Land Health Evaluation for the Littlefield Allotment (4843)
and the Littlefield Community Allotment (4827)

I. Introduction

The Littlefield and Littlefield Community allotments land health evaluation was conducted in accordance with directions set forth in the Washington Office (WO) Instruction Memorandum (IM) No. 98-91 and Arizona State IM No. 99-012 for implementation of Standards for Rangeland Health and Guidelines for Grazing Administration (Standards and Guidelines). Additional guidance is provided in WO IM No. 2009-007.

The purpose of Standards and Guidelines is to ensure the health of public rangelands. Present rangeland health is the result of the interaction of many factors in addition to grazing by livestock. Other contributing factors may include, but are not limited to past land uses, land use restrictions, recreation, wildlife, rights-of-way, mining, fire, weather, and insects and disease. The standards are goals for the desired condition of the biological and physical components and characteristics of rangelands, such as adequate canopy and ground cover; guidelines are management approaches, methods, and practices that are intended to achieve a standard.

Background Information

Arizona's Standards for Rangeland Health and Guidelines for Grazing Administration were developed by the BLM State Standards and Guidelines Team and the Arizona Resource Advisory Council (RAC), a state level council appointed by the Secretary of the Interior. The Secretary of the Interior approved the Standards and Guidelines in April 1997. The Decision Record, signed by the BLM State Director (April 1997) provides for full implementation of the Standards and Guidelines in all Arizona land use plans. See Appendix A for a copy of the Arizona Standards and Guidelines.

The permittee, interested publics, state agencies, and other federal agencies were encouraged to provide the BLM with allotment-specific resource data for consideration in development of this land health evaluation. This assessment was then conducted by an interdisciplinary assessment team (IAT) of resource specialists with expertise in soils, vegetation, and wildlife biology from:

- BLM
- Natural Resource Conservation Service (NRCS)
- Arizona Game and Fish Department (AGFD)
- Mohave County Extension.

The IAT was assisted by the Rangeland Resource Team (RRT), a diverse group of local residents formed and appointed under the RAC charter (see Appendix B for a list of members on both teams). The RRT may provide informal advice to the BLM Field Manager/Monument Manager regarding implementation of Standards and Guidelines, and "will have opportunities to raise any matter of concern with the resource advisory council

and ... to provide information and options to the council for their consideration" as provided for by regulations at 43 CFR 1784.6-2(a)(2)(iv)(A).

The BLM/RAC Implementation Strategy for Arizona states that the RRT's primary role is to assist BLM managers in assuring the Standards and Guidelines are consistently applied. The IAT analyzed all available information in cooperation with the RRT. Based on field observations, team members made recommendations on whether rangeland conditions were meeting, progressing toward meeting, or not meeting the Standards for Rangeland Health.

The RRT, permittees, and other interested parties were invited to attend an issue scoping meeting on January 22, 2008 and a field visit on January 13, 2009. At the conclusion of the field visit, the group that attended the allotment tour provided their opinions on the status of rangeland health in the Littlefield and Littlefield Community allotments. In February and May 2010, BLM resource staff and staff from the U.S. Fish and Wildlife Service (USFWS) made field visits to allotments within desert tortoise habitat (including these allotments) to assess resource conditions and discuss desired vegetative communities for the desert tortoise. The results of these discussions are incorporated into the desired plant community objectives developed for the allotments, as well as in making recommendations on whether resource conditions were meeting the standards for rangeland health. These recommendations on whether the standards for rangeland health are being met are detailed on pages 93-96 of this evaluation report. BLM resource specialists have made field visits to the allotment numerous times since to observe resource conditions and conduct rangeland monitoring studies. That monitoring data is included in this evaluation report, and was used to make the recommendation on whether standards are being met.

Technical recommendations from this land health evaluation will identify appropriate actions needed, which will inform the National Environmental Policy Act (NEPA) analysis, and provide the Field/Monument Managers the opportunity to consider all available information before making a final determination on achievement of standards. If the evaluation report documents that standards are not achieved in the assessment area, then the Field/Monument Managers will determine significant causal factors for non-achievement. Causal factors can include current grazing practices, historical livestock use, drought, off-highway vehicle (OHV) use, fire, recreation, etc. If existing grazing management practices or levels of grazing use on public land are significant factors, then an appropriate action will be developed and implemented in accordance with 43 CFR subpart 4180.2(c) and direction contained within WO IM No. 2009-007.

II. Allotment Profile

A. Description

The Littlefield Community Allotment is a large allotment lying south and east of Littlefield, Arizona. The northern boundary follows the Virgin Mountains, which separate the winter and summer use pastures and also form the boundary of the Paiute Wilderness. The Paiute Wilderness occurs from Elbow Canyon north to Interstate 15. The Virgin River flows along the northwestern edge of the allotment. The allotment includes the highest peak on the Arizona

Strip, Mount Bangs, which is 7,940 feet in elevation. Also contained within the allotment boundary are the Cougar Spring area, Hatchet Valley and the upper part of Tom and Cull Valley on the east side of the Virgin Mountains. The southern portion of the allotment (12,866 acres) is within Grand Canyon-Parashant National Monument (GCPNM). The Littlefield Community Allotment contains diverse plant communities, ranging from the low hot desert (Mojave Desert ecological zone) to montane chapparal (interior chapparal ecological zone), and also a few fir trees. Approximately 21,065 acres of this allotment has been burned since 1992, of which 7,631 acres are considered tortoise habitat – see map on page 113 of this evaluation report.

The Littlefield Allotment is a small allotment bordered on the north by Interstate 15, the community of Littlefield on the east, the Virgin River on the south, and Coon Wash on the west. It is bisected by Highway 91. The allotment slopes slightly toward the south and contains relatively flat topography. It is entirely Mojave Desert ecological zone. None of this allotment has burned.

