FINAL REPORT
LANDSCAPE ANALYSIS

CHAPTER 6:
RECOMMENDATIONS

Prepared for:

USDA FOREST SERVICE
SPRING MOUNTAINS NATIONAL RECREATION AREA
HUMBOLDT-TOIYABE NATIONAL FOREST
Contract No. AG-9360-C-06-0003

Prepared by:

ENTRIX, INC.
Las Vegas, NV

Project No. 3138801

August 2008

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HUMBOLDT-TOIYABE NATIONAL FOREST
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TABLE OF CONTENTS

TABLES

ACRONYMS

AML	Appropriate Management Level
BLM	Bureau of Land Management
BMPs	best management practices
CA	Conservation Agreement
CUAs	Concentrated use areas
GC	general commitment
GIS	Geographic Information System
GMP	General Management Plan
MVUM	Motorized Vehicle Use Map
NEPA	National Environmental Policy Act

NRA	National Recreation Area
NRIS	Natural Resource Information System
OHV	Off Highway Vehicle
RNA	Research Natural Area
USFS	U.S. Forest Service
VC	Visitor center
WUI	Wildlife urban interface

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1.0 INTRODUCTION

This step of the process is the final phase of this Landscape Assessment. The purpose of Chapter 6 is to recommend management strategies, actions, or processes that will provide for a sustainable biological and social ecosystem within the Springs Mountains National Recreation Area (NRA). The recommendations are intended to be used for development of program direction, project priorities, and information/data needs. It is also anticipated that any specific recommendation may be modified as a result of additional information, future analysis, or agency direction.

The recommendations are both broad scale in nature and site specific, with scope of the recommendations being compatible with both the accuracy and specificity of the information contained in the Landscape Assessment. The basis for the recommendations is found within Chapters 1-5 of this Landscape Assessment.

The Recommendations are developed in response to the key questions that were initially developed by the Project Interdisciplinary Team. However, some of the recommendations are more programmatic in nature and thus address all key questions and are identified separately. In addition, Chapter 6 contains recommendations regarding specific Action Items contained in the Spring Mountains National Recreation Area Conservation Agreement (CA) (Table 6.3).

Recommendations are stated after each key question and followed by the rationale for the recommendations. Some recommendations are based on similar rationale and thus are grouped together.

2.0 FINAL ISSUE AND KEY QUESTIONS

Once the questions had been modified by ENTRIX, they were reviewed and discussed with USDA Forest Service personnel prior to finalization. The final issues and key questions are presented in this section. The recommendations that follow in Sections 3.0 and 4.0 below are developed in response to these key questions. The General Recommendations are more programmatic in nature and address all of the following key questions, while the Specific Recommendations directly address only one of these key questions.

2.1 CORE TOPIC: SPECIES AND HABITAT PROTECTION/MAINTAINING SPECIES VIABILITY

2.1.1 Issue

Under natural conditions, plant and animal species have a high degree of resiliency and can maintain viability; however, management activities and human uses on the Spring Mountains NRA may be affecting habitat and species viability.

2.1.2 Key Questions

1) How do recreation activities affect key species and habitats? Which types and locations of recreation activities are having more substantial effects on species and habitats?

2) How does current fire management affect key species and habitats compared to historical fire patterns?

3) How is development affecting key species and habitats? Which types and locations of development are having a more substantial effect on species and habitats?

4) How are nonnative species affecting key species and habitats? Which are having more substantial effects on species and habitats?

5) How have natural and human modification of hydrologic and stream channel systems affected key species and habitats?

2.2 CORE TOPIC: RECREATION AND HUMAN USE

2.2.1 Issue

The rapidly expanding visitor use and the changing nature of recreational activities on the Spring Mountains NRA challenge the Forest Service to provide for recreation opportunities and species viability.

2.2.2 Key Questions

1) How does current agency management direction from NRA enabling legislation, GMP, the Clark County MSHCP, and CA affect the availability and diversity of recreation opportunities on the Spring Mountains NRA?

2) In light of current and future recreational demands and use patterns on the Spring Mountains NRA, what potential recreation strategies would be most effective in providing for recreation opportunities while maintaining species viability?

3.0 GENERAL RECOMMENDATIONS

The following recommendations are more programmatic in nature and address all of the Key Questions outlined in Section 2.0 above.

3.1 SUBTOPIC: SPECIES

Recommendations:

1) Through an adaptive management approach, revise the list of species included in the CA for the Spring Mountains NRA, categorize the species by the intensity of management necessary, and adjust conservation priorities appropriately.

2) Any revisions of species status would be conducted through an established process in the Comprehensive Inventory and Monitoring Strategy, revised Conservation Agreement, or other document/program. The list may be revised to add or remove species or shift between categories or management strategies based on taxonomic changes, new information on species distribution, changes in level of threat to species, etc. The timeframe for revision would be outlined in the established process (e.g., minor taxonomic revisions every year versus major additions or deletions every five years).

3) Work toward ensuring consistency of the CA list of species with other Forest Service planning or partnering agency lists.

4) Existing or future components in the Forest Plan and associated amendments should guide or support management of ecosystem diversity in the Spring Mountains NRA to provide for a variety of unique habitats and species. Where necessary, manage for individual species, but across the landscape maintain ecosystem health, processes and habitat connectivity for species that have a restricted distribution globally but are abundant on the Spring Mountains, or that have a wider distribution beyond the Spring Mountains and are stable on the Spring Mountains.

Rationale: The existing analysis, together with any new information received since the analysis was completed, indicates there are some species more imperiled or requiring more management attention than others on the Spring Mountains NRA. In addition, the analysis, recent information, monitoring and surveys also indicate several species are more secure and/or broadly distributed in the Spring Mountains or beyond than previously thought. Synthesis of existing information and analysis shows that different levels of management are needed, which are described below. Species that do not occur on the Spring Mountains or species where the Spring Mountains plays a minor role in the range-wide viability of the species should be dropped from the list or not considered for future inclusion in a revised CA. Existing policies, laws, and conservation plans that guide the Forest Service and its partners to manage ecosystem health and diversity should provide for overall species and habitat diversity for wider ranging species.

Based on the best available information to date, the following tables provide the classification and prioritization of species for a revised CA. These tables only address the species analyzed in the landscape assessment; thus, there may be other species not yet analyzed that are appropriate to include in a revised CA [i.e., moosewort moonwort (*Botrychium tunux*)]. Table 6.1 covers species for which the conservation management under the CA would be directed along with priorities (Tier 1 and Tier 2 species). This table provides a brief rationale or basis as to why the species was included in each category and provides the most important conservation actions necessary for the species. Chapters 3/4 and 5 provide detailed supporting information for the rationales and actions. Table 6.2 includes species that would be conserved through management for ecosystem diversity.

Table 6-1 List of Special Status Species

Recommended Special Status Species

Certain species within the Spring Mountains NRA require a more intensive or rigorous management strategy to provide effective conservation. Species have been grouped into two categories, either Tier 1 or Tier 2, each with different levels of intensity for conservation management of the species. Note that all scientific and common names reflect the most current versions at the time of this publication (see Ch. 3/4, Species Accounts for discussion of taxonomic changes). Older versions used in Chapters 1-5 are included in parentheses below the current versions.

Tier 1 Species (14)

Due to highly restricted known distribution, viability concerns, threats to species and habitat, and/or significant lack of information, these species **require focused or high conservation management**. This includes elements such as: consistent inventory, monitoring, and/or research to fill information gaps, determine viability/track trend, etc.; active restoration; continuation of existing conservation measures; and development of additional conservation measures to reduce threats or increase viability.

- These species or specific aspects of species-activity interaction are the top or first tier of priority for inventory, monitoring and/or research.
- Impacts from existing or future projects to these species and their occupied habitat should be avoided.
- Shifting from avoidance to minimization of impacts and loss of occupied habitat should occur only if sufficient mitigation (most importantly, restoration or creation of habitat) is provided to offset the loss.
- If significant new life history or distribution information is obtained for species lacking such information to warrant a change in the level of conservation management, shifting the species to a different category (Tier 2 Species) or management strategy will be considered through the established process.
- If threats to the species are sufficiently reduced and/or species viability improved to warrant a change in the level of conservation management, shifting the species to a different category (Tier 2 Species) or management strategy will be considered through the established process.

Current Taxonomy	**CA/MHCHP taxonomy**	
INVERTEBRATE SPECIES		
Insects / Butterflies		
Acastus checkerspot (*Chlosyne acastus robusta)*	Spring Mountains acastus checkerspot *(Chlosyne acastus robusta)*	Rationale: — endemic species with highly restricted known distributions — lack of information on life history — ongoing threats — viability concerns Actions: — obtain life history information — conduct regular monitoring to track trend through the Comprehensive Inventory and Monitoring Strategy — reduce threats — implement active restoration or other measures to increase viability
Spring Mountains dark blue (*Euphilotes ancilla purpura)*	Dark blue *(Euphilotes. enoptes purpurea)*	
Morand's checkerspot *(Euphydryas chalcedona morandi)*	Morand's checkerspot *(Euphydryas anicia morandi)*	
Mt. Charleston blue *(Plebejus shasta charlestonensis)*	Mt. Charleston blue *(Icaricia shasta charlestonensis)*	
Charleston ant *(Lasius nevadensis)*		Rationale: — endemic with highly restricted known distribution — significant lack of life history, survey, and threats information Actions: — obtain distribution information — determine threats, if occurring — reduce threats, if appropriate

Table 6-1 List of Special Status Species

Pyrgs/Springsnails		
Spring Mountains pyrg (*Pyrgulopsis deaconi*)	Spring Mountains springsnail *(Pyrgulopsis deaconi)*	Rationale: — endemic species with highly restricted distribution — ongoing threats Actions: — conduct regular monitoring to assess/track population trend through the Comprehensive Inventory and Monitoring Strategy — reduce threats
Southeast Nevada pyrg (*Pyrgulopsis turbatrix*)	Southeast Nevada springsnail *(Pyrgulopsis turbatrix)*	
PLANT SPECIES		
Mixed Conifer		
Clokey's milkvetch *(Astragalus aequalis)*	Clokey milkvetch *(Astragalus aequalis)*	Rationale: — endemic with highly restricted known distribution — ongoing threats Actions: — obtain life history information, especially microhabitat requirements — determine role of fire in life history — conduct regular monitoring to track trend through the Comprehensive Inventory and Monitoring Strategy — reduce threats
Egg milkvetch *(Astragalus oophorus* var. *clokeyanus)*	Clokey eggvetch *(Astragalus oophorus* var. *clokeyanus)*	Rationale: — endemic with highly restricted known distribution — viability concerns — ongoing threats Actions: — obtain life history information, especially microhabitat requirements — determine role of fire in life history — conduct regular monitoring to track trend through the Comprehensive Inventory and Monitoring Strategy — reduce threats
Low Elevation		
Spring Mountains milkvetch *(Astragalus remotus)*		Rationale: — endemic with highly restricted known distribution — significant lack of survey and threats information Actions: — obtain distribution information — determine threats, if occurring — reduce threats, if appropriate
Riparian and Springs		
Trianglelobe moonwort (*Botrychium ascendens)*	Upswept moonwort *(Botrychium ascendens)*	Rationale: — species are highly restricted to an important microhabitat — ongoing threats Actions: — conduct regular monitoring to track trend through the Comprehensive Inventory and Monitoring Strategy — reduce threats to protect riparian and springs habitat
Scalloped moonwort *(Botrychium crenulatum)*	Dainty moonwort *(Botrychium crenulatum)*	
Narrowleaf moonwort *(Botrychium lineare)*	Slender moonwort *(Botrychium lineare*)	

Table 6-1 List of Special Status Species

Cliffs and Steep Slopes		
Clokey's greasebush *(Glossopetalon clokeyi)*	Clokey greasebush *(Glossopetalon clokeyi)*	Rationale: — endemic with highly restricted known distribution — significant lack of survey and threats information Actions: — obtain distribution information — determine threats, if occurring — reduce threats, if appropriate
Tier 2 Species (24) Due to a restricted distribution, potential viability concerns for some species, and/or a moderate degree of threats to species and habitat these species require **a moderate level of increased management**. This includes elements such as: periodic inventory, monitoring, and/or research to fill information gaps, determine viability/track trend, etc.; and the continuation of existing conservation measures and best management practices. • These species or specific aspects of species-activity interactions are the second tier of priority for inventory, monitoring, and/or research. • Impacts from existing or future projects to these species and their habitat should be avoided first, when possible; if avoidance is not possible, the project should be designed and/or implemented to minimize impacts to the species and their habitat to the maximum extent possible; and, mitigation (particularly restoration or creation of habitat) will be provided when possible. • If significant new life history or distribution information is obtained for species lacking such information to warrant a change in the level of conservation management, shifting the species to a different category or different management strategy will be considered through the established process. • If significant new threats or risks are identified and/or species viability significantly decreases to warrant a change in the level of conservation management, the species will be considered through the established process to determine species needs and status. • If threats to the species are sufficiently reduced and/or species viability improved to warrant a change in the level of conservation management, the species will be considered through the established process to determine species needs and status.		
Current Taxonomy	**Common Synonyms (old names)**	
INVERTEBRATE SPECIES		
Insects / Butterflies		
Carole's fritillary *(Speyeria carolae)*	Carole's silverspot *(Speyeria zerene carolae)*	Rationale: — endemic, but relatively wide distribution in the Spring Mountains — reduced oviposition specificity compared to other butterfly species Actions: — see larval host plant *Viola charlestonensis*: determine cause-effect relationship from specific activities to species and habitat (especially vegetation management program) — monitor periodically (e.g., every 3-5 years) to track trend through the Comprehensive Inventory and Monitoring Strategy — reduce threats, if appropriate
Nevada admiral *(Limenitis weidemeyerii nevadae)*		Rationale: — endemic, but relatively wide distribution in the Spring Mountains (also Sheep Mountains for Nevada admiral) Actions: — monitor periodically (e.g., every 5 years) through the Comprehensive Inventory and Monitoring Strategy
Spring Mountains comma skipper *(Hesperia colorado mojavensis)*	Spring Mountains comma skipper *(Hesperia comma ssp.)*	
Spring Mountains icarioides blue *(Plebejus icarioides austinorum)*	Spring Mountains icarioides blue *(Icaricia icarioides austinorum)*	

Table 6-1 List of Special Status Species

MAMMAL SPECIES		
Palmer's chipmunk *(Neotamias palmeri)*	Palmer's chipmunk *(Tamias palmeri*)	Rationale: — endemic with restricted distribution — species is tolerant of some anthropogenic activities, but lack of information on threats that may be of significance Actions: — monitor periodically (e.g., every 3-5 years) to track trend through the Comprehensive Inventory and Monitoring Strategy — determine cause-effect relationship from specific activities to species and habitat — reduce threats, if appropriate
REPTILIAN SPECIES		
Western redtail skink *(Eumeces gilberti rubricaudatus*)	Western red-tailed skink *(Eumeces gilberti rubricaudatus*)	Rationale: — specialized habitat within mixed conifer — significant lack of survey and threats information Actions: — obtain distribution and threats information for Spring Mountains NRA — determine threats, if occurring, in Spring Mountains NRA — encourage/work with partners to determine extent of distribution in Sheep and Newberry mountains
PLANT SPECIES		
Alpine		
Charleston Mountain pussytoes *(Antennaria soliceps)*	Charleston pussytoes *(Antennaria soliceps)*	Rationale: — endemic species distributed in limited, fragile habitat — this habitat/alpine ecosystem is vulnerable to long-term climate change Actions: — monitor activities in alpine habitat to ensure fragile community is not at risk — monitor species as an alpine group through the Comprehensive Inventory and Monitoring Strategy
Jaeger's draba *(Draba jaegeri)*	Jaeger whitlowgrass *(Draba jaegeri)*	
Charleston Mountain draba *(Draba paucifructa)*	Charleston draba *(Draba paucifructa)*	
Charleston Peak mousetail *(Ivesia cryptocaulis)*	Charleston or hidden ivesia *(Ivesia cryptocaulis)*	
Clokey's catchfly (*Silene clokeyi)*	Clokey silene (*Silene clokeyi)*	
Compact chickensage *(Sphaeromeria compacta)*	Charleston tansy *(Sphaeromeria compacta)*	
Charleston Mountain kittentails *(Synthyris ranunculina)*	Charleston kittentails *(Synthyris ranunculina)*	
Cliffs and Steep Slopes		
Lone fleabane *(Erigeron uncialis* ssp. *conjugans)*	Inch high fleabane *(Erigeron uncialis* ssp. *conjugans)*	Rationale: — species distribution in limited, specialized habitat — lack of distribution and monitoring information — lack of information on threats Actions: — obtain distribution information — monitor species as a cliff species group through the Comprehensive Inventory and Monitoring Strategy — determine cause-effect relationship from specific activities to species and habitat — reduce threats, if appropriate
Dwarf greasebush *(Glossopetalon pungens)*	Smooth dwarf greasebush *(Glossopetalon pungens* var. *glabrum)* Smooth pungent or rough dwarf greasebush *(Glossopetalon pungens* var. *pungens)*	
Jaeger's mousetail *(Ivesia jaegeri)*	Jaeger ivesia *(Ivesia jaegeri)*	

Table 6-1 List of Special Status Species

Mixed Conifer		
Charleston Mountain angelica *(Angelica scabrida)*	Rough angelica *(Angelica scabrida)*	Rationale: — endemic with restricted distribution — species is tolerant of some anthropogenic activities, but lack of information on threats that may be of significance Actions: — monitor periodically (e.g., every 5 years) through the Comprehensive Inventory and Monitoring Strategy — determine cause-effect relationship from specific activities to species and habitat — reduce threats, if appropriate
King's rosy sandwort *(Arenaria kingii* ssp. *rosea)*	Rosy King sandwort *(Arenaria kingii* ssp. *rosea)*	Rationale: — endemic with restricted distribution to the east side of the Spring Mountains — relatively abundant within mixed conifer, however, species potentially sensitive to numerous activities occurring in the vegetation community Actions: — monitor periodically (e.g., every 5 years) through the Comprehensive Inventory and Monitoring Strategy — determine cause-effect relationship from specific activities to species and habitat — reduce threats, if appropriate
Nevada willowherb *(Epilobium nevadense)*		Rationale: — distribution is limited range wide and in the Spring Mountains — lack of distribution and threats information Actions: — obtain distribution information — determine threats, if occurring — reduce threats, if appropriate
Keck's beardtongue *(Penstemon leiophyllus* var. *keckii)*	Charleston beardtongue *(Penstemon leiophyllus* var. *keckii)*	Rationale: — endemic with restricted distribution — species is tolerant of some anthropogenic activities, but lack of information on threats that may be of significance Actions: — obtain distribution information and better habitat description — monitor periodically (e.g., every 5 years) through the Comprehensive Inventory and Monitoring Strategy — determine cause-effect relationship from specific activities to species and habitat
Jaeger's beardtongue *(Penstemon thompsoniae* spp. *jaegeri)*	Jaeger beardtongue *(Penstemon thompsoniae* spp. *jaegeri)*	Rationale: — limited distribution in the Spring and Sheep mountains Actions: — monitor periodically (e.g., every 5 years) through the Comprehensive Inventory and Monitoring Strategy — determine cause-effect relationship from specific activities to species and habitat (especially vegetation management program) — reduce threats, if appropriate

