable--Unrankable; present and possibly in peril, but not enough data yet to estimate rank.
S?	Unranked--Not yet ranked.

APPENDIX II

THREAT RANKING SYSTEM

Stress Ranking Guidelines

Draft Indicators and Benchmarks

Severity of Damage -- what level of damage can reasonably be expected within 10 years under current circumstances (given the continuation of the existing management/conservation situation)	
Very High	The stress is likely to <i>destroy or eliminate</i> the conservation target over some portion of the target's occurrence at the site
High	The stress is likely to <i>seriously degrade</i> the conservation target over some portion of the target's occurrence at the site
Medium	The stress is likely to <i>moderately degrade</i> the conservation target over some portion of the target's occurrence at the site
Low	The stress is likely to <i>only slightly impair</i> the conservation target over some portion of the target's occurrence at the site

Scope of Damage – what is the geographic scope of impact on the conservation target at the site that can reasonably be expected within 10 years under current circumstances (given the continuation of the existing situation)	
Very High	The stress is likely to be <i>very widespread or pervasive in its scope</i> , and affect the conservation target <i>throughout the target's occurrences</i> the site
High	The stress is likely to be <i>widespread in its scope</i> , and affect the conservation target at <i>many of its locations</i> at the site
Medium	The stress is likely to be <i>localized in its scope</i> , and affect the conservation target at <i>some of the target's locations</i> at the site
Low	The stress is likely to be <i>very localized in its scope</i> , and affect the conservation target at a <i>limited portion of the target's location</i> at the site

Stress Ranking Chart

↓ Severity	Scope			
	Very High	High	Medium	Low
Very High	Very High	High	Medium	Low
High	High	High	Medium	Low
Medium	Medium	Medium	Medium	Low
Low	Low	Low	Low	-

Source-of-Stress Ranking Guidelines

Draft Indicators and Benchmarks

Contribution -- Expected contribution of the source, acting alone, to the full expression of a stress (as determined in the stress assessment) under current circumstances (i.e., given the continuation of the existing management/conservation situation)

Very High	The source is a <i>very large</i> contributor of the particular stress
High	The source is a <i>large</i> contributor of the particular stress
Medium	The source is a <i>moderate</i> contributor of the particular stress
Low	The source is a <i>low</i> contributor of the particular

Irreversibility – Reversibility of the impact from the projected Source of Stress; responsiveness to corrective action

Very High	Impact of the projected stress from the source, for all intents and purposes, is not reversible (e.g. wetland converted to shopping center)
High	Impact of the projected stress from the source is reversible, but not practically affordable (e.g. wetland converted to agriculture)
Medium	Impact of the projected stress from the source is reversible with a reasonable commitment of additional resources (e.g. ditching and draining of wetland)
Low	Impact of the projected stress from the source is easily reversible at relatively low cost (e.g. ORVs trespassing in wetland)

Source Ranking Chart

↓ <i>Irreversibility</i>	<i>Contribution</i>			
	Very High	High	Medium	Low
Very High	Very High	High	High	Medium
High	Very High	High	Medium	Medium
Medium	High	Medium	Medium	Low
Low	Medium	Medium	Low	Low

Combined Threat Ranking System

The Combined Threat Rank for a source of stress is determined in two steps:

- 1) Determine the Threat Rank for each Stress-Source combination, based on the following table:

		STRESS			
		Very High	High	Medium	Low
SOURCE	Very High	Very High	Very High	High	Medium
	High	High	High	Low	Low
	Medium	Medium	Medium	Low	Low
	Low	Low	Low	Low	--

- 2) Determine the Combined Threat rank for a source by combining the individual Threat ranks for each stress-source combination. For sources that cause only one stress, the Combined Threat rank equals the individual threat rank. For sources that cause multiple stresses, the initial Combined Threat rank takes on the rank of the highest-ranked threat; this initial rank may then be adjusted upward by applying the rule of 3,4,5.

- Rule of 3,4,5 – Three High threats are equivalent to one Very High threat; four Medium threats are equivalent to one High threat; and five Low threats are equivalent to one Medium threat.

For example, the Combined Threat rank of a source of stress that contributes to three High-ranked threats would be Very High, because the three High threats are equivalent to a Very High threat. Likewise, a source of stress that contributes to two High threats and four Medium threats would have a Combined Threat rank of Very High because the four Medium threats are equivalent to a third High threat, which in turn are equivalent to one Very High threat.

APPENDIX III

SYSTEMS/STRESSES/SOURCES WORKSHEETS

Stresses/Sources/Strategies Worksheet

Gold Butte

System/Focal Conservation Target: Creosote-Bursage Community

Stresses	Severity	Scope	Stress	User Override
Altered composition/structure	High	Very High	High	
Altered soil nutrient cycles	Medium	Medium	Medium	
Habitat fragmentation	Medium	Medium	Medium	
Direct mortality/removal	Very High	Low	Low	
Habitat destruction or conversion	Very High	Low	Low	
Altered soil layers	Very High	Low	Low	
			-	
			-	

Sources of Stress			Altered composition/structure	Altered soil nutrient cycles	Habitat fragmentation	Direct mortality/removal	Habitat destruction or conversion	Altered soil layers	-	-	Threat to System Rank
			High	Medium	Medium	Low	Low	Low	-	-	
Responsible use of open roads Active Threat	Contribution	Low			Very High	High					Medium
	Irreversibility	Very High	Medium	-	Very High	Very High	Low	-	-	-	
	Override Source	Medium			Very High	High					
Incompatible Grazing practices Active Threat	Contribution	Medium					Low				Medium
	Irreversibility	High	Medium	Low	-		Low	Low	-	-	
	Override Source	Medium	Medium		-	-	Low	Medium		-	
Incompatible Grazing practices Historical Source	Contribution	Very High		High			Medium	High			High
	Irreversibility	High	High	Medium	-		Low	High	Low	-	
	Override Source	Very High		High		-	Medium	High		-	
Vehicle misuse Active Threat	Contribution	Medium		Low	Very High	Medium	High				Medium
	Irreversibility	Medium	Medium	Low	High	Medium	Very High	Low	High	Low	
	Override Source	Medium	Medium		Very High		High	Medium		-	
Oil or gas drilling Active Threat	Contribution			Low							Low
	Irreversibility		-	Medium	Low	-		-	-	-	
	Override Source	-		Low		-	-	-	-	-	
Recreational use Active Threat	Contribution					Medium					Low
	Irreversibility		-			Very High	Low		-	-	
	Override Source	-		-	-	High		-	-	-	
Mining practices Active Threat	Contribution			Low				High			Low
	Irreversibility		-	Medium	Low	-		High	Low	-	
	Override Source	-		Low		-	-	High		-	
Poaching or commercial collecting Active Threat	Contribution					Medium					Low
	Irreversibility		-			Very High	Low		-	-	
	Override Source	-		-	-	High		-	-	-	