Both allotments are categorized as "improve" (I) allotments, which means that one or more of the following exists:

a) Present range condition is unsatisfactory;
b) The allotments have high to moderate resource production potential and are producing at low to moderate levels;
c) Serious resource-use conflicts/controversy exists;
d) Opportunities exist for positive economic return from public investments;
e) Present management appears unsatisfactory.

B. Acreage

Littlefield Community Allotment:

- 71,854 acres of federal land
- 1,030 acres of state land
- 4,780 acres of private land

77,664 total acres

Littlefield Allotment:

- 2,097 acres of federal land
- 148 acres of state land
- 881 acres of private land

3,126 total acres

C. Permitted Use

1. Total grazing privileges

Littlefield Community
Active Grazing Use: 2,615 AUMs
Suspended Non-use: 1,722 AUMs

Littlefield
Active Grazing Use: 119 AUMs
Suspended Non-Use: 40 AUMs
(Note: an AUM, or Animal Unit Month, is a unit of measurement indicating how much forage is eaten by a cow/calf pair in one month.)

2. Season(s) of use

03/01-02/28

The Littlefield Community Allotment includes land both within and outside of desert tortoise habitat. Cattle only graze tortoise habitat during the tortoise inactive season (October 15 to March 15). Littlefield Allotment (which is completely within desert tortoise habitat) is only grazed during the tortoise inactive season. See page 5 for a description of the grazing system in these allotments.

3. Kind and class of livestock

Cow/calf

4. Percent federal range[1]

96%

D. Key Species[2]

Management of these allotments is based on a selection of key species. These species are selected for their similarity to other grasses and browse species that occur in the allotments. The definition of key species is: (1) Forage species of sufficient abundance and palatability to justify its use as an indicator to the *degree of use* of associated species; and (2) Those species which must, because of their importance, be considered in the management program. Key species for the allotments are:

Cool Season Grasses

- Indian ricegrass — *Achnatherum hymenoides* (*Oryzopsis hymenoides)*
- Muttongrass — *Poa fendleriana*

Warm Season Grasses

- Sand dropseed — *Sporobolus* spp.
- Big galleta — *Hilaria rigida*

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[1] The percentage of public land use determined by the proportion of livestock forage available on public lands within each allotment compared to the total amount available from public lands, state land, and those owned or controlled by the permittee or lessee.
[2] A complete list of species (common and scientific names) included in this assessment can be found in Section VIII.

Browse

- White bursage — *Ambrosia dumosa*
- Blackbrush — *Coleogyne ramosissima*
- Mormon tea — *Ephedra* spp.
- Serviceberry — *Amelanchier utahensis*
- Buckbrush — *Ceonothus*
- Cliffrose — *Purshia mexicana*
- Birchleaf mahogany — *Cercocarpus montanus*
- Sagebrush — *Artemisia tridentata*
- Winterfat — *Krascheninnikovia lanata*
- Ratany — *Krameria parvifolia*

The above listed key species are all important to wildlife and cattle for forage, cover, and watershed protection. These species are all native to the subject ecological sites, and add to the biodiversity of the region.

E. Grazing System

Desert tortoise habitat requirements dictate the grazing management in these allotments. Cattle graze the west slopes and foothills of the Virgin Mountains, in tortoise habitat (both allotments), from October 16 to March 14. Cattle are removed from tortoise habitat from March 15 to October 15, with many taken to ranges in Utah, leaving only a fraction of the total in the summer to graze in the Virgin Mountains and in Hatchet and Tom and Cull Valleys (Littlefield Community Allotment – Littlefield Allotment is completely within tortoise habitat, so all livestock are removed by March 15). The cattle that remain are moved around in the high country pastures to accommodate vegetation regrowth in those areas being rested.

F. Biological Resources

1. Special Status Species

Threatened, Endangered, and Candidate Species

There are no listed or candidate plant species, or habitat for any listed plant species, on these allotments. The following threatened and endangered animal species may occur within the Littlefield and/or Littlefield Community allotments, or may be affected by grazing within the allotments.

- California condor *(Gymnogyps californianus)* – endangered (experimental nonessential population)
- Southwestern willow flycatcher (*Empidonax traillii extimus*) – endangered + critical habitat
- Yuma clapper rail (*Rallus longirostris yumanensis*) – endangered
- Mexican spotted owl (Strix occidentalis lucida) – threatened
- Mojave Desert tortoise (*Gopherus agassizii*) – threatened + critical habitat

- Woundfin (*Plagopterus argentissimus*) – endangered + critical habitat
- Virgin River chub (*Gila seminuda*) – endangered + critical habitat

See Section IV.B.7 of this assessment report for a detailed discussion of these species.

BLM Sensitive Species and Migratory Birds

Sensitive species are usually rare within at least a portion of their range. Many are protected under certain State and/or Federal laws. Species designated as sensitive by the BLM must be native species found on BLM-administered lands for which the BLM has the capability to significantly affect the conservation status of the species through management, and either:

1. There is information that a species has recently undergone, is undergoing, or is predicted to undergo a downward trend such that the viability of the species or a distinct population segment of the species is at risk across all or a significant portion of the species range; or

2. The species depends on ecological refugia or specialized or unique habitats on BLM-administered lands, and there is evidence that such areas are threatened with alteration such that the continued viability of the species in that area would be at risk."

All federally-designated candidate species, proposed species, and delisted species in the 5 years following delisting are included as BLM sensitive species. Table 1 lists the sensitive animal species that may occur within these allotments.