Table 6-1 List of Special Status Species

Jones' townsend daisy (*Townsendia jonesii* var. *tumulosa)*	Charleston grounddaisy (*Townsendia jonesii* var. *tumulosa)*	Rationale: — distribution is limited range wide including the Spring Mountains — relatively abundant within mixed conifer; however, species potentially sensitive to numerous activities occurring in the vegetation community Actions: — monitor periodically (e.g., every 5 years) through the Comprehensive Inventory and Monitoring Strategy — determine cause-effect relationship from specific activities to species and habitat (especially vegetation management program) — reduce threats, if appropriate — encourage/work with U.S. Fish and Wildlife Service and other partners to determine extent of distribution in the Sheep Mountains
Charleston Mountain violet *(Viola charlestonensis)*	Charleston violet *(Viola purpura var. charlestonensis)*	Rationale: — distribution is limited range wide including the Spring Mountains — relatively abundant within mixed conifer, however, species potentially sensitive to numerous activities occurring in the vegetation community Actions: — monitor periodically (e.g., every 5 years) through the Comprehensive Inventory and Monitoring Strategy — determine cause-effect relationship from specific activities to species and habitat (especially vegetation management program) — reduce threats, if appropriate
Low Elevation		
Clokey's buckwheat *(Eriogonum heermannii* var. *clokeyi*)	Clokey buckwheat *(Eriogonum heermannii* var. *clokeyi*)	Rationale: — endemic with highly restricted known distribution — significant lack of survey and threats information Actions: — obtain distribution information determine threats, if occurring reduce threats, if appropriate

Table 6-2 List of Other Species Considered

Other Spring Mountains Species - Ecosystem Diversity

The animals and plants in this management category include wider ranging Spring Mountains endemics, as well as species whose ranges extend beyond the Spring Mountains that are generally presumed to be stable. These species will be provided for through management of ecosystem diversity – maintenance of ecosystem health, processes and habitat connectivity that will provide a variety of unique habitats and species on the Spring Mountains NRA. Existing or future components in the Forest Plan and associated amendments will guide management of ecosystem diversity in the Spring Mountains NRA, such as management of fire, vegetation, migration corridors, etc. . Direction for some species would be provided for at the Forest level.

If significant new threats or risks are identified and/or species viability significantly decreases to warrant a change in the level of conservation management, shifting the species to a different management strategy will be considered through the established process.

Note that all scientific and common names reflect the most current versions at the time of this publication. Older versions used in Chapters 1-5 are included in parentheses below the current versions.

Endemic Species (8)

The following category is composed of endemic species that are relatively widespread throughout the Spring Mountains, and for many, also in the nearby Sheep Mountains. Currently, these endemic species and their habitats are considered stable. In an effort to ensure the viability of these species based on their endemic status, these species will be monitored periodically (e.g., every 5 years) to watch for changes to viability or significant changes in threats or risks to habitat, particularly on a landscape level. The endemic plants should be considered in monitoring for vegetation and ecosystem processes to quickly detect any change in status.

Current Taxonomy	Common Synonyms (old names)	
PLANT SPECIES		
Mixed Conifer		
Whitespine thistle *(Cirsium clokeyi)*	Clokey thistle *(Cirsium clokeyi)*	Rationale: — endemic with relatively wide distribution in the Spring and Sheep mountains (except the Whitespine thistle is only known in the Spring Mountains) Actions: — monitor periodically (e.g., every 5 years) through Comprehensive Inventory and Monitoring Strategy as an important vegetation component — evaluate status every 3 to 5 years
Charleston Mountain goldenbush *(Ericameria compacta)*	Charleston goldenbush *(Ericameria compacta)*	
Hitchcock's bladderpod *(Lesquerella hitchcockii)* *(=Physaria hitchcockii* var. *hitchcockii)*	Hitchcock bladderpod *(Lesquerella hitchcockii)*	
Charleston pinewood lousewort *(Pedicularis semibarbata* var. *charlestonensis*)	Charleston lousewort *(Pedicularis semibarbata* var. *charlestonensis*)	
Purple sage *(Salvia dorrii* ssp. *dorrii* var. *clokeyi)*	Clokey mountain sage *(Salvia dorrii* var. *clokeyi*)	

Wide Ranging Species (32)

The following category is composed of species distributed beyond the Spring Mountains. Some species are resident while others are not. These species utilize the Spring Mountains for some aspect of their distribution or life history, but do not rely on the Spring Mountains for their range wide viability. For example, the bat species forage throughout the Spring Mountains but key into caves, mines, cliffs and trees for roost sites, while the reptiles and low elevation plants occupy habitat at the fringe of their elevation limitations on a small amount of habitat relative to other vegetation communities in the Spring Mountains NRA. For many of these species (e.g., bats or listed species), they are conserved and managed through the Forest Plan at the Forest level, as well as other laws and conservation plans. The Forest Service will continue to manage for these species under existing laws or in cooperation with partnering agencies or entities. In addition, inventory and monitoring efforts will be conducted through opportunities with partnering agencies or entities (e.g., Great Basin Bird Observatory for birds).

INVERTEBRATE SPECIES		
Insects / Butterflies		
Bernardino blue *(Euphilotes bernardino)*	Bret's blue *(Euphilotes bernardino inyomontana)*	Rationale: — wide ranging distribution beyond the Spring Mountains and southern Nevada Actions: — management of species through maintenance of ecosystem health, processes and habitat connectivity

Table 6-2 List of Other Species Considered

<table>
<tr><td colspan="3">MAMMALS</td></tr>
<tr><td colspan="3">Bats</td></tr>
<tr><td>Pale lump-nosed bat
(Corynorhinus townsendii pallescens)</td><td>Pale Townsend's big-eared bat
(Corynorhinus townsendii pallescens)</td><td rowspan="7">Rationale:
— wide ranging distribution beyond the Spring Mountains and southern Nevada

Actions:
— management of species through maintenance of ecosystem health, processes and habitat connectivity
— in coordination with partners, protect, manage and monitor bat species and roosts as appropriate under the guidance of the Federal Cave Resources Protection Act, Nevada Bat Conservation Plan, and State Wildlife Action Plan</td></tr>
<tr><td>Allen’s big-eared bat
(Idionycteris phyllotis)</td><td>Allen's lappet-browed bat
(Idionycteris phyllotis)</td></tr>
<tr><td colspan="2">Silver-haired bat
(Lasionycteris noctivagans)</td></tr>
<tr><td colspan="2">Western small-footed myotis
(Myotis ciliolabrum)</td></tr>
<tr><td colspan="2">Long-eared myotis
(Myotis evotis)</td></tr>
<tr><td colspan="2">Fringed myotis
(Myotis thysanodes)</td></tr>
<tr><td colspan="2">Long-legged myotis
Myotis volans</td></tr>
<tr><td colspan="3">Birds</td></tr>
<tr><td colspan="2">Northern goshawk
(Accipiter gentilis)</td><td rowspan="8">Rationale:
— wide ranging distribution beyond the Spring Mountains and southern Nevada

Actions:
— management of species through maintenance of ecosystem health, processes and habitat connectivity
— in coordination with partners, protect, manage and monitor bird species as appropriate under the guidance of the Migratory Bird Treat Act, State Wildlife Action Plan, and Endangered Species Act</td></tr>
<tr><td>Western burrowing owl
(Athene cunicularia hypugaea)</td><td>Western burrowing owl
(Speotyto cunicularia hypogea)</td></tr>
<tr><td colspan="2">Southwestern willow flycatcher
(Empidonax traillii extimus)</td></tr>
<tr><td colspan="2">American peregrine falcon
(Falco peregrinus anatum)</td></tr>
<tr><td colspan="2">Flammulated owl
(Otus flammeolus)</td></tr>
<tr><td colspan="2">Phainopepla
(Phainopepla nitens)</td></tr>
<tr><td>Blue grosbeak
(Passerina caerulea)</td><td>Blue grosbeak
(Guiraca caerulea)</td></tr>
<tr><td colspan="2">Summer tanager
(Piranga rubra)</td></tr>
</table>

Table 6-2 List of Other Species Considered

REPTILIAN SPECIES		
Glossy snake *(Arizona elegans)*		Rationale: — wide ranging distribution beyond the Spring Mountains and southern Nevada Actions: — management of species through maintenance of ecosystem health, processes and habitat connectivity — in coordination with partners, protect, manage and monitor reptile species as appropriate under the guidance of the State Wildlife Action Plan and Endangered Species Act
Western banded gecko *(Coleonyx variegatus)*		
Great Basin collared lizard *(Crotaphytus bicinctores)*	Great Basin collared lizard *(Crotaphytus insularis bicinctores)*	
Speckled rattlesnake *(Crotalus mitchellii)*		
Mojave rattlesnake *(Crotalus scutulatus scutulatus)*	Mojave green rattlesnake *(Crotalus scutulatus scutulatus)*	
Long-nosed leopard lizard *(Gambelia wislizenii)*	Large-spotted leopard lizard *Gambelia wislizenii wislizenii)*	
Desert tortoise (Mojave population) *(Gopherus agassizii)*		
Banded Gila monster *(Heloderma suspectum cinctum)*		
California Kingsnake *(Lampropeltis getula californiae)*		
Spotted leaf-nosed snake *(Phyllorhynchus decurtatus)*	Western leaf-nosed snake *(Phyllorhynchus decurtatus)*	
Common chuckwalla *(Sauromalus ater)*	Chuckwalla *(Sauromalus obesus*)	
Sonoran lyre snake *(Trimorphodon biscutatus lambda)*		
PLANT SPECIES		
Mixed Conifer		
Wavyleaf Indian paintbrush (*Castilleja applegatei* ssp. *martini*)	Clokey paintbrush *(Castilleja martinii* var. *clokeyi)*	Rationale: — wide ranging distribution beyond the Spring Mountains and southern Nevada Actions: — management of species through maintenance of ecosystem health, processes and habitat connectivity
New York Mountains cryptantha *(Cryptantha tumulosa)*	New York Mountains catseye *(Cryptantha tumulosa)*	
Dicranoweisia moss *(Dicranoweisia crispula)*		
Low Elevation		
Funeral Mountain milkvetch (*Astragalus funereus)*	Black woolypod (*Astragalus funereus)*	Rationale: — wide ranging distribution beyond the Spring Mountains and southern Nevada Actions: — management of species through maintenance of ecosystem health, processes and habitat connectivity
Death Valley beardtongue *(Penstemon fruticiformis* spp. *amargosae*)		

Table 6-2 List of Other Species Considered

Species to Remove (8) These species should be removed from or would not be included in the list of species under the CA for the Spring Mountains NRA. Many of these species have no documented occurrences or limited incidental sightings on the Spring Mountains NRA. Most of these species are distributed on other federal lands managed by other agencies in Nevada and adjacent states. If future observations of these species are made on the Spring Mountains NRA, through the established process they could be evaluated for appropriate management.	
FISH	
Lahontan cutthroat trout *(Oncorhynchus clarki henshawi)*	Rationale: — introduced, hybrid population not managed for recovery of this threatened species Actions: — coordinate management with the State for recreational fishing at the one location on the Spring Mountains NRA
MAMMALS	
Bats	
Yuma myotis *(Myotis yumanensis)*	Rationale: — very limited number of occurrences in one, low elevation area on the Spring Mountains NRA Actions: — management of species and existing suitable habitat through maintenance of ecosystem health, processes and habitat connectivity — if additional sightings of this species on the Spring Mountains NRA were to be documented – in coordination with partners, protect, manage and monitor all bat species and roosts as appropriate under the guidance of the Federal Cave Resources Protection Act, Nevada Bat Conservation Plan and State Wildlife Action Plan
Spotted bat *(Euderma maculatum)*	Rationale: — no known occurrences on the Spring Mountains NRA Actions: — management of existing suitable habitat through maintenance of ecosystem health, processes and habitat connectivity — if sightings of this species on the Spring Mountains NRA were to be documented – in coordination with partners, protect, manage and monitor all bat species and roosts as appropriate under the guidance of the Federal Cave Resources Protection Act, Nevada Bat Conservation Plan, and State Wildlife Action Plan

Table 6-2 List of Other Species Considered

PLANT SPECIES		
Low Elevation		
Desert bearpoppy *(Arctomecon merriamii)*	White bearpoppy *(Arctomecon merriamii)*	Rationale: — no known occurrences on the Spring Mountains NRA (except bicolored beardtongue with only one historic sighting and no known, recent occurrences) — on BLM land on lower elevations in the Spring Mountains ecosystem — also distributed in and beyond southern Nevada Actions: — management of existing suitable habitat through maintenance of ecosystem health, processes and habitat connectivity
Mojave milkvetch (*Astragalus mohavensis* var. *hemigyrus)*	Half-ring pod milkvetch (*Astragalus mohavensis* var. *hemigyrus)*	
Leconte's barrel cactus (*Ferocactus cylindraceus* var. *lecontei)*	Barrel cactus *(Ferocactus acanthoides* var. *lecontei)*	
Pinto beardtongue (*Penstemon bicolor* ssp. *bicolor)*	Bicolored or yellow two-tone beardtongue (*Penstemon bicolor* ssp. *bicolor)*	
Pinto beardtongue *(Penstemon bicolor* ssp. *roseus)*	Rosy two-colored or two-tone beardtongue *(Penstemon bicolor* ssp. *roseus)*	

3.2 SUBTOPIC: CONSERVATION AGREEMENT AND GENERAL MANAGEMENT PLAN (SPRING MOUNTAINS NRA AMENDMENTS)

Recommendation: Revise conservation actions and general commitments in the CA and Forest Plan (and amendments) to no longer use areas designated and mapped as biodiversity hotspots as a data collection and planning tool. Maintain the intent of designating biodiversity hotspots by using the management strategies outlined in the List of Special Status Species and Other Species Considered to target conservation management for groups of species or areas and key habitats. Identify key habitats to avoid or minimize impacts to the greatest extent possible for Tier 1 and Tier 2 species.

Rationale: The designation of biodiversity hotspots by The Nature Conservancy in 1994 was a valuable concept to draw attention to the importance of the richness of the Spring Mountains ecosystem in terms of species diversity. Thirty-nine biodiversity hotspots were identified, with at least two or more ecologically significant elements – federally listed species, candidate species, locally and regionally endemic species, locally rare species, and unique communities such as riparian streams and springs – sharing the same habitat. These areas were prioritized for conservation management planning and collection of baseline information. Initially the biodiversity hotspots were used as an effective tool to focus data collection, species and habitat monitoring, and project planning. However over time, with the expansion of knowledge regarding species and unique communities, the use of biodiversity hotspots has become less valuable. With the Spring Mountains having long been recognized as "an island of endemism", the agency professionals and partners providing conservation management for the Spring Mountains NRA have come to recognize that the majority of the Spring Mountains NRA is simply one, large biodiversity hotspot based on the original definition by The Nature Conservancy.

Through the qualitative and quantitative analysis in the Landscape Assessment, it has been determined that certain species and unique communities or habitats are in need of a more intensive conservation management (Tier 1 and 2 species) than other more widely distributed or generalist species. Focused conservation efforts to manage certain species will also benefit unique or key habitats such as riparian systems and springs, cliffs and steep slopes, and alpine habitat. In essence, this was the intent of the original

designation of biodiversity hotspots by The Nature Conservancy. Thus, while the recommendation is to no longer use specific areas designated and mapped as biodiversity hotspots for purposes of data collection and project planning, the *intent* of the designation is still recommended to remain in practice.

Recommendation: Revise conservation actions and general commitments in the Conservation Agreement based on the recommendations included in the Landscape Assessment. See CA Conservation Actions outlined in Table 6.3.

Rationale: The CA has been effective in reducing impacts to special status species. After 10 years of implementation, inventory, monitoring, and research have provided new information that needs to be considered in any revision. Through this analysis, the effectiveness of conservation measures was evaluated based on implementation and potential effects if fully implemented. Based on the overall assessment, including potential impacts of activities considered and effectiveness of conservation measures, we have recommended which conservation measures in the CA should be dropped or revised. No opinions were given for conservation measures not adequately evaluated in this analysis.

Table 6-3 Each general commitment (GC) and conservation action in the Spring Mountains Conservation Agreement (USES 1998) was evaluated based on the analysis in the Landscape Assessment. The team recommended continuing, revising, or dropping conservation measures. If the analysis did not address a conservation measures, no opinion was given.

General Commitments (GC) and Conservation Actions	Determination (continue, drop, revise, or no opinion)	Rationale
1.0 PROJECT PLANNING AND IMPLEMENTATION		
GC 1.1 Maintain a philosophy of adaptive management in implementing this CA which provides the basis for changes and mid-course corrections as determined to ensure species viability and habitat protection.	No opinion based on this analysis	
GC 1.2 Develop new trails and encourage trail use outside of biodiversity hotspots to avoid further adverse effects on rare and sensitive species.	Revise	See Rationale under 3.0 - Subtopic: Conservation Agreement and General Management regarding the rationale for removal of reference to Biodiversity Hotspots (3.2).
GC 1.3 Implement the principles of ecosystem management in the Spring Mountains NRA (page 6 of this CA).	No opinion based on this analysis	
GC 1.4 Conduct pre-activity surveys for the species of concern prior to any actions that may affect them, and design projects to minimize or avoid adverse effects. Ensure that surveys consider unique habitat components of the species of concern (e.g., mud and puddles for butterflies).	Continue and revise	See Rationale under 3.0 - Subtopic: Species and Current and Future Activities (3.1 and 3.5).
GC 1.5 Secure funding for projects involving inventory, monitoring, research, protection, restoration, and education in the Spring Mountains NRA.	Continue	With decline federal budgets, additional funding will be necessary to ensure conservations actions are implemented.
GC 1.6 Secure funding for additional staff positions including a field ecologist, biologist, botanist, interpreters, visitor center personnel, wilderness manager and rangers, dispersed recreation rangers, and law enforcement officers.	No opinion based on this analysis	
1.1 Ensure that all NRA staff annually review a copy of this CA and are familiar with its intent and terms. This will provide the basis for informed decision making in providing for species and ecological resource protection during planning and implementation of new and ongoing projects.	Drop (add to 1.3)	Current conservation action item will be incorporated into a more all inclusive action item. See Rationale under 3.0 - Subtopic: Environmental Education, Interpretation and Outreach (3.3).