Stresses/Sources/Strategies Worksheet

Gold Butte

System/Focal Conservation Target: Gypsophilic Community

Stresses	Severity	Scope	Stress	User Override
Habitat destruction or conversion	Very High	Medium	Medium	
Direct mortality/removal	Very High	Low	Low	
Extirpation of pollinator	Very High	High	High	
Altered composition/structure	High	Medium	Medium	
Altered soil nutrient cycles	High	Low	Low	
			-	
			-	
			-	

Sources of Stress		Habitat destruction or conversion	Direct mortality/removal	Extirpation of pollinator	Altered composition/structure	Altered soil nutrient cycles	-	-	-	Threat to System Rank
		Medium	Low	High	Medium	Low	-	-	-	
Incompatible Grazing practices	Contribution	Medium	Low	-	-	High	-	-	-	Low
	Irreversibility	Medium				Medium				
	Override Source	Medium				Medium				
Vehicle misuse	Contribution	Very High	Medium	Low	-	Very High	-	-	-	Medium
	Irreversibility	Medium				Medium				
	Override Source	High				High				
Poaching or commercial collecting	Contribution	-	Low	-	-	-	-	-	-	Low
	Irreversibility									
	Override Source									
Mining practices	Contribution	Medium	Medium	Low	-	Medium	Low	-	-	Medium
	Irreversibility	Very High				Medium				
	Override Source	High				Medium				
Ignorance leading to loss of pollinator	Contribution	-	-	-	High	Very High	-	-	-	High
	Irreversibility					Very High				
	Override Source					Very High				
	Contribution	-	-	-	-	-	-	-	-	-
	Irreversibility									
	Override Source									
	Contribution	-	-	-	-	-	-	-	-	-
	Irreversibility									
	Override Source									
	Contribution	-	-	-	-	-	-	-	-	-
	Irreversibility									
	Override Source									

Stresses/Sources/Strategies Worksheet

Gold Butte

System/Focal Conservation Target: Blackbrush/Joshua Tree Community

Stresses	Severity	Scope	Stress	User Override
Habitat fragmentation	Medium	Medium	Medium	
Habitat destruction or conversion	Very High	Low	Low	
Direct mortality/removal	Very High	Medium	Medium	
Altered composition/structure	High	Very High	High	
Altered soil nutrient cycles	Medium	Medium	Medium	
Altered soil layers	Medium	Low	Low	
Alteration of natural fire regimes	High	High	High	
			-	

Sources of Stress		Habitat fragmentation		Habitat destruction or conversion		Direct mortality/removal		Altered composition/structure		Altered soil nutrient cycles		Altered soil layers		Alteration of natural fire regimes		Threat to System Rank
		Medium		Low		Medium		High		Medium		Low		High		
Responsible use of open roads	Contribution	Medium						Medium						Medium		
	Irreversibility	Very High	Medium		-		-	Very High	High		-		-	Medium	Medium	High
	Override Source	High		-		-		High		-		-		Medium		
Vehicle misuse	Contribution	Very High				Medium		High		Medium		Medium		Medium		
	Irreversibility	Medium	Medium		-	Very High	Medium	Very High	High	High	Low	Very High	Low	Medium	Medium	High
	Override Source	High		-		High		High		Medium		High		Medium		
Recreational use	Contribution							Medium						Medium		
	Irreversibility		-		-		-	Very High	High		-		-	Medium	Medium	High
	Override Source	-		-		-		High		-		-		Medium		
Mining practices	Contribution	Low		Low		Low		Low		Low		Low				
	Irreversibility	Medium	Low	Very High	Low	Very High	Low	Very High	Medium	High	Low	Very High	Low		-	Medium
	Override Source	Low		Medium		Medium		Medium		Medium		Medium		-		
Oil or gas drilling	Contribution	Low		Low		Low		Low		Low		Low				
	Irreversibility	Medium	Low	Very High	Low	Very High	Low	Very High	Medium	High	Low	Very High	Low		-	Medium
	Override Source	Low		Medium		Medium		Medium		Medium		Medium		-		
Poaching or commercial collecting	Contribution					Low										
	Irreversibility		-		-	Very High	Low				-		-		-	Low
	Override Source	-		-		Medium		-		-		-		-		
Invasive/alien species	Contribution			Very High				High						Very High		
	Irreversibility		-	Very High	Low			Very High	High		-		-	Very High	High	High
	Override Source	-		Very High		-		High		-		-		Very High		
Incompatible Grazing practices	Contribution							Very High		High						
	Irreversibility		-		-			Medium	High	High	Medium		-		-	High
	Override Source	-		-		-		High		High		-		-		

Stresses/Sources/Strategies Worksheet

Gold Butte

System/Focal Conservation Target: Sand Substrate Communities

Stresses	Severity	Scope	Stress	User Override
Altered composition/structure	Medium	High	Medium	
Altered soil layers	High	Medium	Medium	
Habitat fragmentation	Medium	Low	Low	
Habitat destruction or conversion	Very High	Low	Low	
			-	
			-	
			-	
			-	

Sources of Stress		Altered composition/structure	Altered soil layers		Habitat fragmentation		Habitat destruction or conversion		-		-		-		-		Threat to System Rank
		Medium		Medium		Low		Low		-		-		-			
Vehicle misuse Active Threat	Contribution Irreversibility Override Source	Very High	Medium	Very High	Medium		-		-		-		-		-		Medium
		Medium															
		High				-				-				-			
Mining practices Active Threat	Contribution Irreversibility Override Source		-	Low	Low	Low	-	Low	Low		-		-		-		Low
				Very High		Low		Very High									
		-		Medium		Low		Medium		-		-		-		-	
Responsible use of open roads Active Threat	Contribution Irreversibility Override Source		-		-	Low	Low		-		-		-		-		Low
						Very High											
		-		-		Medium											
Lake Mead water level maintenance Active Threat	Contribution Irreversibility Override Source		-	Medium	Low		-		-		-		-		-		Low
				High													
		-		Medium		-		-		-		-		-		-	
Active Threat	Contribution Irreversibility Override Source		-		-		-		-		-		-		-		-
		-		-		-		-		-		-		-		-	
Active Threat	Contribution Irreversibility Override Source		-		-		-		-		-		-		-		-
		-		-		-		-		-		-		-		-	
Active Threat	Contribution Irreversibility Override Source		-		-		-		-		-		-		-		-
		-		-		-		-		-		-		-		-	
Active Threat	Contribution Irreversibility Override Source		-		-		-		-		-		-		-		-
		-		-		-		-		-		-		-		-	
Active Threat	Contribution Irreversibility Override Source		-		-		-		-		-		-		-		-
		-		-		-		-		-		-		-		-	

Stresses/Sources/Strategies Worksheet

Gold Butte

System/Focal Conservation Target: Spring Communities

Stresses	Severity	Scope	Stress	User Override
Altered composition/structure	Very High	Very High	Very High	
Modification of water levels; changes in natural	Very High	Very High	Very High	
Nutrient loading	High	High	High	
Groundwater depletion	Very High	Low	Low	
			-	
			-	
			-	
			-	