Table 1. Sensitive Species Associated with the Littlefield and Littlefield Community Allotments

Species	Littlefield	Littlefield Community
Bald eagle (*Haliaeetus leucocephalus*)	potential	potential*
Golden eagle (*Aquila chrysaetos*)	potential	verified
American peregrine falcon (*Falco peregrinus*)	potential	verified
Ferruginous hawk (*Buteo regalis*)	verified	verified
Western burrowing owl (*Athene cunicularia hypugea*)	potential	potential
Yellow-billed cuckoo (*Coccyzus americanus*)	potential	verified
Pinyon jay (*Gymnorhinus cyanocephalus*)	no potential	verified

Species	Littlefield	Littlefield Community
Northern goshawk (*Accipiter gentilis*)	no potential	potential
Spotted bat (*Euderma maculatum*)	verified	verified
California leaf-nosed bat (*Macrotus californicus*)	verified	verified
Townsend's big-eared bat (*Corynorhinus townsendii pallescens*)	verified	verified
Allen's big-eared bat (*Idionycteris phyllotis*)	verified	verified
Relict leopard frog (*Rana onca*)	potential	potential
Desert sucker (*Catostomus clarki*)	verified	verified
Flannelmouth sucker (*Catostomus latippinus*)	verified	verified
Speckled dace (*Rhinichthys osculus*)	verified	verified
Virgin spinedace (*Lepidomeda mollispinis mollispinis*)	verified	verified

* "Potential to occur" means that suitable habitat exists, but species presence has not been verified.

Executive Order 13186 requires the BLM and other Federal agencies to work with the USFWS to provide protection for migratory birds. These species are protected by legislation and it is important to maintain habitat for these species so migratory patterns are not disrupted. All migratory birds are protected under the 1918 Migratory Bird Treaty Act (16 USC 703-712), which prohibits the taking of any migratory birds, their parts, nests, or eggs unless specifically permitted by regulation. Additional protection is provided by the Neotropical Migratory Bird Conservation Act of 2000 (16 USC Chapter 80).

Bald and golden eagles are protected by the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c). This law, enacted in 1940, and amended several times since then, provides for the protection of bald and golden eagles by prohibiting, except under certain specified conditions, the taking, possession and commerce (selling, purchasing, bartering, transporting, importing, or exporting) of such birds including their parts, nests, or eggs. "Take" includes "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb."

2. Other Wildlife Species

The Littlefield Community and Littlefield allotments are in AGFD's Game Management Unit (GMU) 13B. Desert bighorn sheep (*Ovis canadensis nelsoni*)

habitat is present throughout the Virgin Mountains portion of the Littlefield Community Allotment. Bighorn were believed to have been extirpated from the Arizona Strip around the turn of the 20th century. In a cooperative effort between the BLM and AGFD beginning in 1979, bighorn sheep were reintroduced into suitable habitat areas, including the Virgin River Gorge. These reintroduction efforts and successful reproduction have resulted in a gradual increase in the population. Limited hunting occurs on an annual basis.

Mule deer (*Odocoileus hemionus*) habitat is considered yearlong, summer, and summer crucial in approximately the eastern half of the Littlefield Community Allotment. The western portion of Littlefield Community and the Littlefield Allotment are considered limited habitat for mule deer. Big game annual count data for GMU 13B can be found in Appendix F.

A variety of other wildlife species are present on the allotments, including small mammals (such as desert cottontail rabbits), birds (including raptors, songbirds, and quail), and reptiles. Predators include coyotes, bobcats, and mountain lions. The non-native and invasive European pig (*Sus scrofa*) is known to occur in the Littlefield Community Allotment. Signs of black bear (*Ursus americanus*) have been reported from the east side of Mount Bangs but are not common.

G. Recreation Resources

General Management: The Littlefield and Littlefield Community allotments' recreation values derive from their geology, scenic viewsheds, and history. General recreation activities that occur in these allotments include sightseeing, ATV riding, hiking, river rafting and floating, horseback riding, camping, hunting, rock collecting, photography, bird watching and nature study.

Recreational Settings: These allotments are primarily managed as part of the Arizona Strip Field Office Extensive Recreation Management Area (ERMA), except adjacent to the Virgin River where the Virgin River Special Recreation Management Area (SRMA) occurs and on the southern portion of the Littlefield Community Allotment (in the Virgin Mountains outside designated wilderness) where the Virgin Ridge SRMA and the Parashant SRMA occur. ERMAs receive only custodial management regarding visitor health and safety, user conflict and resource protection issues, with no activity level planning. In the ERMA, regulation of visitor use would occur only when monitoring indicates a trend towards unacceptable change to desired recreational settings brought about by such use.

The primary strategy for the Virgin River SRMA is to target a demonstrated destination recreation-tourism market demand from mainly local community residents and regional visitors for day-use and overnight hiking, family outings, rock climbing, school group field outings, and white water activities. Similarly, there is market demand from local, regional, and national visitors for sightseeing, appreciation of geologic resources, rest from travel and escaping the cold winter

weather of other locations. This demand is supported by the area's distinctive location along high traffic volume Interstate Highway 15, its place in the Grand Canyon-like landscape of Virgin River Gorge, and ease of access for day and overnight recreation. National, regional, and local recreation-tourism visitors value these public lands as recreation-tourism destinations. Within this SRMA, the Virgin River Recreation Management Zone (RMZ) is managed for group-oriented white-water and climbing adventures amidst rugged and stunning geologic features.

The primary strategy for the Virgin Ridge SRMA is to target a demonstrated community recreation-tourism market demand from primarily local communities (dependent on public lands recreation and/or related tourism use, growth, and/or development), as well as some other regional visitors, for motorized/mechanized/ non-mechanized exploring, world-class rock climbing, and guided touring in close-to-town natural settings. This demand is supported by the area's distinctive landscape, its close proximity to the rapidly growing communities of Mesquite, Bunkerville, Logandale, and Overton, Nevada and Beaver Dam, Scenic and Littlefield, Arizona. Local recreation-tourism visitors value these public lands as their own 'back-yard' recreation settings. Within the Virgin Ridge SRMA is the Virgin Ridge RMZ, managed for self-directed, rugged, adventure in a natural setting close to town with opportunities for scenic natural and historic appreciation. Activities in this RMZ could include hiking, scrambling, equestrian, hunting, OHV exploring, mountain bike riding.