Table 6-3 Each general commitment (GC) and conservation action in the Spring Mountains Conservation Agreement (USES 1998) was evaluated based on the analysis in the Landscape Assessment. The team recommended continuing, revising, or dropping conservation measures. If the analysis did not address a conservation measures, no opinion was given.

General Commitments (GC) and Conservation Actions	Determination (continue, drop, revise, or no opinion)	Rationale
1.2 Ensure that all NRA staff annually review species and ecosystem protection recommendations made by field researchers. This information is summarized in the document "Management Recommendations for Species and Ecosystem Management in the Spring Mountains National Recreation Area", on file in the Spring Mountains NRA office.	Drop (add to 1.3)	See above
1.3 Conduct annual briefings with FS, FRS, and State line officers (management) to update them on the status of CA implementation and to provide an assessment of future funding needs.	Revise to include 1.1, 1.2, 1.4, 1.5	See above
1.4 Provide NRA staff and key permutes and partners with annual information on biodiversity hotspots, the species that occur in these areas, and the importance of avoiding adverse impacts to the species of concern and their habitats.	Drop (add to 1.3)	See above
1.5 (a) Provide copies of this CA to, and	Drop (add to 1.3)	See above
1.5 (b) Hold annual meetings with partners and other interested parties to increase awareness of conservation priorities and encourage partnerships in accomplishment of conservation actions.	Drop (add to 1.3)	See above
1.6 Establish a technical advisory group comprised of individuals with knowledge and expertise on conservation of the species of concern, and convene annual meetings to discuss conservation actions.	No opinion based on this analysis	
1.7 Integrate efforts in this CA with the Clark County Multispecies Planning effort to ensure that mutual goals to achieve species conservation are accomplished.	No opinion based on this analysis	
1.8 (a) Coordinate with BLM in project planning and implementation in conservation of the species of concern and other sensitive ecological resources within their purview, and	Continue	Current conservation action item will be incorporated into a more all inclusive action item. See Rationale under 3.0 - Subtopic: Environmental Education, Interpretation and Outreach (3.3).
1.8 (b) Work towards inclusion of BLM lands within the Spring Mountains ecosystem into this CA.	No opinion based on this analysis	
1.9 Develop and distribute a field guide for use by Spring Mountains NRA and Red Rock Canyon NCA staff and others in identifying species of concern and their habitats in the Spring Mountains.	Revise	Current conservation action item will be incorporated into a more all inclusive action item. See Rationale under 3.0 - Subtopic: Environmental Education, Interpretation and Outreach (3.3).
1.10 Maintain, periodically update, and make accessible to NRA staff and other involved agencies and partners, a Geographic Information System (GIS), with locations of the species of concern and other sensitive ecological resources. This will provide baseline information useful for avoiding where feasible, or minimizing when necessary, adverse impacts on the species of concern and their habitats.	Continue & revise	See Rationale under 3.0 - Subtopic: Data Management (3.4).
1.11 (a) Develop (a prescribed burn plan) and	Revise	See Rationale under 4.2 - Subtopic: Wildland Urban Interface (4.2.4).

Table 6-3 Each general commitment (GC) and conservation action in the Spring Mountains Conservation Agreement (USES 1998) was evaluated based on the analysis in the Landscape Assessment. The team recommended continuing, revising, or dropping conservation measures. If the analysis did not address a conservation measures, no opinion was given.

General Commitments (GC) and Conservation Actions	Determination (continue, drop, revise, or no opinion)	Rationale
1.11 (b) Implement a prescribed burn plan for the NRA, with emphasis on ecosystem health and enhancement of habitat for sensitive bats, endemic plants and butterflies, and other ecological resources. This plan will, at a minimum, determine the location, species, and habitats for enhancement, identify studies needed prior to implementation, outline a public information campaign, and identify the time frame in which the plan will be implemented. The prescribed burn plan will address concerns, and where feasible implement recommendations for protection of rare and sensitive flora and plant communities (Nachlinger and Reese 1996), overwintering pollinators, endemic butterflies and their host plants (Weiss et al. 1997), Palmer's chipmunk (Tomlinson 1995), bats (Ramsey 1994, 1997), and other species of concern. This plan will specifically address the issue of whether or not Clokey eggvetch may benefit from prescribed burns.	See above	See above
1.12 (a) Develop (a fuelwood plan) and	Revise	See Rationale under 4.1 - Subtopic: Firewood Gathering Areas (4.1.10).
1.12 (b) Implement a fuelwood plan for the NRA which addresses and ameliorates potential impacts to the species of concern, in particular, Palmer's chipmunk, bats, and other species that may be affected by fuelwood cutting. The fuelwood plan will address concerns, and where feasible, implement recommendations for protection of Palmer's chipmunk (Tomlinson 1995), bats (Ramsey 1994, 1997), butterflies (Weiss et al. 1997), reptiles, overwintering pollinators, and other species.	See above	See above
1.13 Identify and pursue purchases or exchanges of National Forest inholdings that will benefit the species of concern and other sensitive ecological resources.	Continue	See Rationale under 4.3 - Subtopic: Private land/private buildings (4.3.2).
1.14 (a) Develop and implement memoranda of understanding with climbing and caving groups, and hold annual meetings emphasizing species conservation, identifying protective measures, and specifying surveys for the species of concern prior to establishment of new climbing or caving opportunities. The information derived from these programs will assist the FS in determining future management actions for species protection.	Revise	Current conservation action item will be incorporated into a more all inclusive action item. See Rationale under 3.0 - Subtopic: Environmental Education, Interpretation and Outreach (3.3).
1.14 (b) Identify additional special interest groups and develop memoranda of understanding.	See above	See above
2.0 INVENTORY		
For all inventory items need a review of technical information and scientific management recommendations		
GC 2.1 Evaluate inventory priorities on an annual basis and coordinate in development of inventory strategies.	Revise	Develop an integrated inventory and monitoring strategy. Revised species list will provided additional direction (See 3.0 - Subtopic: Species (3.1)). See sections 5.0 and 6.0.
2.1 Inventory for populations of rare flora and fauna on an annual basis. A Native Species Site Survey Report (Appendix G) will be used to record new records of species occurrence, and copies of this form will be provided to the Nevada Natural Heritage Program. Species and area priorities identified to date are as follows:	Revise	See above

Table 6-3 Each general commitment (GC) and conservation action in the Spring Mountains Conservation Agreement (USES 1998) was evaluated based on the analysis in the Landscape Assessment. The team recommended continuing, revising, or dropping conservation measures. If the analysis did not address a conservation measures, no opinion was given.

General Commitments (GC) and Conservation Actions	Determination (continue, drop, revise, or no opinion)	Rationale
2.1 Very High Priority Species: (a) Mojave bajada and wash plants - halfring milkvetch, Death Valley beardtongue, black woolypod, Spring Mountains milkvetch, (b) Spring plants - upswept and dainty moonwort, (c) Bret's blue butterfly - focus inventory at Big Timber Spring (d) Townsend big-eared bat; Very High Priority Areas: (e) Butterfly habitats - Foxtail Canyon, Mt. Potosi, (f) :Bat roosts - Column Cave (summer, winter), Pinnacle Cave (spring, fall, winter); High Priority Species: (g) Cliff plants - smooth pungent greasebush and pungent dwarf greasebush; (h) Butterflies - Spring Mountains acastus checkerspot, dark blue butterfly, Morand checkerspot, Mt. Charleston blue; (i) Bats - Allen's lappet-brewed bat; High Priority Areas: (j) Butterfly habitats - Mummy Mountain, Harris Mountain; Fletcher Peak, West side of Mt. Stirling, Trail Canyon/North Loop intersection, Mud Springs, Wallace Canyon; (k) Bat roosts (cliff climbing areas) - Imagination Wall, Cathedral Rock, Echo Cliff, unnamed wall east of South Loop Trail, The Hood; l) Bat water sources - unsurveyed springs; (m) Neotropical migratory bird habitat - riparian areas (will also include inventory of brown-headed cowbird nest parasitism); (n) Raptor inventory; Medium or Low Priority Species: (o) Forest plants - Nevada willowherb and Charleston grounddaisy; (p) Fringed myotis; Medium or Low Priority Areas: (q) Butterfly habitat - Wood Spring.	See above	See above
3.0 MONITORING		
Need to revaluate monitoring priorities for all species		
GC 3.1 Evaluate monitoring priorities on an annual basis and coordinate in development of additional monitoring protocols for species and habitats, as needed.	Revise	See above
GC 3.2 Use the results of monitoring activities to, where feasible and necessary, refine management strategies for protection of the species of concern. Where monitoring has indicated status decline or habitat degradation for the species of concern, develop and implement strategies to avert further decline or degradation, and improve species status and habitat quality..	Continue	See Rationale under 3.0 - Subtopic: Species (3.1).
3.1 (a) Conduct annual monitoring of Clokey eggvetch. Monitoring efforts will be in accordance with the protocol developed by TNC in cooperation with FWS and FS (Nachlinger and Combs 1996a, 1996b).	Revise	Develop an integrated inventory and monitoring strategy. Revised species list will provided additional direction (See 3.0 General recommendations - Subtopic: Species (3.1)) as well as species specific information and data gaps. See sections 5.0 and 6.0.
3.1 (b) Conduct annual monitoring of rough angelica. Monitoring efforts will be in accordance with the protocol developed by TNC in cooperation with FWS and FS (Nachlinger and Combs 1996a, 1996b).	See above	See above

Table 6-3 Each general commitment (GC) and conservation action in the Spring Mountains Conservation Agreement (USES 1998) was evaluated based on the analysis in the Landscape Assessment. The team recommended continuing, revising, or dropping conservation measures. If the analysis did not address a conservation measures, no opinion was given.

General Commitments (GC) and Conservation Actions	Determination (continue, drop, revise, or no opinion)	Rationale
3.2 (a) Develop a butterfly monitoring plan, emphasizing population, host plant and habitat monitoring. Frequency and intensity of monitoring identified in the plan will be based on population status, abundance, and threats. (b) Conduct annual monitoring for high priority butterfly species, using methods described in the butterfly monitoring plan. At present, Bret's blue, Morand's checkerspot, Mt. Charleston blue butterfly, Spring Mountains acastus checkerspot, and the dark blue are the highest priority species. (c) Conduct periodic monitoring for medium priority butterfly species, using methods described in the butterfly monitoring plan, At present, Spring Mountains comma skipper, Nevada admiral, Spring Mountains icarioides blue, and Carole's silverspot are medium priority species.	Revise	See above
3.3 (a) Develop a Palmer's chipmunk monitoring plan, emphasizing population and habitat monitoring. Frequency and intensity of monitoring identified in the plan will be based on population status, abundance, and threats. (b) Conduct periodic monitoring for the Palmer's chipmunk, using methods described in the Palmer's chipmunk monitoring plan.	See above	See above
3.4 (a) Develop a bat monitoring plan, emphasizing roost site and water source monitoring for known occurrences of bats. Frequency and intensity of monitoring identified in the plan will be based on species occurrence, habitat suitability, and threats. (b) Conduct periodic monitoring for bats, using methods described in the bat monitoring plan.	Revise	See above
3.5 Develop and implement a plan to monitor springsnail populations and habitats at Kiup Spring, Willow Creek, and Cold Creek.	Revise	See above
3.6 (a) Develop a plan to monitor riparian function and habitat condition. The plan will focus primarily on Deer Creek, Cold Creek, Willow Creek, and Carpenter Canyon, but may include others areas as appropriate. Monitoring protocol will be specific to each area, emphasizing evaluation of habitat requirements of the species particularly dependent on these areas. (b) Conduct periodic monitoring of riparian areas, using methods described in the riparian monitoring plan.	Revise	See above
3.7 (a) Develop and (b) implement a monitoring program for assessing effects of recreational use on high elevation communities and the species that occur in these communities.	Revise	Priorities for cause and effects relationships should be re-visited. Revised species list will provided additional direction (See 3.0 - Subtopic: Species (3.1)) as well as species specific information and data gaps. See sections 5.0 and 6.0.

Table 6-3 Each general commitment (GC) and conservation action in the Spring Mountains Conservation Agreement (USES 1998) was evaluated based on the analysis in the Landscape Assessment. The team recommended continuing, revising, or dropping conservation measures. If the analysis did not address a conservation measures, no opinion was given.

General Commitments (GC) and Conservation Actions	Determination (continue, drop, revise, or no opinion)	Rationale
3.8 Develop and implement a program to monitor selected biodiversity hotspots and species of concern habitats not covered in 3.1 through 3.7, based on periodic biologist site visits and/or photo points to document habitat conditions. This program will provide information needed to assess management suitability and the need to modify management practices in these areas. Determination of features that should be managed in these areas will be based, in part on information provided in the report "Spring Mountains National Recreation Area Biodiversity Hotspots and Management Recommendations" (TNC 1996). A form for recording basic monitoring information will be developed with the technical assistance of TNC. Because it will not be logistically feasible to annually visit all known areas for these species, site visits will be most frequent in the most vulnerable or sensitive areas (typically, areas most accessible by people). Where appropriate, photo points will also be established. Priority species and habitats include the following (* indicates photo point will be established):	Revise	Develop an integrated inventory and monitoring strategy. Revised species list will provided additional direction (See 3.0 General recommendations - Subtopic: Species (3.1)) as well as species specific information and data gaps. See sections 5.0 and 6.0.
3.8 (a-m) Frequent (annual) Site Visits: (a) Carpenter Canyon (Palmer's chipmunk, bats, Lahontan cutthroat trout, butterflies, plants, riparian stream corridor), (b) Deer Creek (Palmer's chipmunk, bats, butterflies, plants, riparian stream corridor); Upper Kyle Canyon, including Mary Jane Falls (Palmer's chipmunk, butterflies, plants, riparian areas and spring sources); Upper Lee Canyon, including Three Springs* (Palmer's chipmunk, butterflies, plants), and Macks Canyon, Macks Canyon Spring*, and Macks Road (Palmers chipmunk, bats, plants), (c) Willow Creek (butterflies, springsnails, plants, riparian stream corridor); Camp Bonanza and North Divide Trail, including McFarland and Whiskey Springs (bats, plants); and, Cold Creek (butterflies, springsnails, riparian stream corridor), (d) Wheeler Well (bats, plants), and Trough Spring* (to monitor habitat following restoration), (e) Stanley B Spring (plants, riparian area); Periodic (every 2 to 3 years) Site Visits: (f) Fletcher Canyon and Spring (bats and plants), Mummy Spring*, and lower North Loop Trail (plants), (g) Lee and Kyle canyons summer home sites (plants, Palmer's chipmunk), Mahogany Grove (plants), Robber's Roost (plants), (h) Lost CabinSpring*, CC Spring*, and Cave Spring (to monitor habitat condition following restoration), (i) Peak Spring (plants); Occasional Site Visits: G) Harris Mountain and Saddle (plants), (k) Mud Springs area (plants), (l) Big Timber andRock Spring (to monitor habitat condition following restoration), (m) Roses Spring (to monitor habitat condition following restoration).	See above	See above
3.9 (a) Develop and (b) implement a recreation monitoring strategy involving trail counters and wilderness rangers. This strategy will include development of methods resulting in collection of data to assess recreation trends and effects on the species of concern and ecological resources.	Revise	See above. Continue current monitoring needs and integrate information with cause and effect.
3.10 (a) Develop and (b) implement a cumulative impact tally to monitor effects of NRA activities on the species of concern and their habitats. This program will provide sufficient information to trigger the need for quantitative monitoring or remedial actions to halt species declines.	Revise	See above. Also, see Rationale under 3.0 - Subtopic: Data Management (3.4).

Table 6-3 Each general commitment (GC) and conservation action in the Spring Mountains Conservation Agreement (USES 1998) was evaluated based on the analysis in the Landscape Assessment. The team recommended continuing, revising, or dropping conservation measures. If the analysis did not address a conservation measures, no opinion was given.

General Commitments (GC) and Conservation Actions	Determination (continue, drop, revise, or no opinion)	Rationale
3.11 (a) Develop and (b) implement a plan to inventory and map problem areas of non-native plants, and monitor encroachment over time.	Revise	Use existing direction per new Forest Service direction. See Rational under 4.4 Recommendations.
4.0 PROTECTION		
GC 4.1 Focus new recreation development (campgrounds, picnic areas, and other facilities) in the least sensitive areas at lower elevations, to lessen visitor impacts on the species of concern and other sensitive ecological resources.	Revise	See Rationale under 3.0 - Subtopic: Conservation Agreement and General Management regarding the rationale for removal of reference to Biodiversity Hotspots (3.2) and under 4.7.
GC 4.2 Encourage partnerships with volunteers to maintain and enhance natural resources in the NRA.	Revise	Current conservation action item will be incorporated into a more all inclusive action item. See Rationale under 3.0 - Subtopic: Environmental Education, Interpretation and Outreach (3.3).
GC 4.3 Adhere to goals, objectives, standards and guidelines detailed in the Plan Amendment which promote protective management of the species of concern and other ecological resources.	Continue	See Rationale under 3.0 - Subtopic: Conservation Agreement and General Management regarding the rationale for removal of reference to Biodiversity Hotspots (3.2) and Subtopic: Species (3.1)
GC 4.4 Identify specific areas of exceptional sensitivity where conservation management will be emphasized over recreation.	Revise	See Rationale under 3.0 - Subtopic: Conservation Agreement and General Management regarding the rationale for removal of reference to Biodiversity Hotspots (3.2) and 4.7. The intent of the original direction needs to be maintained for all discretionary management activities.
GC 4.5 Minimize clearing of undergrowth during construction of new facilities.	Revise	Larger issue of how do you manage for species near facilities, WUI. Need to be more species and activities specific and part of larger vegetation management strategy. See Rationale under 4.1.1 - Subtopic: Developed campgrounds/picnic areas/trailheads.
GC 4.6 Prior to use of pesticides and other chemicals, determine potential impacts to the species of concern (e.g., butterflies, bats), and implement strategies to avoid impacts to those species.	No opinion based on this analysis	
GC 4.7 Protect habitat of the species of concern from dispersed recreation (e g., heavy foot traffic, off-road vehicles, mountain bikes), and the adverse effects of wild horses and burros.	Revise	See 4.1 for associated recreation activities (4.1.2, 4.1.3, 4.1.4) and 4.3 - Subtopic: Wild Horses and Burros (4.3.1).
4.1 (a) Develop and (b) implement an overnight wilderness permitting process that provides visitor education on sensitive resource issues.	Consider revising	See 4.1 - Subtopic: Concentrated Use Areas (4.1.2) and High and Low Mileage Trails (4.1.4). Consider a wider range of tools for managing conflicts, if monitoring demonstrates impacts.
4.2 (a) Develop and (b) implement a climbing "self registration" process that encourages development of new routes away from ecologically sensitive areas.	Consider revising	See 4.1 - Subtopic: Caves/Climbing Areas (4.1.8). Consider a wider range of tools for managing conflicts, if monitoring demonstrates impacts.