Sources of Stress		Altered composition/structure		Modification of water levels; changes in		Nutrient loading		Groundwater depletion		-		-		-		-		Threat to System Rank
		Very High		Very High		High		Low		-		-		-		-		
Operation of ditches, dikes, drainage or diversion systems	Contribution	Very High		Very High														Very High
	Irreversibility	Medium	Very High	Medium	Very High		-		-		-		-		-		-	
	Source	High		High		-		-		-		-		-		-		
Excessive groundwater withdrawal	Contribution	Very High		Very High														Very High
	Irreversibility	Very High	Very High	Very High	Very High		-	Very High	Low		-		-		-		-	
	Source	Very High		Very High		-		Very High		-		-		-		-		
Incompatible Grazing practices	Contribution	Very High				Very High	High											Very High
	Irreversibility	Medium	Very High		-	Medium					-		-		-		-	
	Source	High		-		High		-		-		-		-		-		
Invasive/alien species	Contribution	Medium																Very High
	Irreversibility	Very High	Very High		-		-				-		-		-		-	
	Source	High		-		-		-		-		-		-		-		
	Contribution																	
	Irreversibility		-		-		-				-		-		-		-	
	Source	-		-		-		-		-		-		-		-		
	Contribution																	
	Irreversibility		-		-		-				-		-		-		-	
	Source	-		-		-		-		-		-		-		-		
	Contribution																	
	Irreversibility		-		-		-				-		-		-		-	
	Source	-		-		-		-		-		-		-		-		

Stresses/Sources/Strategies Worksheet

Gold Butte

System/Focal Conservation Target:

Washes

Stresses	Severity	Scope	Stress	User Override
Altered composition/structure	High	High	High	
Altered soil layers	High	Low	Low	
Direct mortality/removal	High	Medium	Medium	
Disturbance (of biota)			-	
			-	
			-	
			-	
			-	

Sources of Stress		Altered composition/structure		Altered soil layers		Direct mortality/removal		Disturbance (of biota)		-		-		-		-		Threat to System Rank
		High		Low		Medium		-		-		-		-				
Vehicle misuse Active Threat	Contribution Irreversibility Override Source	Very High	High	Very High	Low	Medium	Medium	Very High	-		-		-		-		-	High
		Medium		High		Very High												
		High		Very High		High		-										
Poaching or commercial collecting Active Threat	Contribution Irreversibility Override Source	Low	Medium		-	Low	Low		-		-		-		-		-	Medium
		High				Very High												
		Medium		-		Medium		-										
Responsible use of open roads Active Threat	Contribution Irreversibility Override Source	Low	Low		-	Low	Low	Very High	-		-		-		-		-	Low
		Medium				Very High												
		Low		-		Medium		-										
Incompatible Grazing practices Active Threat	Contribution Irreversibility Override Source	Very High	High	Very High	Low	High	Low		-		-		-		-		-	High
		Medium		High		Low												
		High		Very High		Medium		-										
Incompatible Grazing practices Historical Source	Contribution Irreversibility Override Source	Very High	High	Very High	Low	Medium	Low		-		-		-		-		-	High
		Medium		High		Low												
		High		Very High		Low		-										
Active Threat	Contribution Irreversibility Override Source		-		-		-		-		-		-		-		-	-
		-		-		-		-										
Active Threat	Contribution Irreversibility Override Source		-		-		-		-		-		-		-		-	-
		-		-		-		-										
Active Threat	Contribution Irreversibility Override Source		-		-		-		-		-		-		-		-	-
		-		-		-		-										
Active Threat	Contribution Irreversibility Override Source		-		-		-		-		-		-		-		-	-
		-		-		-		-										

Stresses/Sources/Strategies Worksheet

Gold Butte

System/Focal Conservation Target: Mixed Conifer / Pinyon-Juniper System

Stresses	Severity	Scope	Stress	User Override
Alteration of natural fire regimes	Medium	High	Medium	
Altered composition/structure	Medium	Very High	Medium	
			-	
			-	
			-	
			-	
			-	
			-	

Sources of Stress			Alteration of natural fire regimes	Altered composition/structure														Threat to System Rank
			Medium	Medium														
Global climate change Active Threat	Contribution			Very High	Medium													Medium
	Irreversibility			Very High														
	Override			Very High														
Invasive/alien species Active Threat	Source		High	High	Medium													Medium
	Contribution		Very High	Very High														
	Irreversibility		High	High														
Fire suppression techniques Active Threat	Override		Medium	Medium	Low													Low
	Source		High	High														
	Contribution		Medium	Medium														
Incompatible Grazing practices Historical Source	Irreversibility			High	Medium													Medium
	Override			High														
	Source			High														
	Contribution																	
	Irreversibility																	
	Override																	
	Source																	
	Contribution																	
	Irreversibility																	
	Override																	
	Source																	
	Contribution																	
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	Override																	
	Source																	
	Contribution																	
	Irreversibility																	
	Override																	
	Source																	
	Contribution																	
	Irreversibility																	
	Override																	
	Source																	

Stresses/Sources/Strategies Worksheet

Gold Butte

System/Focal Conservation Target:

Desert Tortoise

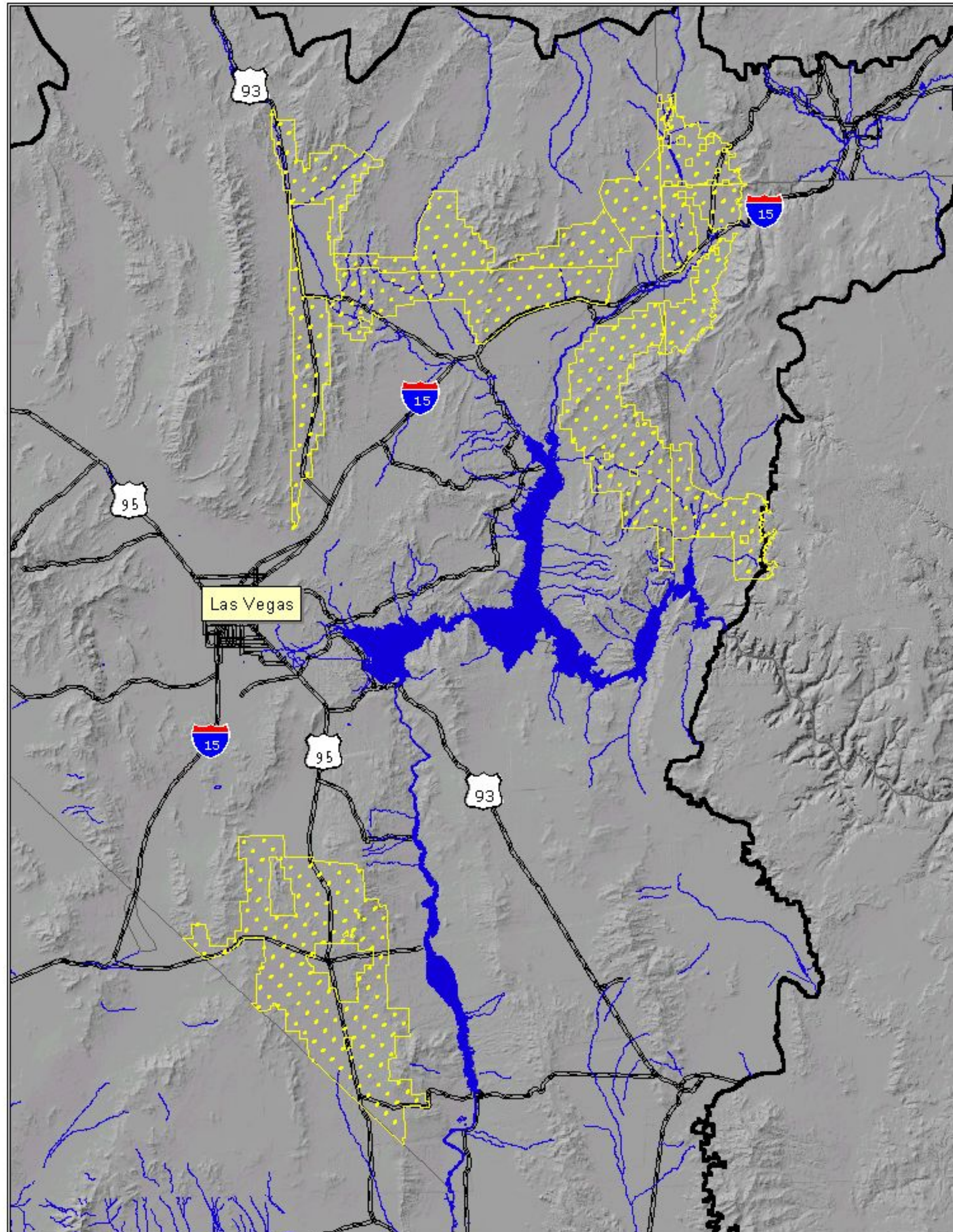
Stresses	Severity	Scope	Stress	User Override
Altered food plant availability	High	High	High	
Extraordinary predation	High	Medium	Medium	
Extraordinary disease	Medium	Very High	Medium	
Direct mortality/removal	Very High	Medium	Medium	
Altered habitat structure	High	High	High	
Habitat fragmentation	High	High	High	
			-	
			-	

Sources of Stress			Altered food plant availability	Extraordinary predation	Extraordinary disease	Direct mortality/removal	Altered habitat structure	Habitat fragmentation	-	-	Threat to System Rank
			High	Medium	Medium	Medium	High	High	-	-	
Incompatible Grazing practices	Contribution Irreversibility Override Source	Active Threat	High	Medium							Medium
			Medium								
			Medium								
Incompatible Grazing practices	Contribution Irreversibility Override Source	Historical Source	Very High	High				High	High	High	Very High
			Medium								
			High								
Development of roads or utilities	Contribution Irreversibility Override Source	Active Threat		-	High	Medium	Low	Low	Very High	High	High
Invasive/alien species	Contribution Irreversibility Override Source	Active Threat	High	High							High
			Very High								
			High								
Vehicle misuse	Contribution Irreversibility Override Source	Active Threat		-			High	Low	High	High	High
Responsible use of open roads	Contribution Irreversibility Override Source	Active Threat		-	Very High	Medium	High	Low			Medium
Utility lines	Contribution Irreversibility Override Source	Active Threat		-	Very High	Medium	High	Low	Low		Medium
	Contribution Irreversibility Override Source	Active Threat		-							

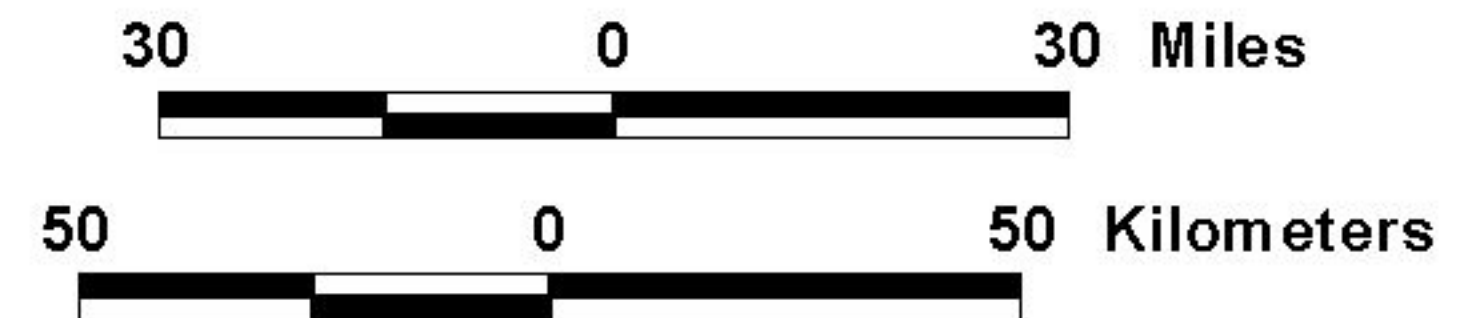
APPENDIX IV

MAPS

Map A. Desert Tortoise Areas of Critical Environmental Concern in the Northeastern Mojave Desert