That portion of the Littlefield Community Allotment within GCPNM is in the Parashant SRMA and the Shivwitz Frontier RMZ. The primary strategy for the Parashant SRMA is to target a demonstrated undeveloped recreation-tourism market demand from local community and regional/national visitors for trophy hunting opportunities, guided backcountry tours, hiking, viewing and appreciating wildland landscapes and cultural sites, canyoneering and motorized/mechanized/non-mechanized exploring. This demand is supported by the area's distinctive remote, rugged landscape; its proximity to the Grand Canyon; its vast size; and the largely open and undeveloped character of its recreation settings. Regional and local recreation-tourism visitors value this area for the distinctive kinds of dispersed recreation it produces.

The Shivwits Frontier RMZ is managed for sustainable access for scenic, natural, open-space appreciation, and exploration recreation adventure somewhat close to nearby communities.

The allotments contain portions of three Travel Management Areas (TMAs): Rural, Specialized, and Primitive. TMAs describe areas delineated for varying types of access. The Rural TMA provides for the widest variety of motorized, non-motorized, and mechanical travel modes to serve existing and future recreational, traditional, casual, commercial, educational, and private needs adjacent to communities, but not to the detriment or exclusion of the protection of resources. The Specialized TMA provides for a variety of motorized, non-motorized, and mechanical travel modes to

serve existing and future recreational, traditional, casual, commercial, and private needs in remote, rustic settings, also not to the detriment or exclusion of the protection of resources. It is characterized by low to moderate densities of improved roads and primitive roads. In the Primitive TMA, high quality recreation opportunities associated with more primitive recreation experience opportunities and non-motorized uses such as camping, sightseeing, hiking, horseback riding, and hunting, will be maintained/ enhanced, provided they will be compatible with the protection and enhancement of sensitive resource values, where appropriate.

Off Highway Vehicles (OHV): The OHV area designations for these allotments are "limited to designated roads and trails" outside designated wilderness and "closed" to OHV use within designated wilderness.

Trails: The main route of the Old Spanish National Historic Trail, a stock trail from southern California missions to Santa Fe, New Mexico, crosses through both allotments from northeast to southwest. Intact segments of this historic trail have been located and documented in the Littlefield Community Allotment and may exist in the Littlefield Allotment. Other historic trails that cross these allotments include the Arrowhead Highway (an early automobile highway) and the Jedediah Smith Trail.

Wilderness Characteristics: There are 15,104 acres managed to maintain wilderness characteristics on the southern end of the Littlefield Community Allotment, on the Virgin Mountain peaks adjacent to GCPNM.

H. Special Designations

1. Designated Wilderness

The Paiute Wilderness is located in the eastern portion of the Littlefield Community Allotment. There are 32,518 acres of designated wilderness within this allotment.

2. Wild & Scenic Rivers

The Virgin River is the boundary between the two allotments. This segment of the river is recommended suitable for recreational values as a wild and scenic river. Several public access points to the river exist within each allotment.

3. Areas of Critical Concern (ACECs)

The Virgin Slope and Virgin River Corridor ACECs are located within and adjacent to the Littlefield Community Allotment. The Virgin Slope ACEC was designated to protect the threatened desert tortoise and Mojave Desert Ecological Zone values (to incorporate areas of this species' critical habitat). The Virgin River Corridor ACEC was designated to protect endangered fish and riparian values. The extreme southern end (and southwestern portion) of the Littlefield Allotment includes the Virgin River Corridor ACEC.

4. National Monuments

The southern portion of the Littlefield Community Allotment is within GCPNM, designated by presidential proclamation in 2000. The purpose of this monument is to conserve, protect and preserve a vast array of outstanding "objects" (i.e., resources) for the benefit of current and future generations. These objects include a variety of scientific, biological, hydrological, and geological resources and a long and rich human history, which have been preserved by remoteness and limited travel corridors, with a sense of solitude, remoteness, and an unspoiled character (Presidential Proclamation No. 7265, 2000).

III. Management Objectives

1. Land Use Plan Objectives

Arizona Strip Field Office Resource Management Plan (RMP))(BLM 2008a)
and
Grand Canyon – Parashant National Monument RMP)(BLM 2008b)[3]

Objectives are labeled according to the applicable resource or resource use and sequentially numbered in the RMP. Listed here are the Desired Future Condition (DFC) decisions that will be assessed in this document. The codes for the objectives are as follows:

RP= Riparian Ecological Zone	WF=Wildlife and Fisheries	WM=Designated Wilderness
WS=Air, Water and Soils	TE=Special Status Species	WC=Wilderness Characteristics
GM=Livestock Grazing	VM=Vegetation	WR=Wild & Scenic Rivers
	RR=Recreation Resources	

Water

DFC-RP-06
All surface water will meet, or be improving towards, Arizona State water quality standards.

DFC-WS-03
Surface water availability at seeps and springs will be appropriate for the soil type, climate, and landform.

Soil Stability

DFC-VM-03/**DFC-VM-04** (Vegetation – All Ecological Zones)
Vegetative communities will provide sufficient plant cover and litter accumulation to protect soils from wind and water erosion and enhance nutrient cycling and productivity, even during drought years.

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[3] Text in **BOLD** type are differences in the GCPNM objectives from those in the Arizona Strip Field Office RMP.

DFC-WS-06
The natural hydrologic functions of all watersheds will be intact.

DFC-WS-07
Soils will exhibit infiltration, permeability, and erosion rates appropriate for the soil type, climate, and landform.