Table 6-3 Each general commitment (GC) and conservation action in the Spring Mountains Conservation Agreement (USES 1998) was evaluated based on the analysis in the Landscape Assessment. The team recommended continuing, revising, or dropping conservation measures. If the analysis did not address a conservation measures, no opinion was given.

General Commitments (GC) and Conservation Actions	Determination (continue, drop, revise, or no opinion)	Rationale
4.3 (a) Develop and (b) implement a plan to protect bat roosts in mines and caves. The plan will address the following protective measures: Gating or closing mines and caves to protect bat roost sites, removing important bat roost mines and caves from future editions of NRA maps, avoiding identification of exact locations of maternity roosts, caves, and occupied mines to the general public, determining the need to close roads to mines and caves, and avoiding use of heavy equipment near mine and cave roosts.	Revise	Revise to reflect existing policy and tier to state plan. (i.e. ecosystem management). See Rationale under 3.0 - Subtopic: Species for bats.
4.4 Facilitate, with Clark County, enforcement of leash laws, and control of feral cats and dogs in areas where adverse effects on Palmer's chipmunk and other wildlife have occurred, particularly areas adjacent to the private developments of Mt. Charleston, Deer Creek, and Lee Canyon.	No opinion based on this analysis	
4.5 Coordinate with county health department in management of disease transmittal by animals to humans (e.g., hanta virus, plague) to ensure that control methods do not have adverse effects on populations of Palmer's chipmunk or other species of concern.	No opinion based on this analysis	
4.6 Manage wild horses and burros in the NRA to avoid damage to species of concern habitats, particularly in lower Lee Canyon, northwest Mt. Stirling, Wheeler Pass, Wheeler Wash, Wood Canyon, Carpenter Canyon, and lower Deer Creek, and continue to quickly remove any stray horses at upper elevations, particularly in upper Lee Canyon, Deer Creek, and Kyle Canyon.	Revise	See 4.3 - Subtopic: Wild Horses and Burros (4.3.1).
4.7 (a) Develop and distribute information to equestrians on the importance of using pelletized feed within the NRA, and (b) develop and distribute a weed-free feed policy for equestrians on Federal lands.	Revise	See Rationale for 4.4. Follow existing direction and recent decisions.
4.8 (a) Sign closure order allowing FS to prohibit camping within specific distance of water sources, based on species and habitat protection needs, and b) control dispersed, primitive camping in the NRA by enforcing the closure order.	Revise	This action item will be 1) addressed in the revised Environmental Education, Interpretation and Outreach plan (3.3) and 2) under 4.1 - Subtopic: Concentrated use areas (4.1.2).
4.9 (a) Develop and (b) implement plan to collect seed for endowment and cultivation of sensitive and rare plants.	Continue	Follow current direction and policy regarding native seed policy (Forest Service Manual 2070 [2008]) and associated handbook direction for seed collection plans.
4.10 Expand Carpenter Canyon Research Natural Area (RNA) to help protect unique alpine biodiversity.	No opinion based on this analysis	
4.11 Consider, and as appropriate, develop additional protective designations in the NRA to protect the species of concern and other ecological resources.	No opinion based on this analysis	
4.12 Coordinate with owners of golf course in lower Kyle Canyon on procedures for use of pesticides, fertilizers, and other chemicals, to eliminate deleterious effects on endemic butterflies, rare plant pollinators, and other species of concern.	Drop	USFS acquired golf course.

Table 6-3 Each general commitment (GC) and conservation action in the Spring Mountains Conservation Agreement (USES 1998) was evaluated based on the analysis in the Landscape Assessment. The team recommended continuing, revising, or dropping conservation measures. If the analysis did not address a conservation measures, no opinion was given.

General Commitments (GC) and Conservation Actions	Determination (continue, drop, revise, or no opinion)	Rationale
4.13 Ensure consistent law enforcement and ranger presence on the east side of the NRA, west side of the NRA, and in the Wilderness Area, a minimum of 4 days per week per area (including weekends and holidays) during the period April 15 - October 15, and a minimum of 3 days per week (including weekends and holidays) during the period October 15 - April 15. Enforcement will emphasize protection of the species of concern and their habitats (e g., peregrine falcon eyries, bat roosts, and alpine species). Increased wilderness ranger presence in high elevation forests and alpine areas will provide a means to distribute information on species conservation needs, ecological resource sensitivity, and low impact recreation use practices.	Revise	Current conservation action item will be incorporated into a more all inclusive action item. See Rationale under 3.0 - Subtopic: Environmental Education, Interpretation and Outreach (3.3).
4.14 Remove brown-headed cowbirds where nest parasitism occurs during neotropical migratory bird inventories or other activities.	Drop	Species has limited occurrence on NRA and management of species is addresses in other State-wide species plans.
4.15 Work with utility companies to ensure poles are raptor-safe.	Drop	Addressed through policy to implement Migratory Treaty Bird Act.
4.16 Coordinate with Nevada Department of Transportation and FS road crews to ensure that road maintenance activities (e g., shoulder work, road salting) do not adversely affect the species of concern (in particular, Morand's checkerspot, acastus checkerspot, and rough angelica in Kyle Canyon, and acastus checkerspot along Deer Creek Highway).	Revise	See Rationale under 3.0 General Recommendations - Subtopic: Environmental Education, Interpretation and Outreach (3.3) for internal education and Subtopic: System Roads and Open Motorized Trails (4.1.3).
5.0 RESTORATION		
GC 5.1 Secure funding for restoration programs beyond those under the scope of Interagency Agreement # 14-48-0001-94605.	No opinion	
GC 5.2 Secure funding for restoration programs beyond those under the scope of Interagency Agreement # 14-48-0001-94605.	Revise	See Rationale for Conservation Action 5.2.
GC 5.3 Ensure that restoration projects focus on protection and enhancement of the species of concern and do not inadvertently cause irretrievable damage to the habitats of the species of concern (e.g., open water for bats, mud puddles for butterflies).	Revise	This is included in general restoration goals - ecosystem management type issues.
5.1 (a) Develop native plant material and seed list for restoration projects by plant community. The list will specifically identify larval and nectar host plants for the endemic butterflies. (b) Develop plan to collect local seed for restoration efforts, and (c) establish and maintain a native seed supply.	Revise	Follow current direction and policy regarding native seed policy (Forest Service Manual 2070 [2008]) and associated handbook direction for seed collection plans. Priority species should still continue to include butterfly host plants.
5.2 Restore habitat in accordance with Interagency Agreement # 14-48-0001- 94605 between the FS and FWS for the Spring Mountains NRA (Appendix H). All restoration activities will be designed and implemented in coordination with the Technical Working Group (1.6 to avoid inadvertent adverse effects on the species of concern. Priorities identified to date are as follows:	Revise	Current conservation action item will be incorporated into a more all inclusive action item. See Rationale under 3.0 - Subtopic: Environmental Education, Interpretation and Outreach (3.3).

Table 6-3 Each general commitment (GC) and conservation action in the Spring Mountains Conservation Agreement (USES 1998) was evaluated based on the analysis in the Landscape Assessment. The team recommended continuing, revising, or dropping conservation measures. If the analysis did not address a conservation measures, no opinion was given.

General Commitments (GC) and Conservation Actions	Determination (continue, drop, revise, or no opinion)	Rationale
5.2 (a-p) Very High Priorities: (a) McFarland Spring - Improve fence, treat headcut, construct drywell, (b) Mummy Spring - Remove informal trails, (c) Carpenter Canyon - Close last 0.25 mile of road, create parking area; High Priorities: (d) Trough Spring - Close road, treat road bed, seed area, (e) Lost Cabin Spring- Close road; eliminate diversion, restore springbrook, (f) Big Timber Spring - Remove stocktank and stockpond, (g) Little Falls Spring - Remove headbox and pipeline, (h) Gold Spring - Remove stocktank, headbox, and pipeline; Medium Priorities: (i) Middle Mud Spring and East Mud Spring - Repair fence, remove headbox and pipeline, j) Buck Spring - Remove headbox, pipeline, and trough, (k) Macks Canyon Spring - Extend exclosure, (l) Younts Spring - Eliminate salt cedar, remove impoundment, (m) Santa Cruz Spring - eliminate salt cedar, construct exclosure, drywell, and pipeline, (n) Ninetynine Spring - Discontinue dredging, construct exclosure, drywell, and pipeline, (o) Mexican Spring - Discontinue dredging, construct exclosure, drywell, and pipeline, (p) Cougar Spring - Construct exclosure, drywell, and pipeline.	Revise	See above
5.3 Work with private property owners to restore and enhance the Cold Creek area. This effort will include plans to relocate facilities (e.g., fences, patios, and sheds) outside the riparian zone, and to control camping and fires (to protect butterflies), and maintain habitats for the species of concern (e.g., mud and seeps).	Revise	Current conservation action item will be incorporated into a more all inclusive action item. See Rationale under 3.0 - Subtopic: Environmental Education, Interpretation and Outreach (3.3).
5.4 Develop and begin implementing a comprehensive restoration plan for the Willow Creek area. This plan will include relocation of roads and campgrounds out of the riparian area, removal of unneeded spur roads, a walk-in day-use plan, protection and habitat enhancement for springsnails, butterflies (including mud), and phainopepla (Phainopepla nitens). The plan will emphasize opportunities for public participation.	Continue	See Rationale under 3.0 - Subtopic: Species (3.1); 4.1 - Subtopic: Non-system Trails and Closed Motorized Trails (4.1.5); and 4.7.
5.5 Work with summer home residents on the NRA to ensure that all future improvements avoid adverse effects to the species of concern, and where possible, enhance their habitats and populations.	Revise	Current conservation action item will be incorporated into a more all inclusive action item. See Rationale under 3.0 - Subtopic: Environmental Education, Interpretation and Outreach (3.3).
5.6 Work with Las Vegas Ski and Snowboard Resort to develop protective strategies for sensitive ecological resources. This will include investigating options for erosion control of the Lee Canyon ski slopes with native seed mixes, including Astragalus calycosus var. mancus, to enhance butterfly habitat, management of herbicides and pesticides, and a plan for eventual elimination of non-native seeding, and management of the Three Springs area.	Revise	See Rationale under 4.1 - Subtopic: Ski Area and 4.7.
5.7 Remove selected informal high-elevation and alpine campsites (particularly those within or near the habitats of the plant species of concern and butterfly host plants), encourage use of specific strategically placed campsites, and remove all high elevation fire rings.	Revise	See Rationale under 4.1 - Subtopic: Concentrated Use Areas (4.1.2).

Table 6-3 Each general commitment (GC) and conservation action in the Spring Mountains Conservation Agreement (USES 1998) was evaluated based on the analysis in the Landscape Assessment. The team recommended continuing, revising, or dropping conservation measures. If the analysis did not address a conservation measures, no opinion was given.

General Commitments (GC) and Conservation Actions	Determination (continue, drop, revise, or no opinion)	Rationale
5.8 Remove roads causing environmental damage: (a) Road to Cave Spring, (b) road to CC Spring, (c) road to Lost Cabin Spring, and (d) identify additional roads for closure, particularly in biodiversity hotspots, and work with community groups to close them.	Revise	Consistent with travel management planning and process for restoration or physical closures and identification of close roads with conflicts. See Rational under 4.1 - Subtopic: System Roads and Open Motorized Trails (4.1.3) and Subtopic: Non-system Trails and Closed Motorized Trails.
5.9 Organize volunteer work parties to manually remove exotic plants and noxious weeds along the ridgeline trail and other high elevation routes.	Revise	Current conservation action item will be incorporated into a more all inclusive action item. See Rationale under 3.0 General Recommendations - Subtopic: Environmental Education, Interpretation and Outreach (3.3).
5.10 Develop and implement vegetation management and restoration plans for campgrounds and dayuse areas that enhance resources for Palmer's chipmunk, endemic butterflies, and rare plants. Priority areas include: (a) Deer Creek Picnic Area - Move picnic tables out of the riparian zone, and revegetate the area to enhance habitat for Palmer's chipmunk, neotropical migratory birds, and bats; (b) Lee Canyon campgrounds and picnic areas - Create cover sites for Palmer's chipmunk, and revegetate areas to enhance chipmunk and butterfly habitat; (c) Kyle Canyon campgrounds and picnic areas - Create cover sites for Palmer's chipmunk, and revegetate areas to enhance chipmunk and butterfly habitat; (d) Gary Abbot Campground - Close campsite and restore area to enhance habitat of Clokey eggvetch and butterflies.	Revise	See Rationale for 4.1 Recommendations - Subtopic: Developed Campgrounds/Picnic Areas/Trailheads (4.1.1)
5.11 Work with volunteers to provide nest boxes for cavity nesting western bluebirds (*Sialia mexicana*) and mountain bluebirds (*S. currucoides*), and roosting bats, to replace lost habitat.	Drop	This does not relate to the Tier 1 and Tier 2 species. Other opportunities are available to manage habitat for bats (See Rational under 3.0 - Subtopic: Species for bats).
6.0 RESEARCH		
Reevaluate all research priorities		
GC 6.1 Secure funding for research based on priorities identified below.	No opinion based on this analysis	
GC 6.2 Encourage and support research in the Spring Mountains NRA, particularly in the Carpenter Canyon Research Natural Area, to assist with management concerns as well as to focus on basic research interests.	Revise	Develop an integrated inventory and monitoring strategy. Revised species list will provided additional direction (See 3.0 General recommendations - Subtopic: Species (3.1)) as well as species specific information and data gaps. See 5.0 and 6.0 Recommendations.
6.1 Develop an information package identifying and promoting research opportunities in the Spring Mountains NRA and Carpenter Canyon RNA. Update and distribute to local researchers, universities, and other research entities.	No opinion based on this analysis	

Table 6-3 Each general commitment (GC) and conservation action in the Spring Mountains Conservation Agreement (USES 1998) was evaluated based on the analysis in the Landscape Assessment. The team recommended continuing, revising, or dropping conservation measures. If the analysis did not address a conservation measures, no opinion was given.

General Commitments (GC) and Conservation Actions	Determination (continue, drop, revise, or no opinion)	Rationale
6.2 Conduct research on the species of concern and ecological communities of the Spring Mountains NRA by prioritizing research needs and identifying funding sources. Priority research needs include the following:	Revise	Develop an integrated inventory and monitoring strategy. Revised species list will provided additional direction (See 3.0 General recommendations - Subtopic: Species (3.1)) as well as species specific information and data gaps. See 5.0 and 6.0 Recommendations.
6.2 (a) Seed germination and other habitat requirements of Clokey eggvetch, including analysis of factors such as seed caching and predation by rodents and insects, fire, and other perturbations.	See above	See above
6.2 (b) Autecology, spatial extent of population (particularly Kyle Canyon Wash), and larval host plant relations of the Spring Mountains acastus checkerspot.	See above	See above
6.2 (c) Fire ecology and disturbance regimes of plant communities, particularly as pertaining to maintenance of populations and habitat for rare plants, butterflies and their host plants, Palmer's chipmunk, bats, and other species.	See above	See above
6.2 (d) Fire management for ecosystem health within the urban interface.	See above	See above
6.2 (e) Metapopulation dynamics of Mt. Charleston blue and Morand's checkerspot (including spatial limits of Wallace Canyon population), and genetic distinctiveness of three phenotypes of Morand's checkerspot.	See above	See above
6.2 (f) Relationships of ants and the larval stages of Bret's blue, Mount Charleston blue, dark blue, and Spring Mountains icarioides blue.	See above	See above
6.2 (g) Habitat requirements of Morand's checkerspot, Mt. Charleston blue, Spring Mountains acastus checkerspot, and dark blue, to determine why the taxa are not distributed across the range of their host plants.	See above	See above
6.2 (h) Effects of human disturbance, including caving, climbing, and other forms of recreation on bats.	See above	See above
6.2 (i) Winter habits of bats: Migration patterns and destinations, habits of bats that overwinter and hibernate in the NRA.	See above	See above
6.2 (j) Palmer's chipmunk: Features of movements and home ranges, dispersal patterns, and behavioral interactions between Palmer's chipmunk and golden mantled ground squirrel as related to habitat condition.	See above	See above
6.2 (k) Survey and study of NRA customer needs to determine who is visiting, what is expected from their visits, and how to communicate with non-English speaking visitors. This survey would assess visitor awareness of; and interest in species and ecological resource conservation issues.	See above	See above
6.2 (l) Development of a recreation use monitoring strategy to determine amount, type, and timing of recreation trail use.	See above	See above
6.2 (m) Waste management in the Wilderness Area: Effects of waste on resources and methods for control or removal.	See above	See above

Table 6-3 Each general commitment (GC) and conservation action in the Spring Mountains Conservation Agreement (USES 1998) was evaluated based on the analysis in the Landscape Assessment. The team recommended continuing, revising, or dropping conservation measures. If the analysis did not address a conservation measures, no opinion was given.