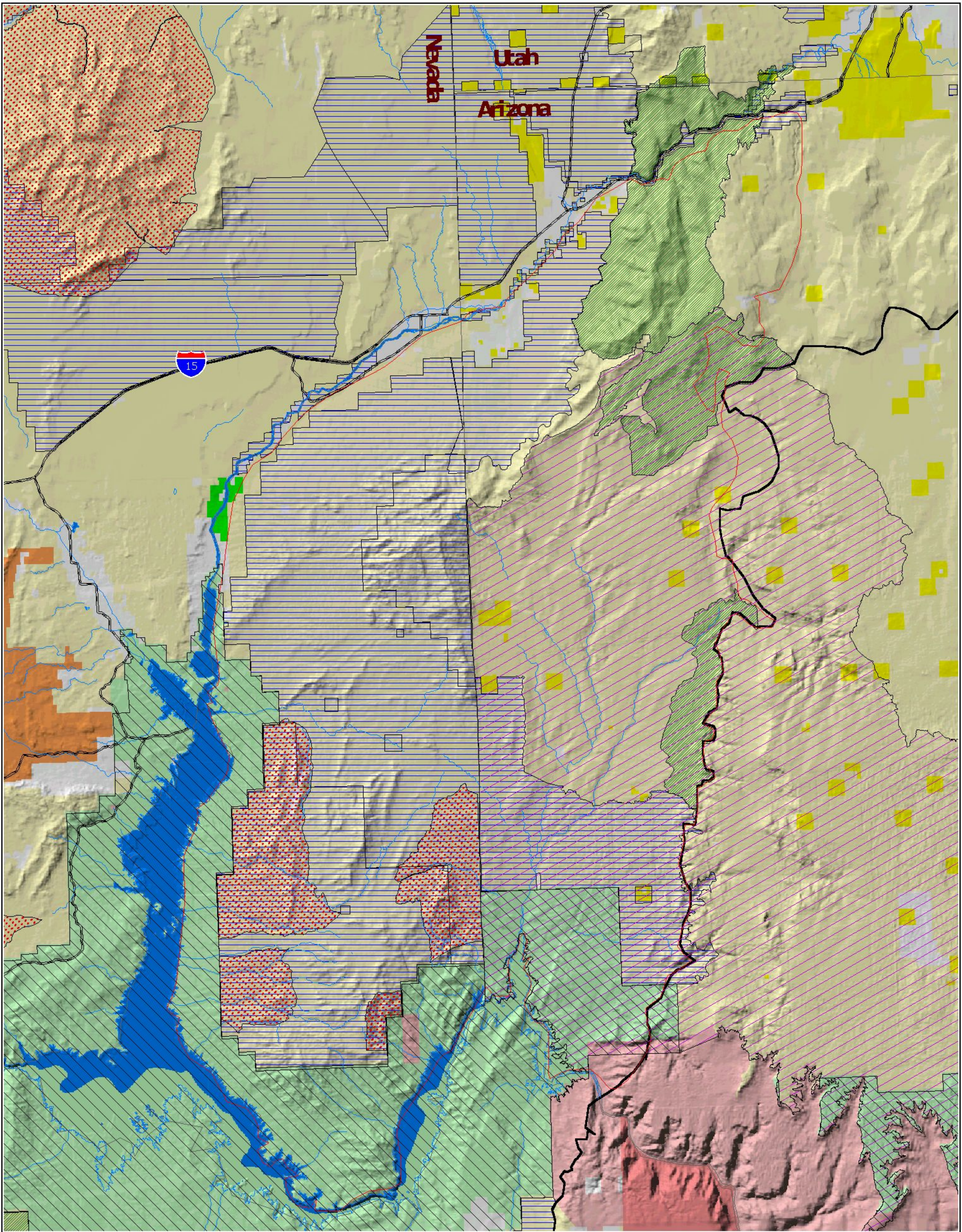


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-  Desert Tortoise Areas of Critical Environmental Concern
-  Major Rivers and Washes
-  Major Roads
-  Lakes
-  Mojave Desert Boundary
-  States





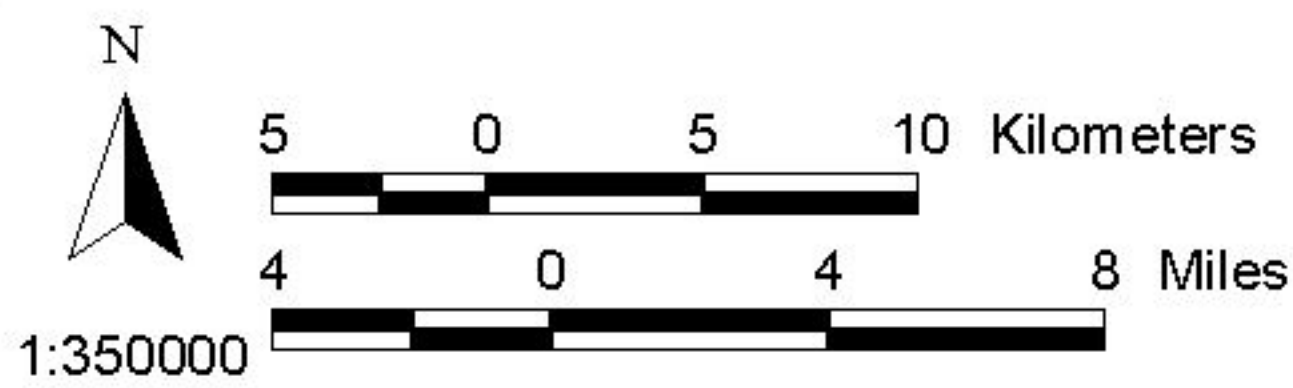
Land Management/Designation

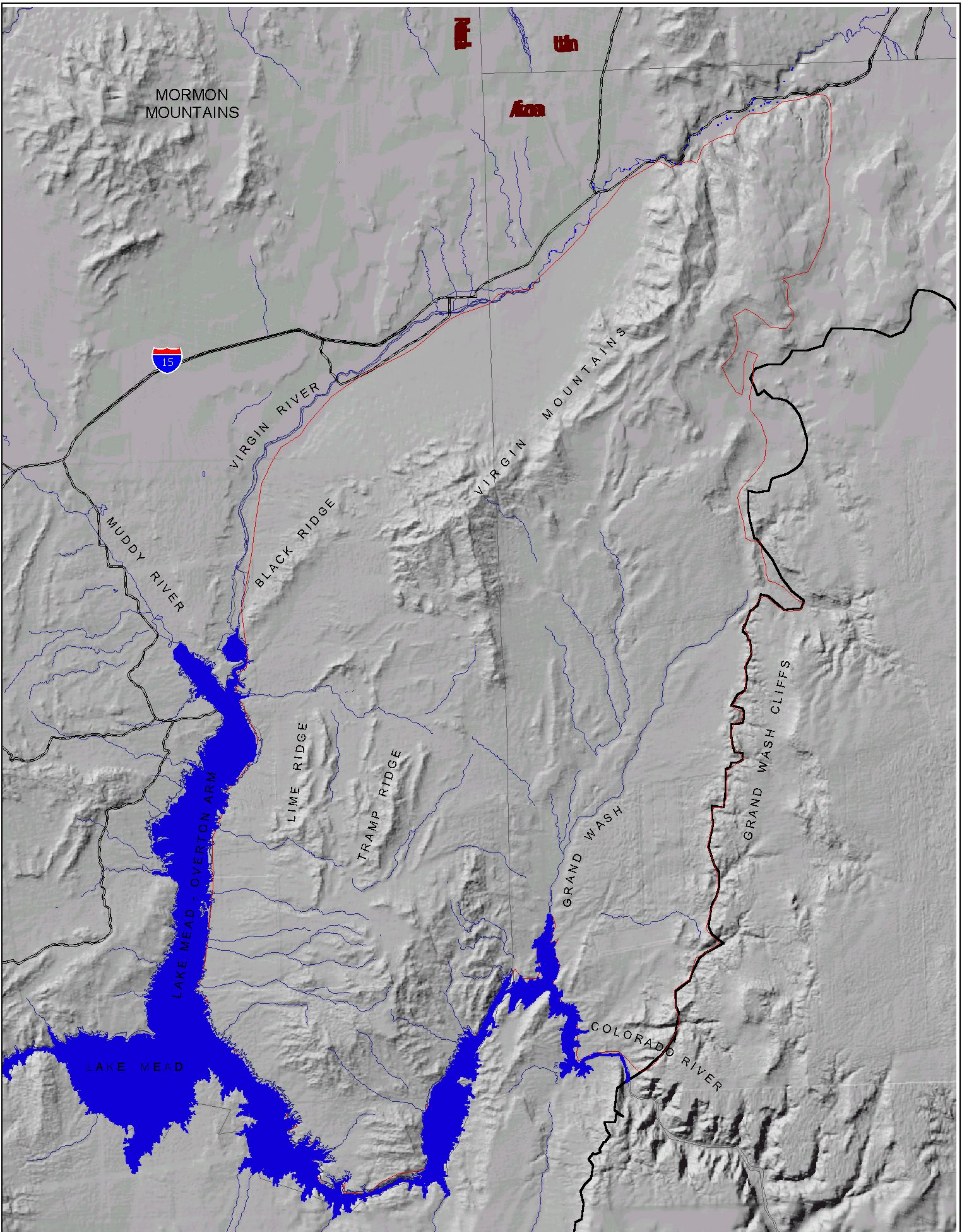
- BUREAU OF LAND MANAGEMENT
- AREA OF CRITICAL ENVIRONMENTAL CONCERN
- WILDERNESS STUDY AREA
- WILDERNESS
- NATIONAL PARK
- NATIONAL MONUMENT
- NATIONAL RECREATION AREA
- NATIVE AMERICAN RESERVATION
- PRIVATE
- STATE
- STATE WILDLIFE RESERVE