DFC-WS-08
Physical soil crusts will show an increase in organic cover including cryptobiotic colonies, moving them towards being organic crusts.

Ecological Processes

DFC-VM-04/**DFC-VM-05** (Vegetation – All Ecological Zones)
Ecological processes and functions will be protected, enhanced, and/or restored by allowing tools that are necessary and appropriate to mitigate adverse impacts of allowable uses and undesirable disturbances, and contribute to meeting the Standards for Rangeland Health … **and enhance Monument values**.

DFC-RP-03
Ecological functions and processes will be intact with vegetative species composition and cover appropriate to the site.

DFC-WS-04
Ecological functions and processes will be intact at all seeps and springs.

DFC-WF-01
Ecological conditions will be within the range of natural variability and will be functional for dependant animal species.

DFC-WF-11/**DFC-WF-12**
The natural biological diversity of fish, wildlife, and plant species will be maintained or, where necessary and feasible, restored throughout the Arizona Strip FO (**Monument)**. Habitats will be managed on an ecosystem basis, ensuring that all parts of the ecosystem and natural processes are functional.

Invasive Plants

DFC-VM-05/**DFC-VM-06** (Vegetation – All Ecological Zones)
Invasive plant species will be contained, controlled, or eliminated and native species restored to meet desired plant community (DPC) objectives.

DFC-RP-11
Invasive plants and animals such as tamarisk, Russian olive, and brown-headed cowbird will be reduced or eliminated.

DFC-VM-34/**DFC-VM-38** (Vegetation – Mojave-Great Basin Transition Ecological Zone)
Management of Mohave-Great Basin Transition Ecological Zone plant communities will focus on removing invasive non-native plants, especially cheatgrass, Sahara mustard, and red brome, and preventing habitat degradation due to wildfire.

No Net Loss

DFC-VM-28/**DFC-VM-32** (Vegetation – Mojave Desert Ecological Zone)
There will be no net loss of acres of Mohave Desert plant communities (i.e., long-term or permanent removal from the landscape). A no net loss objective will not preclude restoration, rehabilitation, or related management actions.

DFC-VM-15 (Vegetation – Great Basin Ecological Zone – Sagebrush Communities)
There will be no net loss of total acres within sagebrush communities (i.e., long-term or permanent removal from the landscape). A no net loss objective will not preclude restoration, rehabilitation, or related management actions.

DFC-VM-33/**DFC-VM-37** (Vegetation – Mojave-Great Basin Transition Ecological Zone)
There will be no net loss in acres of Transition plant communities (i.e., long-term or permanent removal from the landscape). A no net loss objective will not preclude restoration, rehabilitation, or related management actions.

DFC-VM-42 (Vegetation – Interior Chaparral Ecological Zone)
There will be no net loss of acres of Interior Chaparral plant communities (i.e., long-term or permanent removal from the landscape). A no net loss objective will not preclude restoration, rehabilitation, or related management actions.

Livestock Grazing

DFC-GM-02
Livestock use and associated management practices will be conducted in a manner consistent with other resource needs and objectives to ensure that the health of rangeland resources is preserved or improved so that they are productive for all rangeland values. Where needed, public rangeland ecosystems will be improved to meet objectives.

DFC-GM-04
Monument values will be maintained, protected, and improved.

Desired Plant Community

DFC-GM-01
Healthy, sustainable rangeland ecosystems will be maintained or improved to meet Arizona's Standards for Rangeland Health, and produce a wide range of public values such as wildlife habitat, livestock forage, recreation opportunities, clean water, and functional watersheds.

DFC-VM-02/**DFC-VM-03** (Vegetation – All Ecological Zones)
Native vegetative communities will be protected. A mosaic of native perennial and non-invasive annual vegetative communities will be present across the landscape with diversity of species, canopy, density, and age class reflecting its local ecological site potential and naturally occurring habitat conditions.

DFC-VM-14 (Vegetation – Great Basin Ecological Zone – Sagebrush Communities) Sagebrush (primarily *Artemisia tridentata*) communities will consist of a healthy, diverse mosaic of different height and age structures with a thriving community of native grasses and forbs. Mosaics may include stands of young and old sagebrush, openings (ranging from bare ground to short or sparse vegetation to high-density grasslands), wet meadows, seeps, healthy streamside (riparian) vegetation, and other interspersed shrub and woodland habitats.

DFC-VM-18 (Vegetation – Great Basin Ecological Zone – Sagebrush Communities) Existing stands of sagebrush will have a balance between shrub and perennial grass cover, for open to moderate shrub canopy cover (5 to 25%), and multiple height classes. This mosaic will include young, sparse stands to support Vesper sparrows and lark sparrows, and older, dense stands to benefit Brewer's sparrows, sage sparrows, black-throated sparrows, gray flycatchers, and sage thrashers.

DFC-VM-19 (Vegetation – Great Basin Ecological Zone – Sagebrush Communities) Sagebrush communities will include small, grassy openings to support long-billed curlews and burrowing owls.

DFC-VM-20 (Vegetation – Great Basin Ecological Zone – Sagebrush Communities) Sagebrush communities will include large, continuous blocks (≥300 acres) of unfragmented sagebrush habitat, including mosaics of open to moderate shrub canopy cover (5 to 25%) and multiple age and height classes to benefit sage-dependent species.

DFC-VM-21 (Vegetation – Great Basin Ecological Zone – Sagebrush Communities) Sagebrush communities will include openings of short vegetation surrounded by sagebrush for ground foraging by sage thrashers, loggerhead shrikes, Brewer's sparrows, and sage sparrows.

DFC-VM-22 (Vegetation – Great Basin Ecological Zone – Sagebrush Communities) Sagebrush communities will include openings of short vegetation (2 to 8 in.) with wide visibility to provide breeding habitat for long-billed curlews, and burrowing owls.