General Commitments (GC) and Conservation Actions	Determination (continue, drop, revise, or no opinion)	Rationale
Current conservation action item will be incorporated into a more all inclusive action item. See Rationale under 3.0 - Subtopic: Environmental Education, Interpretation and Outreach (3.3).		
GC 7.1 Ensure NRA staff are familiar with the basic habitat elements of the species of concern, including requirements of endemic butterflies (larval host plants, nectar sources, puddles and mud), bats (open water, caves, mines, cliffs, crevices, and other roost sites), Palmer's chipmunk (shelter requirements), and rare plants (edaphic and other requirements).	revised	Current conservation action item will be incorporated into a more all inclusive action item. See Rationale under 3.0 General Recommendations - Subtopic: Environmental Education, Interpretation and Outreach (3.3).
GC 7.2 Use all opportunities where the public is contacted (e.g., ranger stations, future visitor center and entrance stations, public meetings) to distribute materials emphasizing biodiversity protection and ecosystem management. Ensure that educational materials are focused on critical issues such as staying on trails, controlling pets, and avoidance of vegetation trampling and wildlife harassment.	Revise	See above
GC 7.3 Secure funding for educational materials, including brochures, displays, driving programs, and school materials.	No opinion based on this analysis	
7.1 Develop a series of environmental education programs (slide presentations, display boards, etc.), for presentation to schools, user groups, town board meetings, and other community events. Individual programs will highlight biodiversity, sensitive ecological resources, endemic butterflies and plants, and sensitive bats. Ensure that materials are available for use by other agencies, NRA partners, and teachers.	Revise	Current conservation action item will be incorporated into a more all inclusive action item. See Rationale under 3.0 - Subtopic: Environmental Education, Interpretation and Outreach (3.3).
7.2 Develop and distribute information and education materials, directed at specific user groups (climbers, cavers, mountain bikers, equestrians, off-highway vehicle users, etc.) and the public at large; emphasizing protection of riparian habitats, alpine areas, and other sensitive areas.	Revise	See above
7.3 Provide information to summer home residents on Palmer's chipmunk and rough angelica conservation.	Revise	See above
7.4 Develop display materials highlighting the unique resources and biological diversity of the Spring Mountains NRA for the NRA office, Kyle Canyon Guard Station, and for community events.	Revise	See above
7.5 Develop brochures for ten trailheads (North Loop, South Loop, Bonanza, Mary Jane Falls, Trail Canyon, Bristlecone, Big Falls, Little Falls, Robbers Roost, and Fletcher Canyon), highlighting the unique resources and biological diversity of the Spring Mountains NRA.	Revise	See above
7.6 Develop driving tour programs using tapes or low frequency radio transmitters at selected locations to provide NRA information and highlight the unique resources and biological diversity of the Spring Mountains NRA.	Revise	See above
7.7 Design and install information and educational signs in accordance with Interagency Agreement # 14-48-0001-94605 between the FS and FWS for the Spring Mountains NRA (Appendix H). Signs will be located outside the Wilderness Area, at trailheads or near sensitive habitats, and will provide information on low impact recreation and ecological resource protection. Priorities include the following:	Revise	See above

Table 6-3 Each general commitment (GC) and conservation action in the Spring Mountains Conservation Agreement (USES 1998) was evaluated based on the analysis in the Landscape Assessment. The team recommended continuing, revising, or dropping conservation measures. If the analysis did not address a conservation measures, no opinion was given.

General Commitments (GC) and Conservation Actions	Determination (continue, drop, revise, or no opinion)	Rationale
7.7 (a-q) Fused PVC color signs: (a) Cathedral Rock, (b) Mary Jane Falls Trailhead, (c) Deer Creek Picnic Area, (d) Bristlecone Trailhead, (e) Robbers Roost Trailhead, (f) Fletcher Canyon Trailhead, (g) Trail Canyon Trailhead, (h) North Loop Trailhead, (i) Bonanza Trailhead, (j) Harris Spring Trailhead, (k) Carpenter Canyon; Smaller signs: (l) Mummy Springs, (m) Stanley B Spring, (n) CC Spring, (o) Trough Spring, (p) Cave Spring, (q) Macks Canyon Spring.	See above	See above
7.8 Design and install signs specifically addressing Palmer's chipmunk conservation at all developed recreation sites located within its habitat.	Revise	See above

3.3 SUBTOPIC: ENVIRONMENTAL EDUCATION, INTERPRETATION AND OUTREACH

Recommendation: Develop, implement, and monitor a comprehensive environmental education, interpretation, and outreach program for the Spring Mountains NRA. Goals or steps include:

1) Identify the behaviors that could be modified through the environmental education, interpretation, and outreach program.

2) Research existing literature on interpretive, environmental education, or outreach methods that are most effective in modifying behaviors and building support.

3) Develop and implement an environmental education, interpretation, and outreach program. Determine the best implementation methods such as utilizing local outdoor recreation and conservation organizations (e.g., climbing and hiking, equestrian groups), schools, partnerships such as University of Nevada, Las Vegas Public Lands Institute, non-profits, volunteers, and other user groups. Work to establish or continue partnerships developed under the Middle Kyle Canyon Complex Project to help develop and implement these environmental programs.

4) These tools may be directed toward four primary audiences: 1) visitors to the Spring Mountains NRA, 2) federal agency employees and their contractors, 3) private land owners and residents, and 4) partnering organizations or groups that can influence behavior of Spring Mountains NRA visitors such as climbing groups, hiking clubs, or non-profit organizations. Key messages to consider include recreating in a responsible manner (staying on trails, camping in designated areas, treading lightly, and the need to reduce introduction of invasive species, etc.) and building public understanding, appreciation, and support for responsible stewardship (species diversity, healthy ecosystem, cultural values, scenic value, etc.).

5) Integrate media and messages targeted at species and habitat protection objectives into a broad-based education, interpretation, and outreach program that also enhances and enriches visitors' enjoyment of their Spring Mountains NRA experiences; broadens public awareness, understanding, and appreciation of the Spring Mountains NRA; and solicits community engagement and participation in sustaining the unique values of the Spring Mountains NRA for future generations.

6) Monitor and evaluate what techniques and programs are effective in reaching the intended audience, being understood and absorbed by the intended audience, and ultimately eliciting the desired behavior in the audience. Some desired visitor behaviors to begin to encourage include: users not creating new hiking, biking, equestrian, and motorized routes; equestrians feeding only weed-free feed; appropriate use of spring sites (not using the water for drinking and not camping within 300 feet to minimize disturbance to riparian systems); staying on designated trails; and not picking or removing wildflowers or other vegetation. Use partnerships and volunteers to help monitor and evaluate program effectiveness as programs are implemented.

7) Include environmental education, interpretation, and outreach with internal Forest Service personnel to facilitate effective communication with partners, the public, and contractors and to avoid issues with ongoing operations and maintenance. Internal education could take the form of an environmental education training module that occurs during new employee orientation, and/or when Forest Service crews or contractors begin work (road grading, vegetation management, etc).

Rationale: Of the 193 conservation measures investigated in the landscape analysis, 26 are items focusing on information, education, and/or interpretation (Chapter 5, Appendix 5D). The quantitative analysis of these types of conservation measures (see Chapter 5, Section 1.2.1) indicates these measures have not been particularly effective to date. However, in large part, this perceived ineffectiveness relates to limited and spotty implementation of education and interpretive measures. While some individual actions have generated some positive results, nothing resembling a comprehensive strategy and program has been instituted. The Project Interdisciplinary Team rated the current effectiveness of education/interpretation measures as having low or trace effects because these conservation measures have not been fully implemented. However, outside research and experiences provide evidence that education/interpretation measures can be important tools in managing visitor behaviors in other similar sensitive public land recreation settings. Thus the potential still exists for greatly enhancing recreation experiences and species protection through the establishment of a robust integrated public outreach program.

Since education and interpretation measures can easily fall short of achieving desired results, researching available communication strategies and their applicability to the Spring Mountains NRA is a critical element of these recommendations. Even with a strong foundation based on this research and knowledge, some approaches will be more successful than others. An important component of the program thus becomes the inclusion of strategies to adapt messages and media based on adequate monitoring feedback that builds upon successes and redirects less productive efforts. Because of these dual needs for compiling appropriate research and utilizing adaptive, dynamic techniques, locking conservation measures into specific messages or media would be counterproductive at this time.

3.4 SUBTOPIC: DATA MANAGEMENT

Recommendation: Maintain a current, centralized database with metadata. When possible, the data should be maintained in a corporate database and/or in a spatial format (GIS). The data should be current and easily accessible to facilitate use in analysis.

1) Collect data according to Forest Service established protocols for all resource surveys, including contractors. These protocols include established data dictionaries that should be used to ensure consistency of the information collected. Data should be updated regularly. Utilize Natural Resource Information System (NRIS) corporate databases and protocols (ex: TESP-Invasive Species, FAUNA, TEUI, and INFRA).

2) Transfer data in corporate databases to and from external systems and databases maintained by partners, such as the Nevada Natural Heritage Program, Great Basin Bird Observatory, etc. Establish a process, if not available, to regularly transfer data.

3) For activities and inventories without corporate databases or corporate databases without a spatial component, the GIS layers created through this Landscape Assessment should be maintained and updated. The GIS information should be made available to all staff, especially those responsible for surveying and analyzing biological components for projects on the Spring Mountains NRA.

4) Processing the data and documentation should be considered part of the process when planning for surveys, inventories and monitoring. When used in project analysis, the data should be inputted into corporate databases (if available) as part of the analysis process.

Recommendation: Use the best available information for analysis and decision making. Other sources of data are available and maintained by external partners and agencies including Nevada Natural Heritage Program and Nevada Department of Wildlife. Having an updated list of data sources, both external and internal, would be useful.

> ***Rationale:*** Accurate and current information and data are critical to providing assessment of species and impacts (Chapters 3/4, Section 4.0; Chapter 5, Section 3.1.1 and the data gaps section). One way to facilitate cumulative effects analysis is to provide accurate and current information related to impacts affecting habitat as well as well-documented inventories and monitoring. To access species status and trend, an understanding of the distribution is critical. This information is needed for developing habitat relationships and building habitat models. It is useful to have this information stored and managed in a central location, updated regularly, and have a consistent data structure. Maintaining different datasets and associated data has caused difficulties with this analysis as well as project level analysis. Data should be maintained in spatial formats whenever possible to facilitate any analysis process.

3.5 SUBTOPIC: CURRENT AND FUTURE ACTIVITIES

Recommendation: Conduct pre-activity surveys for the special status species prior to any actions that may affect them, and design projects to minimize or avoid adverse effects. Ensure that surveys consider unique habitat components of special status species.

> ***Rationale:*** For this analysis, one of the most important conservation measures identified was to avoid habitats through early surveys in the planning process (Chapter 5, Appendix 5F).

4.0 SPECIFIC RECOMMENDATIONS

4.1 SPECIES AND HABITAT PROTECTION/KEY QUESTION 1

How do recreation activities affect key species and habitats? Which types and locations of recreation activities are having more substantial effects on species and habitats?

4.1.1 Subtopic: Developed campgrounds/picnic areas/trailheads

Recommendation: Develop vegetation management, renovation, and operation and maintenance plans for the recreational sites that specifically address special status species and enhance resources.

1) Adequately survey existing recreational sites for special status species to identify potential impacts.

2) Consider the habitat needs for special status species and techniques that could be used to maintain components of species habitat such as understory species, overstory cover, and down and woody debris (i.e., firewood collection).

Recommendation: Close the Deer Creek Picnic Area once replacement picnic site capacity is established at the Middle Kyle Canyon Complex.

> ***Rationale:*** Potential effects were documented to species for both existing developed campgrounds and picnic areas. The largest overlaps were for Palmer's chipmunk (Chapter 5, Section 3.3.2) and rough angelica (Chapter 5, Section 3.5.4). A variety of species including most of the butterflies were impacted by these activities as well (Chapter 5, Section 4.2.1). Current conservation measures focus on providing the needs of species through vegetation management. For existing facilities, we recommend continuing current conservation measures with some revisions (Table 6.3). Species and habitats will vary for each campground/picnic area. Since baseline surveys of campgrounds are not adequate to determine species that may have been lost at each site, the goal should be to provide for the continued persistence of the existing population. Many of the existing conservation measures for developed campgrounds and picnic areas address placement of future facilities and are discussed under subtopic Proposed Developed campgrounds, picnic areas, trails, trailheads, and biodiversity hotspots. Deer Creek is recommended for closure based on recreation issues (See Chapter 6: Core Topic/Key Question: Recreation and Human Use), however, special status species present in the area and adjacent riparian area will benefit from the closure including Palmer's chipmunk, butterflies, and moonworts (riparian and springs species).

4.1.2 Subtopic: Concentrated use areas (CUAs)

Recommendations: Evaluate and implement opportunities for improving management of CUAs through appropriate and effective techniques.

1) Take appropriate management actions using the Recreation Adaptive Management Guidelines from the Southern California Forest Plan (formerly known as the Chavez-Wambaugh protocol) as resource issues are identified.

a. Conduct an inventory for priority sites to determine the type and extent of the impacts and conflicts with Tier 1 and Tier 2 species.

b. Determine the condition and trend of CUAs across the landscape. Use the established protocol that was implemented for the baseline inventory of CUAs in 2005 and revisit CUA sites at least once every 5 years (2005, 2010, etc.), collecting information under the established data dictionary to determine trends in size and density of CUAs. For wilderness CUAs, maintain or establish consistency with standard wilderness recreation site inventory protocols. Utilize volunteers as much as possible to implement this monitoring. Continue maintenance and update of spatial data for CUAs (see General Recommendations, Subtopic: Data Management).

c. For frontcountry CUAs (those on motorized routes), sites that are available for motorized access are designated through the motorized use maps. Utilize the stepped Southern California Forest Plan adaptive management approach to implement the appropriate level of management. Provide education and information to visitors about user ethics in sensitive habitats. Enlist the assistance of OHV groups in educating visitors and monitoring use. Based on monitoring, implement appropriate and effective best management practices (BMPs) (such as defining site boundaries using boulders, fences, or vegetation) to effectively manage use and to prevent and reduce resource damage. If necessary, as resource issues are identified, the areas can be removed from the designated motor vehicle transportation system as part of the annual Motorized Vehicle Use Map (MVUM) review process. Once removed from the system, CUAs should also be physically closed to motor vehicles if necessary to remedy the issue in question.

d. For backcountry CUAs, consider development of a map of existing CUAs to direct backcountry campers to appropriate sites. Establish a permit system to regulate camping in these locations only if monitoring indicates impacts are occurring to Tier 1 and Tier 2 species. Maps and sensitive resource information could be distributed through an established permit system for overnight use in backcountry areas if monitoring results indicate clear correlations between overnight use and unacceptable impacts.

2) Based on monitoring, implement appropriate and effective BMPs to effectively manage use and to prevent and reduce resource damage such as defining site boundaries using boulders, fences, or vegetation.

Rationale: The total acreage in CUAs areas of influence is much greater than that associated with all existing developed recreation sites. Because of their dispersed and often relatively remote locations, and because they are non-fee, non-concession-managed sites, CUAs also receive little management attention compared to developed sites. Taken together, these factors give CUAs more potential for extensive effects upon multiple species. There were overlaps with this land use and 32 species - 16 plant and 16 wildlife species. Ten mixed conifer plant species overlapped with CUA areas of influence on over 5 acres in the polygon locality data. In total, these effects are important in their extensiveness and, in many cases, their localized intensity. Given the low level of management attention that these areas receive, the potential for those effects to grow in the future might be the greater concern. Since insufficient data exists to establish trends in either use patterns or associated effects upon Tier 1 or Tier 2 species, it is currently not possible to establish how

those patterns are changing. Continued or even increasing use pressures could very possibly increase numbers and sizes of CUAs without more proactive management. Thus it is important to implement a strategy to track changing use and changing conditions to prevent CUAs from generating greater impacts upon Tier 1 and Tier 2 species.

Pricewaterhouse Coopers' findings indicate not all CUAs are needed to meet current or short-term future demand. Since there is a also a cost to manage those sites and no revenue generated from those sites, recreation management efficiencies would also be gained by establishing effective strategies to limit the number of sites and to prevent future site proliferation.

4.1.3 Subtopic: System roads (paved and unpaved) and open motorized trails

Recommendation: Revisit MVUM map annually to identify resource issues and impacts to Tier 1 and Tier 2 species, and to evaluate the need to adjust the transportation system, including potentially removing roads and/or motorized trails from the system.

Rationale: National Forest Service OHV Regulations require an annual review of the motor vehicle transportation system displayed by each management unit's MVUM. Since unpaved roads and their associated areas of influence overlap 16 plant species and 18 wildlife species, paved roads overlap 11 plant species and 11 wildlife species, and motorized trails overlap 5 species and 11 wildlife species, the potential for effects from the transportation system remains high. Since the completion of the first MVUM and the restriction of motorized travel to the designated system routes just occurred in 2007, the effects of those regulatory changes on motorized use patterns is not yet clear. The annual MVUM review affords the opportunity to consider results from appropriate monitoring strategies that are tracking impacts to Tier 1 and Tier 2 species. Monitoring results can be factored into system revisions and restrictions if needed.

Recommendation: Develop and implement a strategy on parking and traffic management to: avoid or minimize conflicts with special status species and habitat; address safety issues; manage user access; and minimize user conflicts. Evaluate the need for changes in current roadside parking locations and develop management strategies based on resource conditions, capacity, and needs. Work with partners including the Nevada Department of Transportation Nevada Highway Patrol, and local police/sheriff departments. Locations where specific actions are needed based on this analysis are given below. Project level analysis should determine methods to best resolve management and species issues.

High priority areas include:

1) Upper Kyle Canyon (Mary Jane Falls – see Subtopic: Trailheads below)

2) Lee Meadows

3) Snow play in Kyle and Lee Canyons

4) Carpenter Canyon

5) Cathedral Rock Trailhead and Picnic area

Rationale: Analysis indicates that conflicts exist for multiple species and the transportation system in multiple locations. Effects to species and habitats can go beyond the presence of the road itself to parking areas adjacent to the road and then to areas affected by the activities people engage in once they leave their vehicles. Managing where, when, and how people park their vehicles can thereby manage those indirect effects tied to the access provided by the routes and the parking.

Mary Jane Falls Trailhead - Defining the appropriate parking area could limit direct effects to species from vehicles. Since parking patterns and uses at Mary Jane Falls Trailhead are interrelated to use patterns at the Trail Canyon roadside parking and the ski tow parking, a comprehensive strategy should be developed for this whole area. Since uses associated with the parking areas go beyond just trail use (and in particular include dispersed camping and the use of the old campground sites), project level analysis should also address effects of those ancillary uses upon Tier 1 and Tier 2 species and their key habitats. Prohibition of dispersed camping may be considered within the adaptive management approach.

Carpenter Canyon - Include the upper canyon as a priority location in monitoring motor vehicle use and associated impacts; and, based on those findings, revise the status of the transportation system in the corridor. Add physical closures as necessary to support the intent of the route designations. The West Side Master Plan recommended closure of the upper reaches of this canyon to motorized use. To support the West Side Master Plan, exclosures should be created and monitored to better demonstrate adverse effects and effectively document and justify the need for motor vehicle restrictions in this location.

Lee Meadow - Restoration of the meadows is planned for 2009. The restoration does not include any changes to the parking system. Project funding was intended to also provide for on-site parking improvements. Project level analysis should consider direct effects to Tier 1 and Tier 2 species from improvements and how parking facilities might help assist in managing associated recreation activities and their resultant species effects.