General Key

- Gold Butte Pahoehoe Planning Area
- Mojave Desert Boundary
- State Boundary
- Major Lakes
- Major Rivers
- Major Roads

Map B. Land Management and Designation



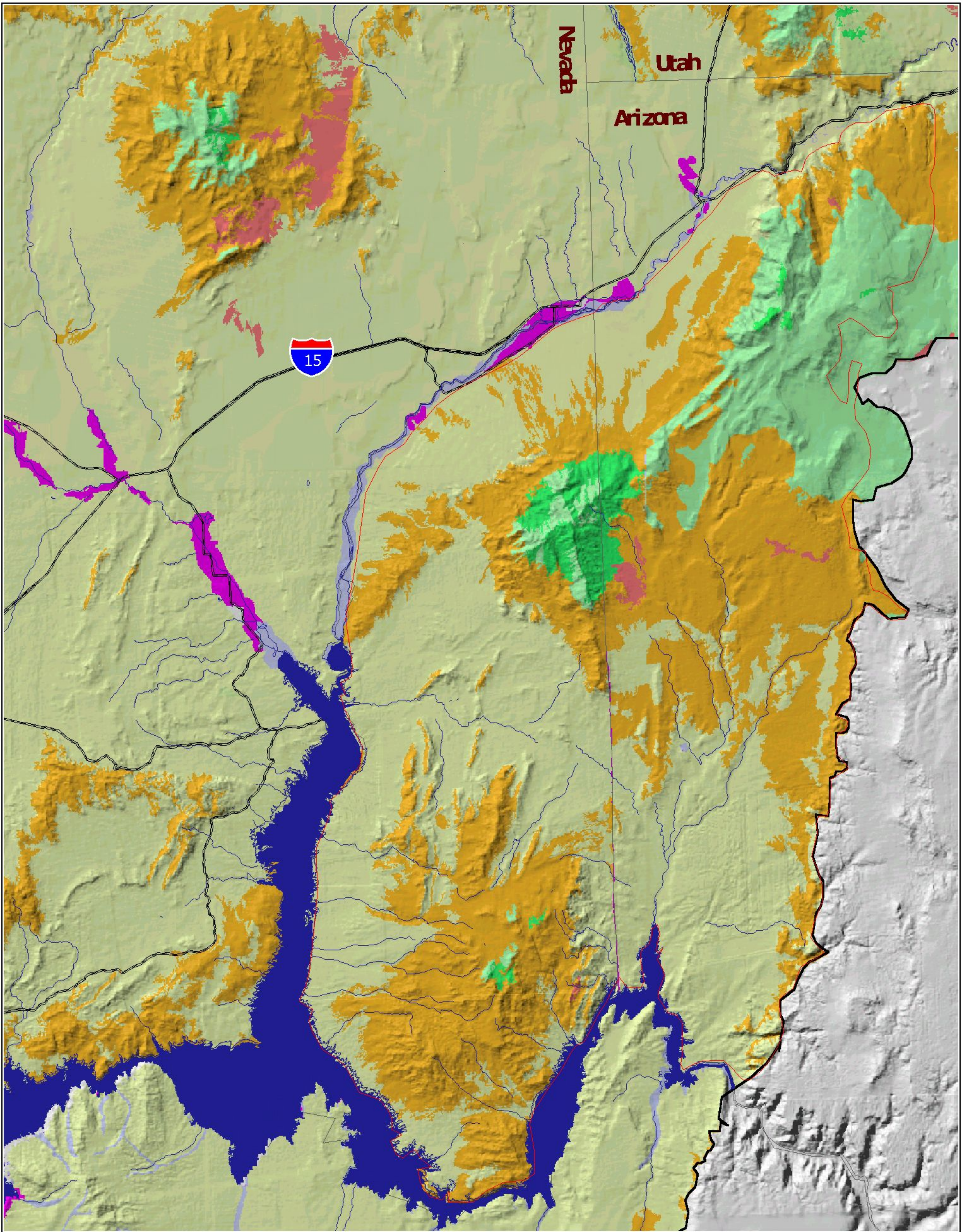


Gold Butte Pakoon Planning Area

- Gold Butte Pakoon Planning Area
- Mojave Desert Boundary
- State Boundary
- Major Lakes
- Major Rivers and Washes
- Major Roads

Map C. Gold Butte Pakoon Planning Area





Major Vegetation Communities within Gold Butte Pakoon Planning Area

- AGRICULTURE
- CREOSOTE - BURSAGE MIXED SCRUB
- BLACKBRUSH - JOSHUA TREE MIXED SCRUB
- NON-NATIVE CONVERTED ASIAN STEPPE
- PINYON - JUNIPER WOODLAND
- MIXED - CONIFER / MOUNTAIN WOODLANDS
- RIPARIAN FOREST

General Key

- Gold Butte Pakoon Planning Area
- Mojave Desert Boundary
- State Line
- Major Lakes
- Major Rivers
- Major Roads

Map D.