DFC-VM-23 (Vegetation – Great Basin Ecological Zone – Sagebrush Communities) Sagebrush communities will include native grass and forb cover in balance with open to moderate (5 to 25%) shrub canopy cover and within ecological site potential. Perennial grass components will be at or above 10%. Native forb composition will be at or above 5%.

DFC-VM-25 (Vegetation – Great Basin Ecological Zone – Pinyon-Juniper Communities)
Healthy, diverse woodland communities will consist of a mosaic of trees, shrubs, grasses, and forbs. Mosaic patches can include stands of young and old pinyon-juniper, openings, wet meadows, seeps, and other interspersed shrub habitats. The communities will be composed of a variety of different height structures and age classes, with a thriving understory community of native grasses, forbs, and shrubs.

DFC-VM-28 (Vegetation – Great Basin Ecological Zone – Pinyon-Juniper Communities)
Stands of pinyon-juniper will include a balance between tree, shrub, and perennial grass cover to support pinyon jay and mule deer. This mosaic will include stands of old growth pinyon-juniper to support juniper titmouse; large openings of grasses, forbs and shrubs to support mule deer and provide foraging habitat for raptors such as sharp-shinned hawk, northern goshawk, Coopers hawk, American kestrel, and red-tailed hawk; and areas of sparse to dense tree canopy cover to support pinyon jay.

DFC-VM-26 (Vegetation – Mojave Desert Ecological Zone)
Endemic plant species and associated communities such as creosote bush, Joshua tree, Mojave yucca and cacti, will be present along with other shrubs, grasses, and wildflowers. These communities can include stands of young and old shrubs, sparse vegetation, scattered to larger expanses of creosote bush or Joshua trees, seeps, healthy streamside vegetation, and other interspersed grassland and shrub habitats.

DFC-VM-30/**DFC-VM-34** (Vegetation – Mojave-Great Basin Transition Ecological Zone)
Endemic plant species and associated communities such as black brush, Joshua tree, Mojave yucca, and cacti will be present along with other shrubs, grasses, and wildflowers. These communities can include stands of young and old shrubs, sparse vegetation, scattered to larger expanses of black brush to various mixes of black brush, Joshua trees, pinyon-juniper, yucca, and shrub habitats.

DFC-VM-32/**DFC-VM-36** (Vegetation – Mojave-Great Basin Transition Ecological Zone)
Priority plant species and associated communities such as black brush, Joshua tree, Mojave yucca, and cacti will be present along with other shrubs, grasses, and wildflowers. These communities can include stands of young and old shrubs, sparse vegetation, scattered to larger expanses of black brush to various mixes of black brush, Joshua trees, pinyon-juniper, yucca, and shrub habitats.

DFC-VM-39 (Vegetation – Interior Chaparral Ecological Zone)
The Interior Chaparral Ecological Zone will consist of diverse populations of endemic vegetative species, particularly shrubs, and a mosaic of age class distributions of these species.

DFC-VM-40 (Vegetation – Interior Chaparral Ecological Zone)
Endemic plant species and associated communities such as manzanita, silk tassel, and live oak will be present, along with other shrubs, grasses, and forbs.

DFC-RP-01
Riparian areas will consist of a diversity of vertical and horizontal structures, vegetative age classes, and endemic species.

DFC-WF-16/**DFC-WF-17**
Mule deer habitat in pinyon-juniper woodland sites will include a healthy diverse mosaic of trees, shrubs, grasses, and forbs.

Riparian

DFC-RP-02
Riparian areas will be protected, enhanced, and/or restored by allowing tools that are necessary and appropriate to mitigate adverse impacts of allowable uses and undesirable disturbances, and contribute to meeting the Arizona Standards for Rangeland Health.

DFC-RP-04
Where sites have the potential for overstory vegetation, the canopy cover of overstory and understory vegetation will be at or approaching maximum density.

DFC-RP-05
All riparian areas will be in, or moving towards, proper functioning condition.

DFC-RP-07
Flowing water systems will provide contiguous water and associated riparian vegetative cover, where possible.

DFC-RP-08
Availability of surface water at seeps and springs will be appropriate for the soil type, climate, and landform and will support a diverse population of endemic plant and wildlife species.

DFC-RP-10
Riparian communities will provide habitat for common species such as rush, cottonwood, willow, and yellow-breasted chat, as well as rare species such as southwestern willow (SW) flycatcher, common black hawk, Lucy's warbler, and speckled dace where consistent with site potential.

DFC-WS-05
Flowing water systems will provide continuous flowing water and associated riparian vegetative cover, where possible.

DFC-TE-15/DFC-TE-19
Essential habitats, important migration routes, required flows, and water quality will be protected and maintained in lentic and lotic systems in the Arizona Strip FO.

DFC-TE-28
Riparian areas will be in proper functioning condition and be of sufficient quantity and quality to provide adequate foraging areas for bald eagles, peregrine falcon, common black hawk, and other special status raptors.

DFC-TE-35
Riparian areas will be in proper functioning condition and be of sufficient quantity and quality to provide adequate foraging areas for SW flycatcher, Yuma clapper rail, yellow-billed cuckoo, and other special status birds.

DFC-TE-37
Riparian areas that can physically support SW flycatcher habitats due to floodplain width and gradient will attain the vegetation structure, plant species diversity, density, and canopy cover to be suitable habitat.

DFC-TE-38
Riparian vegetation will be sufficiently dense and structurally complex to minimize or eliminate the effects of SW flycatcher predators and preclude brown-headed cowbirds from finding SW flycatcher nests.

DFC-TE-39
Cattail and dense marsh habitats will be abundant and provide habitat for Yuma clapper rails.

DFC-TE-40
Cottonwood gallery forests will be abundant and provide habitat for yellow-billed cuckoos.