Snow play – Initiate project level analysis to limit snow play parking to Las Vegas Ski and Snowboard Resort, Foxtail day use site, Old Mill, and Lee Meadows, and close all other areas within the Spring Mountains NRA. Close highway to shoulder parking during the snow play season. This analysis and implementation of this type of strategy would require extensive involvement of the Nevada Department of Transportation, law enforcement agencies, and concession and/or non-profit management partners. A public involvement, education, and outreach campaign would be important in strategy development and implementation. (See Snow play subtopic)

Recommendation: Maintenance of unpaved roads and motorized trails should stay in road prisms (road bed and associated disturbance). Outside of the road prism, issues related to species should be successfully communicated both internally and externally before work is performed. Establish or update co-operative road maintenance agreements with both Clark and Nye counties and ensure their understanding of relevant Tier 1 and Tier 2 species concerns.

Rationale: Although there is overlap and potential effects for Palmer's chipmunk, butterflies, and rare plants, the cause and effect from unpaved road utilization and maintenance to species viability has not been documented; however, site specific impacts have been documented (see Chapters 3/4 summaries of species threats). Mixed conifer plant species overlapped with both unpaved roads (footprints and areas of influence) and motorized trail areas of influence (both open and closed) on over 5 acres

in the polygon locality data. Large numbers of species could conceivably be affected if maintenance activities impact additional areas beyond the road prism. Road crew projects that go beyond the routine maintenance of established road prisms need to be planned and coordinated with the Forest Service District staff early in the development of the maintenance work program to identify any needed clearance on projects. The capacity to manage system roads and maintenance issues is limited, which requires Forest Service and county maintenance crews to make efficient use of their time. If crews do not have adequate information to understand the potential effects of certain maintenance projects, the selected maintenance strategy may not be the most advantageous to species viability. Timely sharing of information and priorities could assist route managers and resource managers identify mutually agreeable maintenance projects and techniques.

4.1.4 Subtopic: High and low mileage trails

Recommendations: For high mileage trails:

1) Manage designated and informal use (unnumbered) trails that are causing resource damage to reduce damage and restrict use to a single trail.

2) Require permits for groups with 15 or more pack or saddle stock. Require as part of the permit that all participants must stay on approved trails. Require removal of all hay and fecal material as part of site rehabilitation.

3) Develop or realign trails into climbing areas as appropriate to provide for public safety and resource protection.

Recommendation: For high and low mileage trails with potential effects on Tier 1 and Tier 2 species, implement the Adaptive Management Guidelines for recreation from the Southern California Forest Plan (formerly known as the Chavez-Wambaugh protocol). One goal of management should be to keep visitors from leaving the trail.

1) Clarify specific species issues and causes of impacts as part of the inventory.

2) Monitor and evaluate the effectiveness of each measure individually, beginning with information and education. If the information and education measure does not work, move to the next level.

3) Consider realignment if necessary and feasible prior to closures.

Recommendation: Allow bicycle use only on established and/or designated roads and trails.

Rationale: In Chapter 5, Section 4.2.13 summarizes effects from low mileage trails. Given the diversity of elevation and habitat types with designated trails, many plant and wildlife species are impacted, but the overall overlap of acres and potential effects are low except for moonworts and alpine/subalpine species (Chapters 3/4, Section 3.5.1). For alpine/subalpine species, conservation measures are thought to be effective at minimizing impacts from trails including limiting the creation of new trails; however, given the fragility of the alpine/subalpine system, activities should continue to be monitored and appropriate measures taken under the Adaptive Management Guidelines for recreation. Springs/seeps and associated species are also common destinations for

trails and may need to be evaluated for measures to minimize impacts that are occurring and affecting species viability. The quantitative analysis only considered where activities currently are occurring. Additional impacts may occur by the creation of new trails and associated disturbances. Many of the recommendations focus on limiting the activities to existing ground disturbance by limiting the number of stock and bicycles to designated trails.

4.1.5 Subtopic: Non-system trails and closed motorized trails

Recommendation: Monitor compliance with the MVUM annually. Evaluate priorities for restoration of closed motorized trails.

1) Use GIS data to identify which non-system and closed motorized trails may be priority candidates for restoration. Areas with Tier 1 species and multiple special status species should have the highest priority for inventory to determine continued use and impacts to species.

2) Prioritize restoration locations based on plant and wildlife species likely to positively respond to habitat restoration, the feasibility of restoration techniques that are appropriate to the species and on-site conditions (i.e., no ripping of trail tread when invasive species are present), and the likelihood of success in discouraging unauthorized motorized intrusions. Monitor for restoration success.

Recommendation: When designating user-created trails, designate a system route on a single, well defined tread, while closing other braided treads when possible. Consider other trail designation options as appropriate.

Rationale: There are potential effects to 16 plant species and 14 wildlife species from closed motorized trails and non-system trails, and the acres of overlap of these activities with occurrence (both point and polygon) locations are low. In Chapter 5, Section 4.2.14 summarizes effects from closed motorized trails and non-system trails. Both land uses have potential effects on multiple plant and wildlife species, and for both it was concluded that revised conservation measures are needed to focus on restoration. Recent decisions have caused the designation of user-created motorized trails to be evaluated. Many trails were closed through that process and monitoring is needed to determine which closed motorized trails are in need of restoration. Some areas may recover without active restoration.

4.1.6 Subtopic: Ski area (current and future development)

Recommendations:

1) Determine the distribution and extent of special status species and their habitats in the Las Vegas Ski and Snowboard Resort permit area using existing information and additional surveys of the permit area (see Data Management in Section 3 of this chapter).

2) Implement effectiveness monitoring to determine the effect of native plant species restoration, erosion control, ski run management, and disturbance regimes.

3) Vegetation management, erosion, and operating and maintenance plans should include, at a minimum, the ski runs and other disturbed areas within the permit area to provide for and maintain species diversity and suitable habitat.

4) Maintain the integrity and ecosystem function of Three Springs by maintaining species diversity and water flow.

5) Develop and implement a conservation strategy for rare special status species within the existing and future ski permit areas for management and operations.

6) Designate the motor vehicle routes and trails required for ski area operations and maintenance. Once designated, utilize only designated routes and trails for operations and maintenance of the ski area (unless an emergency situation arises) to assist in providing for and maintaining species diversity and suitable habitat outside the designated routes and trails.

Rationale: Potential future development identified in the Draft Las Vegas Ski and Snowboard Resort Master Development Plan has a large overlap with many species, including several Tier 1 and Tier 2 species. The quantitative analysis indicates that current ski area activities typically have not impacted alpine species habitat or some other species. However, recent surveys and information have documented additional plant populations and additional species that were not considered in this analysis, which indicate that both current and proposed future activities could have more overlap with species than shown by the quantitative analysis.

For alpine and subalpine plants, the future ski area footprint has the greatest planned activity overlap for point occurrence data. Two future activities have the greatest activity overlap for polygon locality data, the ski area footprint and area of influence. For riparian and springs plant species, the future ski area footprint has the greatest planned activity overlap for both scalloped (dainty) moonwort and trianglelobe (upswept) moonwort.

4.1.7 Subtopic: Snow play

Recommendation: Provide for safe snow play visitor experiences in concessionaire managed areas.

1) Designate Foxtail, Old Mill, Lee Meadows and Las Vegas Ski and Snowboard Resort permit area as snow play areas. These areas would be managed appropriately through a concessionaire or other methods. Close remaining areas to snow play in Lee Canyon and determine appropriate locations to designate or remove in Kyle Canyon.

2) Work with Las Vegas Metropolitan Police Department, Nevada Department of Transportation, and Nevada Highway Patrol to better manage winter roadside parking and, through parking management, thereby direct visitors to safe and appropriate snow play locations. Consider closing highway to shoulder parking during the snow play season.

3) Require a minimum snow cover requirement in concessionaire managed areas for sledding and general snow play.

4) Conduct a winter transportation analysis with a resulting National Environmental Policy Act (NEPA) decision to establish what, if any, routes and areas should be open to motorized over-snow travel by snowmobiles. Analysis should address minimum snow depths and open/closed season issues.

Rationale: Recommendations for snow play relate to recreation management issues as much as effects upon species. In Chapters 3/4, Section 2.2.2, issues associated with snow play areas are documented. There are several areas along Kyle Canyon, Deer Creek, and Lee Canyon Roads where snow play recreation use is concentrated. Use is high on weekends and holidays following snowstorms and there have been safety issues associated with parking and crossing the road, safety issues with sledders, trespassing on private lands, and trash accumulation.

The quantitative analysis analyzed the effects and conservation measures related to existing and designated snow play areas (Chapter 5, Section 4.2.1). Many of the issues related to snow play in the species summaries (Chapter 4, Section 4.0) are due to uncontrolled snow play across the landscape without adequate snow cover. The quantitative analysis showed that the potential effects from snow play in designated areas were low because they assumed effective implementation of current conservation measures, which included a minimum snow cover requirement in concessionaire managed areas. The recommendations address the recreation and species issues by designating snow play areas where use can be controlled and the minimum snow cover requirement enforced.

4.1.8 Subtopic: Caves/climbing areas

Recommendation: Provide for ecosystem diversity of cave systems and roost habitat through implementation of the General Management Plan (GMP) and consider the needs of these systems during any revision or amendments. Work with partner agencies to implement the Nevada Statewide Bat Management Plan and the Federal Cave Resources Protection Act of 1988.

> ***Rationale:*** The quantitative analysis demonstrated that for caves, there are potential effects for 6 bat species. By providing for habitat and ecosystem diversity for cave systems and roost site trees, we will provide for diversity of bat species. Management of the caves and habitat for bats will be provided through implementation of the GMP, the Federal Cave Resources Protection Act of 1988, and the Nevada Statewide Bat Management Plan.

Recommendations:

1) Assess the effects of rock climbing on all cliff-dwelling plant species by initiating inventories and/or appropriate research studies for cliff plants that specifically address documentation on impacts. If effects from rock climbing and associated activities are found, implement environmental education, interpretation, and outreach programs to reduce impacts. Also consider permit systems.

2) Implement provisions in Wilderness Plans to manage climbing routes. Consider protection of Tier 1 and Tier 2 species in development of the Wilderness Plans.

> ***Rationale:*** The quantitative analysis demonstrated that for climbing areas there is a potential effect for one plant species. However, surveys and documentation of known sires are incomplete. Continued assessments of climbing routes will be needed to address wilderness management issues and better establish species effects from this activity. For climbing areas, refer to the narrative in Chapter 5, Section 2.2.7.

4.1.9 Subtopic: Future activities (proposed developed campgrounds, picnic areas, trails, and trailheads)

Recommendation: Avoid new developments (both recreation – campgrounds, trails, trailheads, etc. – and non-recreation facilities) and activities in Tier 1 special status species habitat.

Recommendation: Avoid new developments (both recreation – campgrounds, trails, trailheads, etc. – and non-recreation facilities) and activities in springs/seeps and riparian areas.

Recommendation: Minimize impacts from new developments and activities, especially trails and trailheads, to alpine species and their habitat.

Recommendation: During project development, refine proposed West Side locations (polygons) to reflect recreational demand and avoid or minimize impacts to Tier 1 and Tier 2 species. Use all available information including potential habitat models and known species occurrences to refine proposed recreation locations and to guide development of motorized trail corridors. Potential habitat models and known species occurrences will help identify priorities for surveys based on areas with the highest potential conflicts.

Recommendation: For all future developments (both recreation – campgrounds, trails, trailheads, etc. and non-recreation facilities), conduct a GIS based analysis to help refine specific placement and alignment proposals in order to avoid special status species habitat to the extent possible and to help guide and inform survey needs. Apply to all future activities. Incorporate results of completed surveys for Middle Kyle Canyon Complex and Lee Meadows in project designs.

> ***Rationale:*** The recommendations are based on the need to satisfy existing and future demand for recreation facilities, as well as to conserve special status species and their habitat on the Spring Mountains NRA. Detailed analyses on future market demand for recreation use show increased demand on the east side and west side of the Spring Mountains NRA (Chapter 5, Section 2.2.6). In addition, results from the analysis in this Landscape Assessment show a number of overlaps between future activities, and special status species occurrences and their potential habitat (Chapter 5, Section 4.2.1).
>
> Most of the future recreation activities on the west side did not have potential effects or only had trace potential effects on any species. The only exception was for West Side PO Camping, which potentially encompasses a larger area than other future activities and had potential effects on 14 species; hence the recommendation to refine the West Site locations (polygons). To some degree, the relatively low potential effects from these future activities are likely indicative of incomplete species data incorporated in the analysis since some of these potential new activity locations have not been surveyed to the same intensities as existing activity sites. In the case of the east side Middle Kyle Canyon Complex facilities and Lee Meadows project, additional species data beyond that used in this analysis has been accumulated and indicates potentially greater overlap between habitats and activities than that shown in the analysis reported in Chapter 5.

4.1.10 Subtopic: Firewood gathering areas

Recommendation: Develop and implement a long-term strategy for firewood gathering areas and integrate with the overall vegetation management strategy.

1) Through the Forest Service Forest Products permit system, implement measures to minimize impacts to species from cutting and collection of firewood. Current measures include cutting and piling firewood in easily accessible areas for the public away from sensitive areas and seasonal closures as appropriate for the species in the area.

2) Select areas outside of sensitive areas for public use.

3) Determine sensitive areas by evaluating occupied habitat for Tier 1 and Tier 2 species using the best information available. Consider important habitat components for Tier 1 and Tier 2 species such as Palmer's chipmunk habitat (north facing slopes near wet areas).

Rationale: Existing conservation measures have been implemented through the Forest Service Forest Products permit system and are effective (Chapter 5, Appendix 5F). The potential effects (3-5%) of firewood gathering were greatest on Clokey's milkvetch and butterflies (Carole's fritillary, Mt. Charleston blue, Nevada admiral, acastus checkerspot, Spring Mountains comma skipper, and Spring Mountains icarioides blue) (Chapter 5, Section 4.2.1). Continued implementation of current conservation measures is important to minimize effects to special status species. Only designated firewood cutting areas were considered. Implementing measures to control where this use occurs would be important to minimizing or avoiding impacts to special status species. An overall vegetation management strategy would help to guide staff in continuing to minimize impacts to these species into the future.

4.2 SPECIES AND HABITAT PROTECTION/KEY QUESTION 2

How does current fire management affect key species and habitats compared to historical fire patterns?

4.2.1 Sub-topic: Wildlife urban interface (WUI)

Recommendation: With a priority on protecting life and property, allow natural disturbance regimes and processes, including fire, to continue to operate or are being mimicked to maintain ecosystem health. Wildland fire provides a mechanism for reintroducing ecosystem diversity.

Recommendation: In areas where fire suppression will continue, vegetation treatment and prescriptions should involve integrated resource planning and focus on a strategic, landscape perspective for treatment. Vegetation treatment and prescriptions can meet specific needs; however, vegetation management activities should go beyond the purpose of fuels treatment or improving forest health and look for opportunities to restore species habitat through strategic, large-scale vegetation management. Cumulative impacts to species over both space and time (manage how many sites are impacted in any given years) should be considered. Design vegetation treatment and prescriptions to restore habitats for special status species, particularly any Tier 1 or Tier 2 species that may benefit. Consider special status species habitat needs and relationships early in the planning process and design of vegetation treatments.

Recommendation: Demonstrate through monitoring of WUI and other opportunities which special status species or other species benefit from vegetation treatments and which prefer late seral habitats. Continue effectiveness monitoring of mitigation measures for vegetation treatment projects to determine impacts or benefits to species. Determine appropriate revisions

to existing mitigation measures and/or identify new mitigation measures. If possible, monitoring should also include species and vegetation responses to natural fire.

Recommendation: Utilize pilot species and their habitat to target for vegetation treatments, habitat restoration, and monitoring: ponderosa pine forest and Clokey eggvetch, Clokey's milkvetch, and King's rosy sandwort; Spring Mountains icarioides blue butterfly (lupine) and Carole's fritillary butterfly (thistle and rose). Document Charleston Mountain violet habitat relationships, as well as Carole's fritillary butterfly use to better understand the impact or benefit of opening the canopy on these species.

> ***Rationale:*** Fire has mixed effects on plant and wildlife species considered in this analysis. It is a risk to the species associated with lower elevation plant communities (Chapters 3/4). These systems are not fire adapted and have an increased likelihood of introduction of invasive species (including annual grasses) and significant alteration of the habitat. On the other hand, pinyon-juniper woodlands and ponderosa pine forests have been significantly altered through fire suppression resulting in canopy closures and changes in understory communities. Some of the rare species associated with early successional habitat or a more open understory may be adversely affected by the changes across the landscape as a result of fire suppression. These may include King's rosy sandwort, Clokey eggvetch, Clokey's milkvetch, Spring Mountains icarioides blue butterfly, Carole's fritillary butterfly, and others.
>
> The current WUI project and any future vegetation management activities are likely to have the greatest overlap with species, impacting habitat at the landscape scale. WUI covers 3,723 acres and is one of several significant land use activities on the Spring Mountains NRA that was analyzed in this Landscape Assessment. For WUI, there are relative potential effects to 20 plant species (including Clokey eggvetch, rough angelica and 3 riparian or springs species), and 14 wildlife species (including 8 of the 9 butterflies, and Palmer's chipmunk with the highest relative potential effect) (Chapter 5, Section 4.2.1). The existing WUI project demonstrates the need for landscape level vegetation management that is strategic and utilizes integrated resource planning. WUI projects have specific purpose and need, however, vegetation management activities can go beyond the purpose of fuels treatment or improving forest health – restoration of species habitat through large-scale vegetation management is possible in the future.

4.3 SPECIES AND HABITAT PROTECTION/KEY QUESTION 3

How is development (of non-recreation facilities and activities) affecting key species and habitats? Which types and locations of development are having a more substantial effect on species and habitats?

4.3.1 Subtopic: Wild horses and burros

Recommendations:

1) Implement GMP to maintain Appropriate Management Level (AML) for wild horses within the horse and burro territories. Construct fences in strategic locations or implement other measures to keep wild horses out of Kyle and Lee canyons with quick removal of strays.

2) Monitor the impacts from ungulates to special status species (plants and understory butterfly host plants).

3) Evaluate if fencing is an appropriate avoidance measure for horses at springs with pyrgs (springsnails) and other special status species. If fencing is determined an appropriate avoidance measure, fence springs that have Tier 1 species. If fencing is not an appropriate avoidance measure, investigate and implement other avoidance or minimization measures to protect springs with Tier 1 species.

Rationale: Analysis demonstrates there is significant overlap between wild horse territories and habitat for many species. The Spring Mountains HMA Complex covers a total of 671,625 acres including both BLM and Forest Service land and is jointly managed by both agencies. There are 163,804 acres designated by the Forest Service as wild horse territories on the Spring Mountains BLM 2006.