Major Vegetation Communities



OF NEVADA

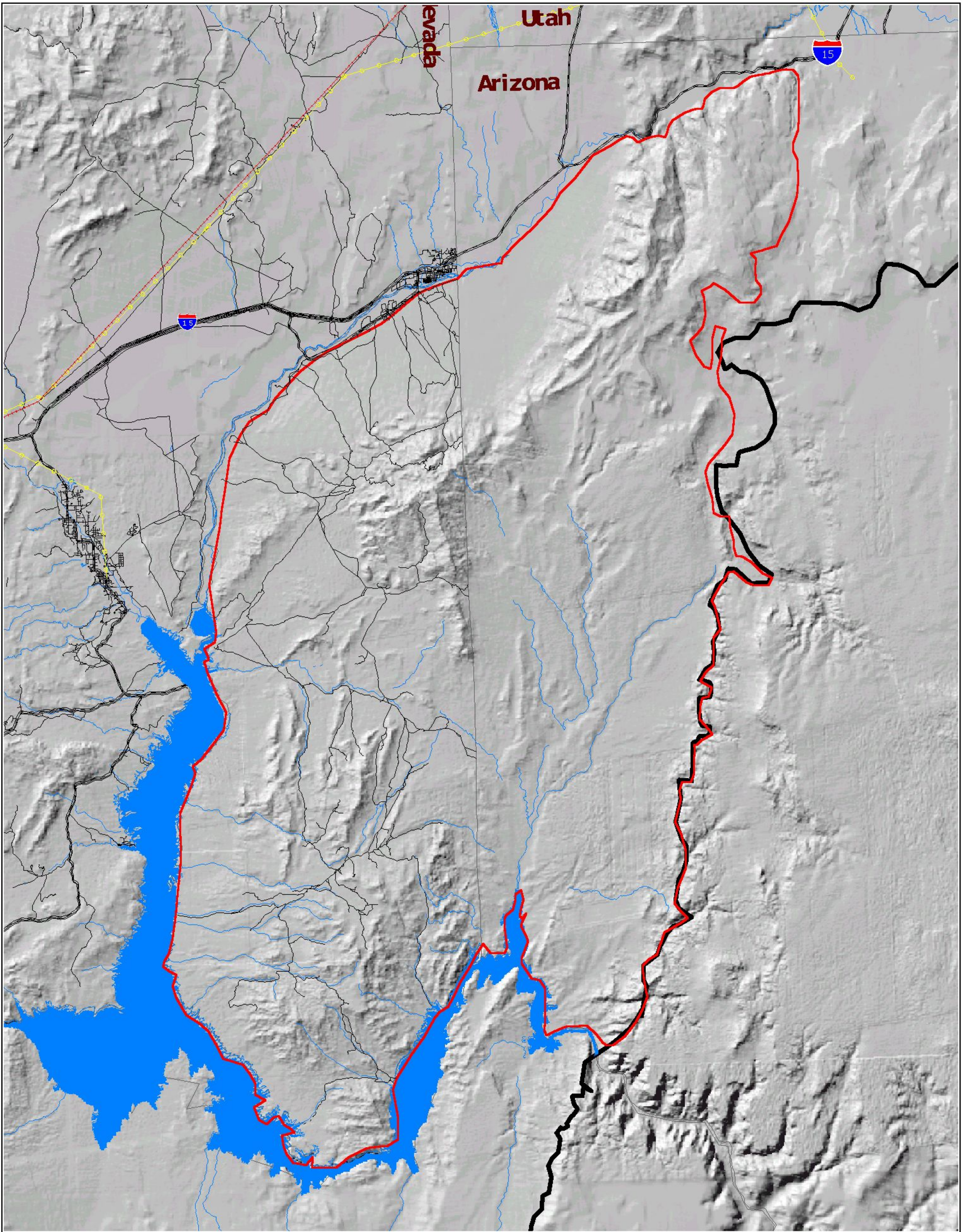
N



5 0 5 10 Kilometers

4 0 4 8 Miles

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Linear Disturbance Types

- Major Roads
- Other Roads (paved and unpaved)
- Above Ground Utility Lines/ROWs
- Buried Utility Pipelines/ROWs

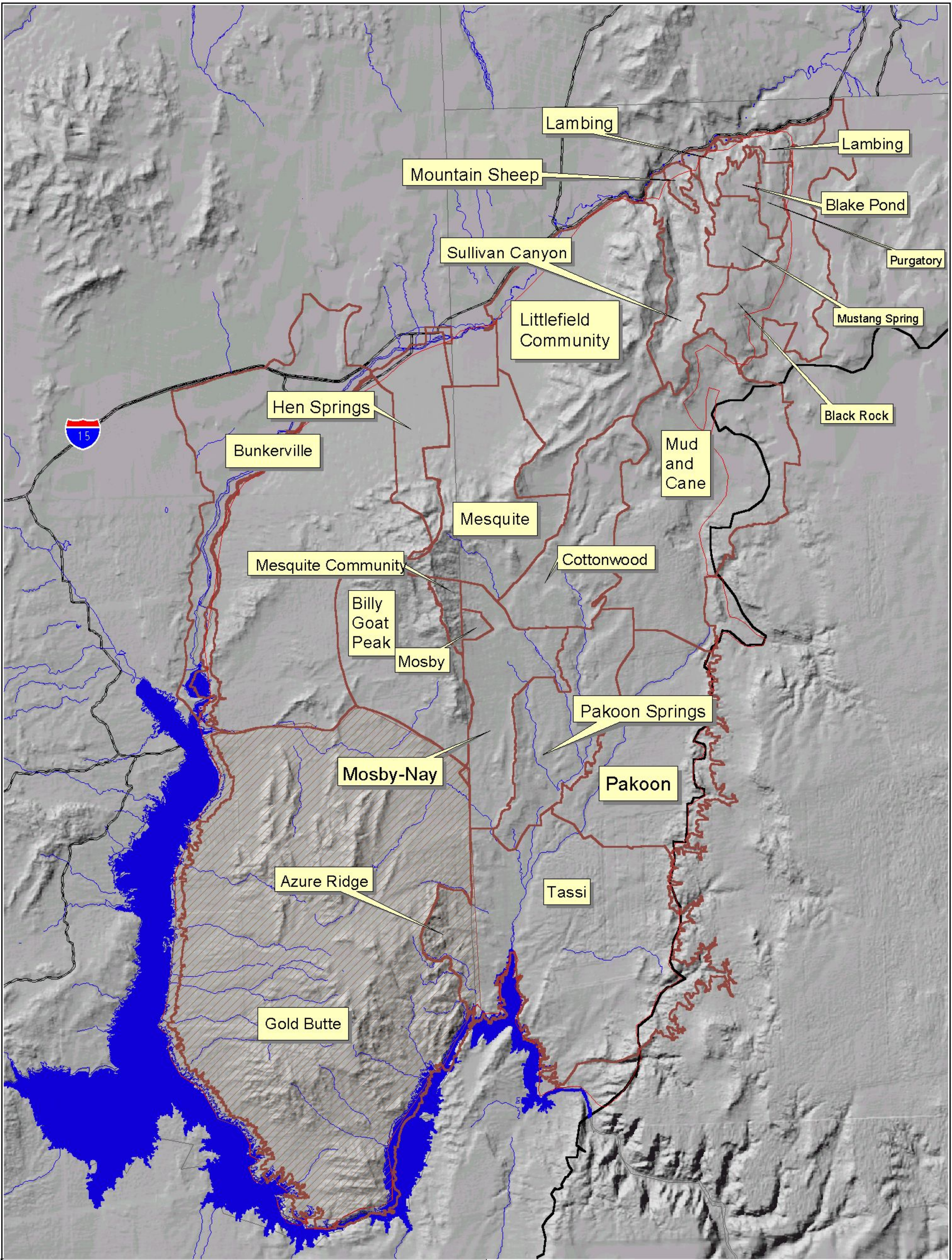
Representations of utility ROWs are approximate