DFC-TE-41
Potential roosting and nesting sites for riparian dependent special status birds will be abundant.

Wildlife Habitat

DFC-VM-31/**DFC-VM-35** (Vegetation – Mojave-Great Basin Transition Ecological Zone)
Endemic animal species such as desert tortoise, chuckwalla, and desert bighorn sheep will be present and thriving with more than adequate food, water, and cover resources.

DFC-VM-41 (Vegetation – Interior Chaparral Ecological Zone)
Endemic animal species such as black-chinned sparrow and mule deer will be present and thriving with more than adequate food, water, and cover resources.

DFC-WF-02
Native wildlife communities will be protected. A complete range of diverse, healthy, and self-sustaining populations of native animal species will occupy all available suitable habitats.

Habitat Connectivity

DFC-WF-06
Habitat connectivity and wildlife movement between ecological zones will be maintained.

DFC-TE-14
Habitat connectivity will be maintained, providing sufficiently frequent contact between tortoises to maintain genetic diversity.

Wildlife Forage Needs

DFC-WF-14/**DFC-WF-15**
Forage in crucial summer mule deer habitat will include at least 10% grasses and forbs composition by weight (CBW) and at least 30% palatable browse species CBW at all key areas, where consistent with site potential.

DFC-WF-29/**DFC-WF-30**
Forage in desert bighorn sheep habitat areas will include at least 20% grasses, 20% forbs, and 20% palatable shrub species CBW, where consistent with site potential.

Fences

DFC-WF-05
Fences will be the minimum necessary for effective livestock control or other administrative purposes. Fences will be wildlife passable, consistent with the species found in the area.

DFC-WF-19/**DFC-WF-20**
All fences in mule deer habitat will be deer passable.

Healthy Wildlife Populations

DFC-WF-03
Forage, water, cover, and space will be available to wildlife of sufficient quantity and quality to support productive and diverse wildlife populations.

DFC-WF-12/**DFC-WF-13**
Mule deer habitat will provide the necessary forage, water, and shelter components for healthy, self-sustaining populations within the range of natural variability.

DFC-WF-27/**DFC-WF-28**
Desert bighorn habitat will provide the necessary forage, water, and shelter components for healthy, self-sustaining populations within the range of natural variability.

DFC-WF-34/**DFC-WF-35**
Desert cottontail habitat will provide the necessary forage, water, and shelter components for healthy, self-sustaining populations within the range of natural variability.

DFC-WF-36/**DFC-WF-37**
Migratory bird habitats will provide the necessary forage, water, and shelter components for healthy, self-sustaining populations within the range of natural variability.

DFC-WF-44/**DFC-WF-45**
Carnivore habitat will provide the necessary forage, water, and shelter components for healthy, self-sustaining populations within the range of natural variability.

Wildlife Population Numbers

DFC-WF-13/**DFC-WF-14**
Mule deer populations will be at or near maximum levels sustainable for the habitat.

DFC-WF-28/**DFC-WF-29**
Desert bighorn sheep populations will be at or near maximum levels sustainable for the habitat.

DFC-WF-35/**DFC-WF-36**
Desert cottontail rabbits will be present in sufficient quantity to provide an adequate prey base for raptors, carnivores, and other predatory species, as well as ample recreational opportunities for hunting and wildlife viewing.

DFC-WF-37/**DFC-WF-38**
Migratory birds that nest in the Arizona Strip FO/**Monument** will have resources of sufficient quantity and quality to provide for nesting sites and to fledge young successfully.

Wildlife Waters

DFC-WF-04
All waters will be safely accessible to wildlife.

DFC-WF-17/**DFC-WF-18**
Water sources within mule deer habitat will be safely accessible to deer and other wildlife.

DFC-WF-18/**DFC-WF-19**
Water sources within mule deer habitat will be spaced no more than 3 miles apart.

DFC-WF-30/**DFC-WF-31**
Water sources within bighorn sheep habitat areas will be safely accessible to bighorn and other wildlife.

DFC-WF-31/**DFC-WF-32**
Water sources within bighorn sheep habitat will be spaced no more than 4 miles apart.

DFC-WF-42/**DFC-WF-43**
Water sources within game bird habitats will be safely accessible by all wildlife.

DFC-RP-09
A sufficient quantity of water with safe access for wildlife will be available, where appropriate.

Special Status Species Habitat

DFC-VM-27 (Vegetation – Mojave Desert Ecological Zone)
Endemic animal species such as desert tortoise and chuckwalla will be present and thriving with more than adequate food, water, and cover resources.

DFC-TE-03
The Arizona Strip/**Monument** will provide a block of remote, contiguous habitat that will serve as refugia for populations of special status species.

DFC-TE-13
Desert tortoise habitat will provide sufficient forage and cover attributes to support thriving populations of the species.

DFC-TE-25/**DFC-TE-21**
Habitat areas for special status raptors will provide sufficient forage and cover attributes to support thriving populations of the species.

DFC-TE-27/**DFC-TE-23**
Potential roosting and nesting sites (for special status raptors) will be abundant.

Healthy Special Status Species Populations

DFC-TE-11
Desert tortoise populations within the ACECs and Desert Wildlife Management Area (DWMA) will be healthy and self-sustaining. Populations will be stable or increasing. Population declines will be halted.

DFC-TE-12
Desert tortoise populations outside of the ACECs and wildlife habitat areas (WHAs) will be healthy and stable. Declines in (**Impacts to the population of)** the WHA will be minimized to the extent possible through mitigation.

DFC-TE-24/**DFC-TE-20**
Special status raptor populations will be healthy and self-sustaining throughout their range.

DFC-TE-29/**DFC-TE-25**
Rodent populations, as a prey base (for special status raptors), within the Arizona Strip FO will be abundant.