For pyrgs (springsnails), horses and burros <0.25 miles from springs and streams have the greatest overlap with current activities. In addition, the summary of individual activity effect acreage on point occurrence data was 0.3 acres for the southeast Nevada pyrg and 0.1 acres for the Spring Mountains pyrg. For all bat species, horses and burros at all distances from springs and streams have the greatest overlap with current activities. Species with the most overlap include long-eared myotis, pale lump-nosed bat (pale Townsend's big-eared bat), and long-legged myotis. For low elevation plant species, horses and burros <0.1 miles from springs and streams have the greatest overlap among all current land use activities for point occurrence data, although the overlap was not more than 0.5 acres. Specifically for the Death Valley beardtongue, horses and burros <0.25 miles from springs and streams have an overlap of greater than five acres for polygon locality data. For mixed conifer plant species, horses and burros at all distances from springs and streams have an overlap of greater than 5 acres for polygon locality data.

Wild horses outside of territories have caused impacts to the species habitats, especially in Kyle and Lee canyons. Recent implementation of the GMP has resulted in removal of horses outside of territories and reduced numbers to the AML in territories. The impacts from horses have been greater near springs and seeps. In response to this and other threats, several springs have been fenced (e.g., Willow Creek) while others have not (e.g., Horseshutem Spring). The effectiveness of maintaining AMLs and fencing to reduce impacts to spring species and upland species needs to be determined. Other appropriate avoidance or minimization measures should be investigated and implemented as appropriate.

Recommendation: If monitoring indicates that there are impacts to special status species, work with BLM to complete range studies that would be used to reevaluate the AML numbers. Adjust AML numbers based upon these studies and a NEPA analysis, and ensure AMLs are consistent between agencies.

Rationale: This recommendation would be necessary if recommendations 1 to 3 above for wild horses and burros indicate that the wild horse AML is not providing for sustainable rare species habitat. Working cooperatively through the NEPA process with BLM to reevaluate AMLs would provide for more efficient management of the herd and ensure sustainability of spring and upland species.

4.3.2 Subtopic: Private land/private buildings

Recommendation: Continue to improve education and outreach with private landowners regarding ecosystem management, and special status species and habitat conservation. (See

General Recommendation above to "Develop, implement, and monitor a comprehensive environmental education, interpretation, and outreach program for the Spring Mountains NRA").

Recommendation: Acquire private property from willing sellers for the purpose of benefiting species viability, or establish conservation easements (or other mechanisms) on the land of willing landowners in coordination with non-profit organizations if appropriate.

Based on the analysis in this Landscape Assessment using species occurrences and polygons, specific areas or parcels targeted for acquisition or easements are listed below.

1) High Priority

- Mummy Mountain – this acquisition or easement would benefit geographically restricted alpine species (6 of the 8 alpine endemic plant species). The parcel is currently undeveloped; thus, consider acquisition or easement if opportunity becomes available or significant changes in management of the private parcel occurs.

- Horseshutem Spring – important acquisition or easement of not only land, but also water rights for the southeast Nevada pyrg (springsnail) which is a Tier 1 special status species.

- Deer Creek – the largest private parcel is the most important as it is a riparian corridor for all three moonwort plants (Tier 1 species), as well as the Charleston Mountain violet and Palmer's chipmunk. The largest parcel and two other smaller parcels would also benefit an additional four plant and wildlife species. Given that portions of the parcels are developed, establishment of a conservation easement, particularly at and around the spring, may be more practical and would greatly benefit the three moonwort species.

2) Moderate Priority

- Cold Creek South – acquisition or an easement on the largest, southern-most private parcel and any water rights would benefit the southeast Nevada pyrg (springsnail), Spring Mountains dark blue butterfly, and two other endemic butterflies. Given that many of the subdivided parcels in Cold Creek are developed, establishment of a conservation easement along the riparian stream and directly adjacent uplands may be more practical and would greatly benefit the southeast Nevada pyrg.

- Lady of the Snow – important acquisition or easement of a large parcel that would benefit Clokey eggvetch and Clokey's milkvetch (Tier 1 special status species), as well as the Palmer's chipmunk. Given that many of the subdivided parcels in the Lady of the Snow area are developed, establishment of a conservation easement may be more practical and could benefit the aforementioned species.

- Clark Canyon – the largest private parcel in Clark Canyon is the most important as it is occupied by Clokey eggvetch (Tier 1 species) and Palmer's chipmunk. Given that many of the subdivided parcels in the Clark Canyon area are developed, establishment of a conservation easement may be more practical and could benefit the Clokey eggvetch the most.

- Crystal Spring – this acquisition or easement would benefit the Spring Mountains dark blue butterfly, a Tier 1 species. Further inventory of the site would likely reveal additional endemic species on the parcel.

- Mountain Springs Northwest – acquisition or an easement on the northwestern-most private parcel could benefit 6 bat species. Protection of a former mine, if located on the private parcel, or adjacent foraging lands, is important. Given that many of the subdivided parcels in the Mountain Springs area are developed, establishment of a conservation easement may be more practical to benefit the bat species.

- Rainbow Canyon – this acquisition or easement would benefit 8 plant and wildlife species, including Clokey's milkvetch, rough angelica, Jaeger's mousetail, and acastus checkerspot butterfly. With the majority of the parcels being subdivided and developed within Rainbow Canyon, the feasibility of acquisition is low. Thus, conservation easements, if more appropriate, should be pursued to benefit the aforementioned species.

- Boy Scout Camp – acquisition or easement that would benefit the Spring Mountains dark blue butterfly and dwarf greasebush.

- Mt. Potosi – acquisition or easement of the largest private parcel on Mt. Potosi where there is a former mine site would benefit four bat species. At the time of this analysis, development of the parcel is in the planning and design stages by the landowner; thus, protection of the mine and bat species through a conservation easement or other mechanism should be pursued; and acquisition, if opportunity becomes available, should be considered.

Rationale: The analysis demonstrates that acquisition of or conservation easements on private inholdings would allow the Forest Service to protect additional lands that are occupied by special status species and their habitat. For alpine plants, private land on Mummy Mountain had the greatest overlap with point occurrence data over any other activity. With mixed conifer plants, private land had an overlap of more than 10 acres. For riparian and springs plants, private land had the greatest overlap, along with another activity, in their specialized habitat. Finally, half of the locations (2 out of the 4) for the southeast Nevada pyrg (springsnail) in the Spring Mountains NRA overlap with private land. The potential parcels for acquisition or easements were prioritized based on the number of species and current status of the species, as well as the feasibility for acquisition or establishment of an easement.

4.4 SPECIES AND HABITAT PROTECTION/KEY QUESTION 4

How are nonnative species affecting key species and habitats? Which are having more substantial effects on species and habitats?

Recommendation: Implement BMPs for noxious and invasive weeds (Forest Service Manual 2080 [2001] and HT Supplement [2004]), especially along paved and unpaved roads and during construction of developments (both recreation – campgrounds, trailheads, trails, etc. – and non-recreation).

Rationale: In Chapters 3/4 of this Landscape Assessment, reference is made to findings of Nachlinger and Reese (1996). They compiled a vascular plant checklist for the Spring Mountains NRA. A total of 459 plant taxa were identified within or immediately adjacent

to their 599 plots and validation points. Thirty-one exotic species were identified. They identified a number of taxa that were thought to be especially invasive. These included: *Arundo donax* (giant reed), *Bromus madritensis* ssp. *rubens* (foxtail chess; red brome), *Bromus tectorum* (downy-chess; junegrass; cheatgrass; broncograss), and *Tamarix ramosissima* (salt cedar; tamarisk). Many of these invasive species are co-located in habitat for special status species and are a threat to several Tier 1 and Tier 2 species. Implementation of BMPs along paved and unpaved roads and during construction of developments (both recreation –campgrounds, trailheads, trails, etc. and non-recreation) is important since vehicles and construction activities represent significant vectors for potential introduction of exotic species.

Recommendation: Continue to aggressively target treatment of noxious and invasive weeds with appropriate techniques and through the most effective mechanisms.

Rationale: Current efforts to aggressively target and treat noxious and invasive weeds through an interagency partnering effort has been effective in quickly managing outbreaks or discoveries of weeds in the Spring Mountains NRA and on other federal lands in southern Nevada. Appropriate treatment techniques should be utilized, and based on the weed and the location being treated, which includes ensuring techniques are as compatible as possible with special status species and their habitats.

4.5 SPECIES AND HABITAT PROTECTION/KEY QUESTION 5

How have natural and human modification of hydrologic and stream channel systems affected key species and habitats?

Recommendation: Implement appropriate BMPs to protect water quality in the Spring Mountains NRA.

Rationale: In the potential effects matrices, land use activities were either rated as having no potential effect or having a potential effect to water quality (Chapter 5, Appendix 5F). Water quality impacts could result from soil compaction, soil erosion, pollution/littering, nutrient loading, etc. Impacts to water quality from all trail or road related activities were rated as having a potential effect for all species evaluated with the quantitative analysis. During construction, rehabilitation, and maintenance of paved and unpaved roads, trails, facilities, and other developments, appropriate BMPs should be implemented and maintained to protect water quality throughout the Spring Mountains NRA. Additional effects to spring systems are discussed in relation to springsnails (Chapter 5, Section 3.2.1) and riparian plants (Chapter 5, 3.6.5). Conservation measures were developed specific to those species.

4.6 RECREATION AND HUMAN USE/KEY QUESTION 1

How does current agency management direction from the Spring Mountains NRA enabling legislation, GMP, the Clark County MSHCP and CA, affect the availability and diversity of recreation opportunities on the Spring Mountains NRA?

Recommendation: Review the GMP and assess the need for change in its content based on the findings of this assessment and the need for consistency with these recommendations, especially the recommended revisions to the CA conservation measures.

Rationale: The GMP is almost twelve years old. Significant changes have occurred in the region during that time, including rapid and continued population growth of the Las Vegas metropolitan area and the multiple funding opportunities afforded by the Southern Nevada Public Lands Management Act. New regulations (e.g., U.S. Forest Service OHV Regulations) and legislation (Rainbow Mountain and La Madre Mountain Wilderness designations and new recreation fee authorities) have also been enacted in the interim. Inflation and allocated funding reductions for recreation operations have reduced the realistic effectiveness of traditional recreation management organizations and strategies. Consequently, some aspects of GMP direction may no longer be appropriate due to these and other changed conditions. Thus, it would be valuable to review this direction in light of the extensive information compiled for this assessment and evaluate if that direction is still current and consistent with the findings and recommendations contained herein. In particular, maintaining GMP direction that is consistent with the CA conservation measures is vital to create and implement a cohesive vision for Spring Mountains NRA management.

4.7 RECREATION AND HUMAN USE/ KEY QUESTION 2

In light of current and future recreational demands and use patterns on the Spring Mountains NRA, what potential recreation strategies would be most effective in providing for recreation opportunities while maintaining species viability?

Recommendation: Use the Adaptive Management Guidelines for recreation from the Southern California Forest Plan (formerly known as the Chavez-Wambaugh protocol) to resolve potential conflicts between recreation use and special status species (Tier 1 and Tier 2 species) and their habitats.

If initial steps fail and a recreation site is closed and decommissioned, the area should be restored to avoid continuing use. Prior to decommissioning, determine alternative recreation areas and impacts to address displaced recreational use. Monitor closures and restoration to determine successful techniques.

Rationale: The Adaptive Management Guidelines are a four-step adaptive management process for both existing areas and new recreation development proposals. This provides a methodology for resolving conflicts between recreational uses, and species and their habitat. The steps progress from education, through restrictions, and finally to closure of the site to prevent impacts. This method will involve identification of problems, assessing causes and effects, and setting priorities where using the guideline would be effective in dealing with issues.

Recommendation: Establish a desired future condition that includes a specific mix of multi-season activities as well as provides for species and ecosystem diversity that will occur at the Las Vegas Snowboard and Ski Resort following acceptance of the Master Development Plan.

Rationale: Discussions with subject matter experts have shown an increase in specialized types of ski resort-dependent recreation activities in southern California (such as mountain boarding). This trend may affect recreation use on the Spring Mountains NRA. Additionally, the Las Vegas Ski and Snowboard Resort is currently proposing to expand their operations on Spring Mountains NRA lands to better serve the growing Las Vegas market. A Draft Master Development Plan proposal has been submitted by the Las Vegas Ski and Snowboard Resort to the Forest Service, and when

the Plan is reviewed and accepted it will undergo environmental analysis under NEPA. Given the number of species, including Tier 1 and Tier 2 species, occurring in the special use permit area of the Las Vegas Ski and Snowboard Resort, it is important to decide upon a specific mix of multi-season activities that still provide for ecosystem diversity and conservation of species and their habitats in addition to an appropriate range or recreation opportunities.

Recommendation: Develop, operate, and maintain the combination of recreation services, facilities, and opportunities recommended in the Market and Financial Analysis.

1) Key recommendations for existing facilities are:

   a. Renovate and maintain existing facilities in high quality condition within the general confines of the existing recreation sites.

   b. Generally maintain existing recreation facilities at approximately the current visitor capacities, with the exception of closing Deer Creek Picnic Area.

2) Key recommendations for new East Side facilities:

   a. Develop new facilities to meet projected demand for capacity and for higher standard sites with more amenities centralized at Middle Kyle Canyon.

   b. Provide a sufficient variety and volume of facilities and opportunities to attract and retain as high a percentage of Spring Mountains NRA visitors as possible.

   c. Develop quality, complete, guest-friendly directional services to show the best locations for appropriate activities, thereby reducing inappropriate behaviors in inappropriate locations that could generate adverse effects to special status species.

   d. Utilize Middle Kyle Canyon as the hub for on-site visitor information and interpretation/education programs.

3) Key recommendations for new West Side facilities:

   a. Develop new facilities to meet projected demand for capacity; focus development in Lovell, Clark and Wheeler canyons.

   b. Maintain a more rustic, natural recreation setting in West Side facilities (relative to more highly developed East Side facilities).

Total recommended East Side capacities for both new and existing facilities are presented in Table 6.4.

Table 6-4 Estimated Quantities to Support Projected East Side Recreation Demand

Facilities	Capacities	Comments
Visitor center (VC) with bookstore	9,000 to 10,000 sq. ft.	Programming is key. Nature/wildlife theme was assumed. Estimated visitation approximately 115,000 to 120,000 total
Exterior exhibits	1,000 to 2,000 sq. ft.	Extension of VC
Indoor meeting space	Small portion of VC	Provide a small flexible space for VC needs only

Retail space with rentals	1 retail/gift/sundry as part of VC	Retail as part of VC only. Rental business not viable
Food area	Seasonal vending carts and 1 cafe	Small café in VC plus seasonal carts
Plaza areas	40,000 sq. ft.	Needed, but square footage to be determined
Landscape and play space	40,000 sq. ft.	Play areas including water where children have numerous activities and tactile experiences preferred
Group picnic sites	1	1 group site for 50 people (replaces Cathedral Rock and Foxtail group picnic areas)
Commons	4.25 acres	Needed, but square footage to be determined
Parking	TBD	
Picnic sites-individual/extended family	55-65 at MKC, 170-190 across east side	Demand exists for 170-190 across the entire Spring Mountains NRA east side by 2015
Picnic sites-group	1	Complements individual facilities, replaces Cathedral Rock and Foxtail picnic areas
Campground-individual RV/tent	150 at MKC, 240-260 across east side	Demand exists for 240-260 sites across the Spring Mountains NRA east side area by the end of the analysis period. New sites should be similar to a KOA style campground
Campground-small group RV/tent	1-2	Demand for small group camping is limited, but one or two small group campsites should be included to replace Mahogany Grove campground
Campground-large group	None	Limited demand for large group camping
Campground-equestrian	10-15 sites	Equestrian campground ideally located near Blue Tree trail system
Rim Trail w/overlook, Canyon Trail/trailhead, hiking trails/trailhead, mountain bike trails/north of SR 157, mountain bike trails/south of Canyon	Hiking 109 miles, equestrian 65 miles, mountain biking 33 miles	Development of trails is a critical component of this scenario. Trails should be designed to accommodate varying skill levels. Market supportable trail mileage is as follows: hiking 109 miles, equestrian 65 miles, mountain biking 33 miles

Source: Pricewaterhouse Coopers, 2008a and b
Note: Capacities include both existing and new facilities.

Total recommended West Side recreation facility capacities are presented in Table 6.5.

Table 6-5 Estimated Quantities to Support Projected West Side Recreation Demand

Facility	Location	Units	Unit Measure
Developed campground	Lovell Rd. corridor	70	campsites
	Clark/Wheeler	20	campsites
Picnic area	incidental to trailheads	0	
Non-motorized trailhead	Upper Lovell (under construction)	10	vehicles
	Clark/Wheeler	50	vehicles
Motorized trailhead	Lovell Rd. corridor	50	vehicles
	Clark/Wheeler	50	vehicles
	Cold Creek	40	vehicles
High mile trails	Upper Lovell (planned)	9.7	miles
	Clark/Wheeler	15	miles
Motorized trails	West Side (some BLM)	106	miles

Source: USDA Forest Service, 2008
Note: As of the time of this writing, none of these developed recreation facilities are in use. The Upper Lovell trailhead and associated trail are currently under construction

Recommendation: Conduct monitoring and evaluation (refer to Data Gaps section in this chapter) to determine whether or not these capacities meet future recreation demand.

Rationale: As discussed in Chapter 5, Section 2.2.6.3 and Section 2.2.6.4, Pricewaterhouse Coopers evaluated specific visitor capacity options. Estimated quantities to support future visitor demand are found in Chapter 5, Table 5-3, 5-4, and 5-5. These recommendations focus on a development scale that allows for expansion and enhancement of day use activities and the beginning of a transition of day-use demand

from the Upper Kyle Canyon down to the Middle Kyle Canyon. Once Middle Kyle Canyon facilities are developed, demand projections for the next ten years indicate that there would then be surplus capacity. Deer Creek generates no revenues, has older, deteriorating facilities, and generally is difficult to manage, making it a logical choice for capacity reduction. For the west side, facilities would be focused in Lovell and Clark/Wheeler canyons to accommodate demand in an efficient and cost effective manner. Since Pricewaterhouse Coopers' future demand estimates were conservative and based on the need to manage for financially sustainable recreation facilities, it is possible that future demand has been underestimated. As a result it will be important to monitor for quantitative increases or qualitative changes in recreation demand.

Recommendation: Given limited resources, employ the applicable Humboldt-Toiyabe Recreation Niches to focus Spring Mountains NRA recreation management on providing those most valuable outdoor recreation opportunities.

Rationale: Analysis of future recreation demand indicates that there are some activities that occur on the Spring Mountains NRA that are not available on other public lands in southern Nevada. These include opportunities for snow play, downhill skiing, snowboarding, and firewood cutting. Additionally, the Spring Mountains NRA GMP amendment indicates the Spring Mountains NRA should be managed to maintain traditional activities.