General Key

- Mormon Mesa Site Boundary
- Mojave Boundary
- State Boundary
- Major Lakes
- Major Rivers

**Map E.
Linear Features and Rights of Way**





**Livestock Grazing Allotments/
Herd Management Areas**

- Livestock Grazing Allotments
- Herd Management Areas

Allotment and Herd Management Area
boundaries are approximate

General Key

- Gold Butte Pagoon Planning Area
- Mojave Desert Boundary
- State Boundary
- Major Lakes
- Major Rivers
- Major Roads

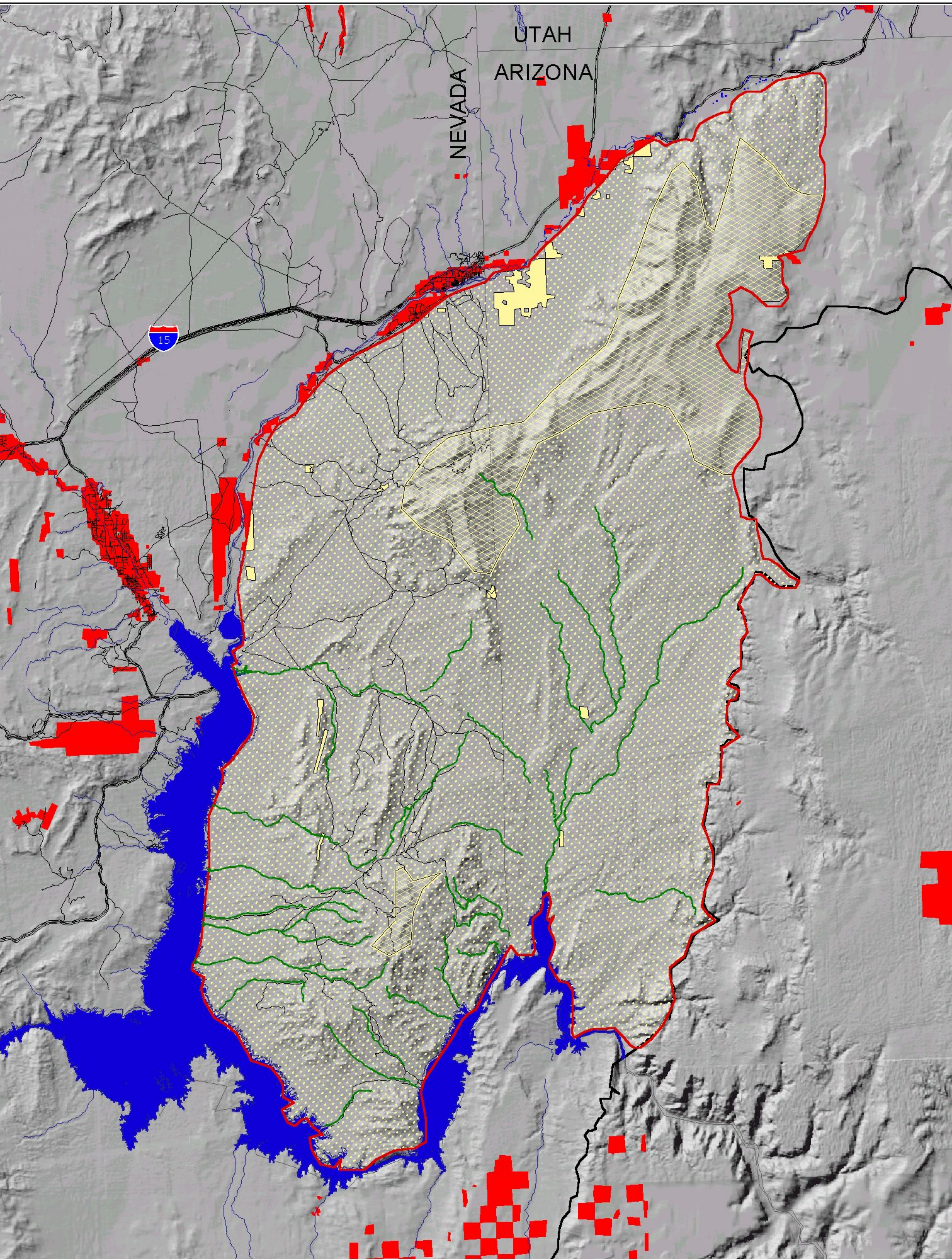
**Map F. Grazing Allotments and
Herd Management Areas**



1:350000

5 0 5 10 Kilometers

4 0 4 8 Miles



Conservation Zones

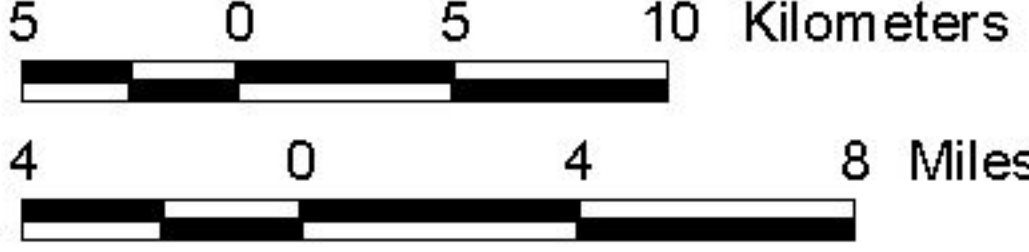
- | | |
|--|---------------------|
| Zone 1 - Private Lands | Other Private Lands |
| Zone 2 - Creosote-Blackbrush-Joshua Tree | |
| Zone 5 - Mixed Conifer / Mountain Shrublands | |
| Zone 6 - Wash Corridors | |

(Zones not depicted here are being mapped as part of other planning efforts as part of the Clark County Multiple Species Habitat Conservation Plan process or as part of the Arizona Strip Resource Management Plan revision for the Grand Canyon Parashant National Monument. See Chapter 9 for details.)

General Key

- | |
|---------------------------------|
| Gold Butte Pakoon Planning Area |
| Mojave Desert Boundary |
| State Boundary |
| Major Lakes |
| Major Rivers |
| Major Roads |
| Roads |

Map G. Conservation Zones



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