Recognizing that no National Forest has the means or abilities to provide all potential services to all potential recreation visitors, the Forest Service Recreation Facility Analysis process directs each National Forest to define its recreation niche in order to help direct limited funding and resources to the most important opportunities, facilities, and programs. The vast size and diversity of the Humboldt-Toiyabe National Forest create the need to establish three sub-niches to refine the general forest-wide niche. Key points from the primary Humboldt-Toiyabe niche, entitled **Islands in the Sky**, are:

- "The steep green mountains of the Humboldt-Toiyabe National Forest provide critical water, wildlife habitat, 'relief from heat', and 'accessible isolation' for visitors and valley residents."

- "Offering extraordinary views, the mountain peaks also serve as the scenic backdrop for the state."

Key points from the sub-niche that apply to the Spring Mountains NRA, entitled **Urban Backyard**, *Vegas Strip*, are:

- **Settings, Special Places, and Values** – "Intense use stems from the neighboring Las Vegas and Reno. Easy access for these bordering urban centers is provided along the eastern Sierra and the eastern NRA. Social interaction and solitude are both possible in this scenic setting."

- "Transition to traditional forest, home to many species, some endemic to the area."

- **Activities/Opportunities** – "The Forest's four-season recreation opportunities, particularly snow-based, are unique within the State of Nevada. The extensive trail system provides short day hikes from urban areas as well as remote long distance

'through' hikes. Scenic loop drives provide viewing of wildlife, wildflowers, natural landscapes and sweeping vistas."

- "Respite from urban life offering picnicking, alpine skiing, group day use, destination camping."

- "Dispersed snow play, day use picnicking, driving for pleasure/scenery, group day use, a visitor center."

- **Site Function/Theme** – "Facilities concentrate use, protect resources and provide visitor convenience for large numbers of urban visitors, many of whom are unfamiliar with natural settings."

- **Key Activities** – "Snow play and parking, driving for pleasure, group day use, information/education, camping, backpacking, mountain biking, group tourism."

5.0 DATA GAPS

The following section outlines data gaps that should be addressed to more fully answer the key questions. For recreation and human uses, addressing the following information needs is recommended to fill data gaps (Table 6.6). This information will be used for develop inventory and monitoring strategies for the Spring Mountain NRA.

Table 6-6 Data gaps for Recreation and Human Uses

Topic	Information Needed
Recreation Use Patterns	▪ Changing recreation use patterns ▪ Number of people/traffic counts ▪ Duration of visits (day use vs. overnight) ▪ Shift in ethnic composition of visitors ▪ Activities engaged in ▪ Where activities are occurring ▪ Use of developed sites vs. general forest/dispersed areas
Use Patterns and Resource Effects	▪ How changes in use patterns correlate to changes in resource effects ▪ Direct cause/effect relationships between quantitative or qualitative shifts in uses and resource effects ▪ Types and quantities of activities that cause noticeable changes in resource effects
Activity Level Triggers and Thresholds	▪ Establish specific triggers and thresholds of activity at a level to generate noticeable positive changes or unacceptable levels of adverse change
Effectiveness of Recreation Management Conservation Measures	▪ Monitor the effectiveness of specific recreation management conservation measures ▪ Better judge their value ▪ Better establish the precise causes of adverse effects
Effect of Management Actions on Visitors	▪ Effectiveness of management actions in eliciting the desired changes in visitor behavior ▪ Successfulness of educational messages and techniques ▪ What mediums and messages reach the target audience and do they see, understand, and feel it? ▪ If successful in reaching people, does it actually elicit the desired change in behavior? ▪ Do actions have undesired effects on visitor behavior?

Table 6-6 Data gaps for Recreation and Human Uses

Topic	Information Needed
Motor Vehicle Use Map and Designated Route Transportation System	▪ Are motorists staying on designated routes ▪ Effectiveness of route signage ▪ Effectiveness of physical closures ▪ Resource damage from unauthorized motorists ▪ Necessity of more closures ▪ Are resources benefiting in areas where motorized travel has been eliminated?
Wilderness Challenge Monitoring	▪ Locations and spread of noxious weeds ▪ Fire starts ▪ Campsite locations and conditions ▪ Visitation levels and trail encounters
Visitors to Dispersed Areas	▪ Willingness to move their activities and destinations to developed sites ▪ Willingness to pay a fee in return for more services and amenities ▪ What services or amenities might make the transition more desirable
When Recreation Sites are Decommissioned on the Spring Mountains NRA	▪ Do people remain on the Spring Mountains NRA? ▪ Do people go to other recreation sites in southern Nevada? ▪ Do people stay home or engage in some other type of recreation activity?

For biological resources, addressing the following information needs is recommended to fill data gaps (Table 6-7).

Table 6-7 Data gaps for Biological Resources

Species Groups	Information Status	Information Needed
Pyrgs/Springsnails	Very limited data	▪ Population numbers/sizes ▪ Viability and trend of populations
Butterflies	Very limited data	▪ Distribution/survey data ▪ Location of areas used for breeding, mating, and feeding ▪ Viability and trend of populations
Charleston Ant	Very limited data	▪ Distribution/survey data ▪ Basic taxonomy and life history ▪ Threats information
Bats	Limited data for some species	▪ Distribution ▪ Roost locations (lacking for some species) ▪ Foraging habitat for all species ▪ Threats to species and their habitats in the Spring Mountains NRA
Birds	Somewhat limited data	▪ Distribution/survey data ▪ Effects of threats including cause/effect relationships ▪ Population viability and trend for flammulated owl
Western Redtail Skink	Very limited data	▪ Distribution/survey data ▪ Life history information for the Spring Mountains NRA ▪ Specific threats in the Spring Mountains NRA

Table 6-7 Data gaps for Biological Resources

Species Groups	Information Status	Information Needed
Alpine/Subalpine Plants	Moderate data	▪ Documentation of occupied habitat including microsite relationships ▪ Life history of Charleston Mountain pussytoes ▪ Viability and trend of populations ▪ Effects of threats including cause/effect relationships including invasive, non-native species ▪ Pollinators
Cliffs and Steep Slopes Plants	Limited data	▪ Distribution/survey data ▪ Cause/effect relationship of particular threats such as rock climbing ▪ Viability and trend of populations ▪ Pollinators
Low Elevation Plants	Limited data	▪ Distribution/survey data ▪ Population trends ▪ Inventory and monitoring data ▪ Effects of threats to species and their habitat including role of invasive species after fire. ▪ Pollinators
Mixed Conifer Plants	Limited data for some species	▪ Distribution/survey data ▪ Habitat relationships and factors limiting distribution including microhabitats and pollinators ▪ Effect of disturbance processes including fire ▪ Life history, pollinators, populations structure and dynamics with highest priorities for Clokey's eggvetch and Clokey's milkvetch ▪ Effect of land management activities including vegetation treatments and native plant restoration
Riparian and Springs Plants	Limited data	▪ Condition and trend along with resolution of genetic relationships for moonworts ▪ Viability and trend of populations

6.0 MONITORING AND RESEARCH QUESTIONS

6.1 SPECIES AND HABITAT PROTECTION/MAINTAINING SPECIES VIABILITY

Monitoring and research questions were expanded from other efforts to develop monitoring and research questions including the Landscape Assessment, Southern Nevada Agency Partnership Science and Research Strategy (Turner et al. 2007), and Comprehensive Inventory and Monitoring Strategy. Additional questions were added for this analysis.

1. **What are the key threats and stressors and their effects on special status species, habitats of concern, and ecological systems?**

   - How are the direct and indirect threats and stressors affecting sensitive species (e.g., distribution, reproduction, etc.) and habitats of concern?

   - What are the best methods or techniques for measuring how key threats and stressors impact sensitive species, habitats of concern, and ecological systems?

   - What is the critical threshold of impact for sensitive species or habitats of concern?

- What are the key threats and stressors and their effects on sensitive species?
- How do we protect sensitive species, habitats of concern, and ecological systems from key threats and stressors?
- How do we reduce key threats and stressors to sensitive species, habitats of concern, and ecological systems?
- What are the consequences of climate change and drought on species and their habitats?
- What are the effects of concentrated uses and their overlap with species and their habitats?
- What are the direct and cumulative effects of woodcutting and gathering on species and their habitats?
- Do wild horses adversely affect the habitats of some species?
- What wildland fire suppression strategies and techniques can be used to minimize impacts?

2. How do management actions affect sensitive species, habitats of concern, and ecological systems?

- What management actions have an effect on sensitive species and habitats of concern, and how do they respond?
- What key conservation measures maintain or enhance resources or species viability?
- How does the composition (e.g., size, shape, etc.) of conservation areas influence the persistence of species and habitats of concern?
- What is the optimum or effective size of corridors such that fragmented habitats and ecological systems function properly?
- Are the benefits gained for sensitive species, habitats of concern, and ecological systems worth the cost of implementation of specific management actions?
- What could be done differently under existing management actions to improve or more effectively benefit sensitive species, habitats of concern, and ecological systems?
- How do we monitor management actions to determine whether they are effective?
- How can the effects of existing recreation developments and uses be managed to minimize effects on species and their habitats?

- How effective are efforts to manage motorized recreation (OHV) and limit other uses (outfitters and guides) to the protection and conservation of species and their habitats?

- How effective are management efforts in reducing negative effects to species dependent on caves?

- Are recreational climbing activities affecting sensitive plants in cliff areas or disrupting roosting areas for bats and other nesting species?

- Are management actions to limit effects of recreational climbing activities effective?

- Are the landscapes being managed within a range of variability that promotes resiliency for the species and their habitats? Have ecological systems been altered, therefore, affecting species and their habitats?

- Where are there opportunities for restoration and/or creation of habitat for these species? Conversely, are there specific habitats or components where impacts should be minimized or avoided?

3. What are the life history and ecology of sensitive species and the ecology of habitats of concern?

- What are the key habitat requirements and important habitat areas for sensitive species?

- What are the population structures, genetics, and dynamics of sensitive species?

- What is the current and historical distribution of sensitive species populations and habitats of concern?

- What is the status and trend of sensitive species and habitats of concern?

- What are the important resources or ecological characteristics associated with habitats of concern?

- What is the current and historical distribution of habitats of concern?

- What abiotic processes drive ecosystem function and plant, animal, and community viability?

- Where are springs, fens, and streams distributed, and what are their baseline conditions, including water quality and yield? What is the ecological status of riparian areas?

- What is the current riparian vegetation composition, structure, and pattern associated with springs, fens, and streams?

4. How does current wildland fire management affect key species and habitats compared to historical fire patterns?

- What are the consequences of wildland fire suppression?

- What are the consequences of wildland fire on species and their habitats?

- What actions can be taken to reduce wildland fire occurrences (severity) resulting in unwanted type conversion or unacceptable environmental effects?

Additional research questions related to invasive species, function of watersheds and landscapes, and management of wildland fire to sustain ecosystems is available in the Southern Nevada Agency Partnership Science and Research Strategy (Turner et al. 2007).

6.2 RECREATION AND HUMAN USES

1. **How are (recreation) use patterns changing on the Spring Mountains NRA?**

    - Numbers of people going where (traffic counts). Establish baseline use levels in key dispersed areas to better establish current use and better track future trends

    - Duration of visits (day use vs overnight)

    - Activities—what are they doing?

    - Shift in ethnic composition of visitors

    - Where are they doing it?—West Side, East Side, Cold Creek, Potosi, Wilderness; developed sites vs. general forest/dispersed areas (this would basically be NVUM data with more site specificity)

2. **How do those changes in use patterns correlate to changes in resource effects; can we establish direct cause-and-effect relationships between quantitative or qualitative shifts in uses and resource effects? If so, what are the types and quantities of activities that cause noticeable changes in resource effects, and are they positive or negative?**

3. **Can we establish specific triggers and specific thresholds of activity levels that are necessary to generate either noticeable positive changes in resource conditions or unacceptable levels of adverse changes?**

4. **Monitor the effectiveness of specific recreation management conservation measures to better judge their value and better establish the precise causes of adverse effects.**

5. **How effective are management actions in eliciting the desired changes in visitor behaviors?**

    - What educational messages and techniques are successful (both in terms of:

        a) Is it a medium and message that reaches the target audience, do they see it, understand it, feel it; and

b) Even if it is successful in reaching people, does it actually elicit the desired change in behavior? (e.g., do "Stay on the Trail" billboards keep people and their vehicles on trails?)

6. **Do certain management actions have undesired effects on visitor behavior? (e.g., do new or increased fees reduce use in those areas and displace use to other areas?) There is a need to evaluate the effectiveness of the MVUM and the implementation of a designated route transportation system.**

   - Are motorists staying on designated routes?
   - Is route signage effective?
   - Are physical closures effective?
   - Where is unauthorized motorized travel causing resource damage?
   - Where do we need more closures?
   - Are we seeing resource benefits in areas where motorized travel has been eliminated**?**

7. **Wilderness Challenge Monitoring**

   - Noxious weed locations and spread
   - Fire starts
   - Campsite locations and conditions
   - Visitation levels—trail encounters

8. **Are visitors to dispersed areas of the Spring Mountains NRA willing to move their activities and destinations to developed sites and pay a fee in return for more services and amenities? What services or amenities might make the transition more desirable?**

9. **Where do people go when we decommission recreation sites? Do they remain on the Spring Mountains NRA? Or, do they go to other recreation sites in southern Nevada? Or, do they stay home, or engage in some other type of recreation activity?**

10. **What are the market demands and trends for recreation on public lands?**

    - What is the projected increase in visitation over time?
    - What types of use will increase over time?
    - What are the likely locations of visitor use in the future?
    - What is the "niche" for each federal agency?

- Where are the opportunities for shared facilities or resources?

- What are effective recreation strategies to meet future demand and trends?

11. How can federal agencies meet recreational needs and provide quality recreational experiences without compromising resources?

- What are the use limits on the resource? Identify high and low capacity areas. What are the impacts of use limits on visitor experience?

- What are ecosystem values for residents and visitors?

- What activities pose impacts to resources or threats to resource integrity?

- How are resources disturbed across the landscape in relation to activities that may impact resources or threaten resource integrity?

- What forms of recreation are compatible with sensitive species/habitats?

- Can visitor carrying capacities for specific recreation activities in specific locations be established and justified based on correlations of use levels to thresholds of adverse impacts upon sensitive endemic species?

- What effect does fire have on recreation and the urban interface?

12. What are current visitor-use patterns and characteristics?

- What are the cultural differences and trends in hard-to-observe activities such as gathering?

- What is visitor satisfaction with Southern Nevada public land areas, including transportation, quality of experience, recreation opportunities, etc?

- What values are commonly held and what values may conflict?

- What do local and non-local visitors, tribes, adjacent property owners value about Southern Nevada public lands and what are their “special places?”

- Who is using public lands in Southern Nevada, which locations are most sought after for which uses, and what benefits do users obtain from those lands?

6.3 EDUCATION, INTERPRETATION, AND OUTREACH

1. Are our conservation education and interpretation actions effective?

- What are the methods and criteria for monitoring and evaluating the effectiveness of conservation education and interpretation programs?

- How should effectiveness monitoring be incorporated into new programs?

- What baseline parameters are needed to be able to measure the effectiveness of our actions?

- Which current conservation education efforts are effective (and ineffective) and why?

2. How are our messages best communicated?

- To what degree and in what sense do public land visitors (various audiences) value Southern Nevada public lands?

- What aspects of Southern Nevada ecosystems are most valued by residents and visitors?

- Which methodologies, tools, techniques, and strategies are effective for conservation education and interpretation for which audiences?

- How can we best target products to respond to the needs and values of our various audiences and to benefit public land resources?

- What are appropriate mechanisms for establishing and maintaining effective partnerships for conservation education and interpretation and what are key elements of successful partnerships?

3. What key messages are necessary to enhance resource stewardship in Southern Nevada?

- What are the critical components of a key message?

- What are or should be our key messages regarding cultural and natural resources, appropriate land use, responsible recreation (including OHV use), restoration, safety, and wilderness?

- What strategies and processes should be used to encourage southern Nevada participating agencies and their partners to input information into and share and reinforce key messages throughout Southern Nevada?

7.0 REFERENCES

Bureau of Land Management (BLM). 2006. Bureau of Land Management National Wild Horse and Burro Program.

Available at: http://www.wildhorseandburro.blm.gov/index.php.

Chavez, D. J. 2002. Adaptive management in outdoor recreation: serving hispanics in southern California. Western Journal of Applied Forestry 17(3): 129-133.

Forest Service Manual 2070. 2008. Forest Service Manual 2000, Zero Code 2070 – vegetation management. National Forest Resource Management, National Headquarters, Washington, DC.

Forest Service Manual 2080. 2001. Forest Service Manual 2000, Zero Code 2080 – noxious weed management. Supplement no. R4 2000-2001-1. National Forest Resource Management, Intermountain Region (Region 4), Ogden, Utah.

Humboldt-Toiyabe Recreation Niches: Recreation Facility Analysis 5-year Program of Work. Humboldt-Toiyabe National Forest. October 1, 2007.

Humboldt-Toiyabe Supplement. 2004. Forest Service Manual 2000, Chapter 2080 – noxious weed management. Supplement no. 2000-2004-1. National Forest Resource Management, Humboldt-Toiyabe National Forest (Region 4), Sparks, Nevada.

Nachlinger, J. L., and G. A. Reese. 1996. Plant community classification of the Spring Mountains National Recreation Area, Clark and Nye counties, Nevada. The Nature Conservancy, Northern Nevada office, Reno. Submitted to the U.S. Department of Agriculture, Forest Service, Humboldt-Toiyabe National Forest, Spring Mountains National Recreation Area, Las Vegas, Nevada.

PriceWaterhouse Coopers. 2008a. Preliminary market analysis for the Middle Kyle Complex located on the Spring Mountains National Recreation Area. Unpublished report submitted to the USDA Forest Service, Las Vegas, Nevada.

PriceWaterhouse Coopers. 2008b. Preliminary market analysis for the West Side of the Spring Mountains National Recreation Area. Unpublished report submitted to the USDA Forest Service, Las Vegas, Nevada.

Turner, K., A. LaVoie, R. Sharp, C. Ronning, C. Palmer, and J. M. Miller. 2007. Proceedings of the Southern Nevada Agency Partnership, Science and Research Strategy, Natural Resources Management Workshop, September 13, 2007. Unpublished report. 37 pp.

U.S. Forest Service (USFS) Intermountain Region. 1998. Conservation agreement for the Spring Mountains National Recreation Area, Clark and Nye counties, Nevada. State of Nevada Department of Conservation and Natural Resources and U.S. Fish and Wildlife Service, Pacific Region. Pp.1-H3.

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