No Net Loss of Special Status Species Habitat

DFC-TE-04 and DFC-TE-08
There will be no net loss in the quality or quantity of special status species habitat throughout the Arizona Strip FO.

DFC-TE-10
There will be no net loss in the quality or quantity of desert tortoise habitat within the ACECs or WHA.

DFC-TE-20/**DFC-TE-16**
No net loss will occur in the quality and quantity of suitable habitat for endemic amphibians and aquatic invertebrate species within the Arizona Strip FO [and] **Monument**.

DFC-TE-26/**DFC-TE-22**
No net loss will occur in the quality and quantity of suitable habitat for special status raptors within the Arizona Strip FO [and] **Monument**.

DFC-TE-33
No net loss will occur in the quality and quantity of suitable habitat for riparian-dependent special status bird species within the Arizona Strip FO.

Condors

DFC-TE-31/**DFC-TE-27**
The experimental non-essential population of California condor will be at or above 150 individuals, viable, and stable to increasing in number.

Aquatic Habitat

DFC-TE-16
All biologically suitable perennial waters on public lands in the Arizona Strip FO will be occupied by thriving, self-sustaining populations of native fish, as appropriate.

DFC-TE-21
All biologically suitable perennial waters on public lands in Arizona Strip FO will be occupied by thriving, self-sustaining populations of native, endemic amphibians and aquatic invertebrate species, as appropriate.

DFC-TE-22
New introduced (or re-introduced) populations of relict leopard frog will increase to the point of being viable and self-sustaining.

Wilderness Characteristics

DFC-WC-02
Areas where wilderness characteristics will be maintained will be ecologically sustainable and resilient to natural and human-caused disturbances.

Recreation and Visitor Services

DFC-RR-01
Recreation and visitor services will be managed to provide varying levels of both:
1. Structured recreation opportunities that offer a range of specific benefits, activities, and experiences within outdoor settings and/or,
2. Dispersed, unstructured recreation opportunities that focus only on visitor health and safety, user conflict, and resource protection issues (extensive recreation management areas (ERMAs).

DFC-RR-01
Recreation and visitor services will be managed to provide varying levels of structured recreation opportunities that offer a range of specific benefits, activities, and experiences within outdoor settings.

DFC-RR-04/**DFC-RR-05**
The excellent opportunities that exist to enjoy remote, rustic settings that provide moderate challenge and solitude in the Specialized Travel Management Area (TMA) will be maintained/enhanced.

DFC-RR-05/**DFC-RR-06**
In Backways and Specialized TMAs, recreation opportunities associated with somewhat remote settings, such as exploring backcountry roads, vehicle camping, hunting, sightseeing, recreation aviation, and picnicking will be maintained/enhanced on existing roads, provided they will be compatible with the protection and enhancement of sensitive resource values, where appropriate.

DFC-RR-06/**DFC-RR-07**
In the Primitive TMA, high quality recreation opportunities associated more with primitive recreation experience opportunities and non-motorized uses such as camping, sightseeing, hiking, horseback riding, and hunting, will be maintained/enhanced, provided they will be compatible with the protection and enhancement of sensitive resource values, where appropriate.

DFC-RR-07
In Rural TMA, a wide variety of recreation opportunities associated with near-urban settings, such as walking, OHV play, equestrian, rock crawling, mountain biking, and viewing events, may be maintained/enhanced, provided they will be compatible with the protection of sensitive resource values.

Designated Wilderness

DFC-WM-01
The first and dominant goal will be to provide for the long-term protection and preservation of the areas' wilderness character under a principle of non-degradation. The areas' natural condition, opportunities for solitude, opportunities for primitive and unconfined types of recreation, and any ecological, geological, or other features of scientific, educational, scenic, or historical value present will be managed so that they remain unimpaired.

DFC-WM-06
BLM wilderness areas will be managed to be ecologically sustainable and resilient to natural and human-caused perturbations (See Vegetation Management and Fire Management decisions). The BLM will strive to preserve or restore the natural quiet and natural sounds associated with the physical and biological resources of designated wilderness.

Wild and Scenic Rivers

DFC-WR-02
Until Congress acts to designate or release from further consideration rivers determined to be eligible and suitable through the previous RMP process and the subsequent Arizona Statewide W&SR Legislative EIS, the following desired conditions will be maintained:

- Preservation of the stream's free-flowing nature.
- Preservation, protection, and, to the greatest extent practicable, enhancement of identified outstandingly remarkable values.
  - Virgin River: scenic, geologic, aquatic, and riparian values
- Preservation of characteristics that establish the potential classifications as Wild, Scenic, or Recreational:
  - Wild: free of impoundments, generally inaccessible except by trail, with shorelines essentially primitive and waters unpolluted.
  - Scenic: free of impoundments and generally inaccessible except by trail. However, shoreline disturbance from highway construction is apparent at several points.
  - Recreational: several access points and noticeable human developments.

National Historic Trails

DFC-HT-01
The following DFCs will apply to the Old Spanish NHT:

- Visitors seeking to experience the NHT will understand and appreciate the trail's history and significance.
- Visitors will appreciate and respect the rights of landowners in the area.
- High-potential NHT segments and historic sites will be protected from over-use, inappropriate use, and vandalism.
- Scenic values related to historical resources will be protected.
- The viability of NHT resources for comprehensive planning will be ensured through effective interim management.

- Maximum protection of historic and prehistoric properties within the trail corridor will be provided.
- The trail will be managed using the interim provisions of this RMP until a Comprehensive Management Plan/EIS is produced by the Old Spanish NHT planning team.

Areas of Critical Environmental Concern

DFC-AC-01
ACECs will provide protection for special status plant and animal species, scenic values, riparian values, and significant cultural resources.

B. Specific Resource Condition Objectives

1. Land Health Standards

Standard 1 - Upland Sites

Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate, and landform (ecological site).

Objective:

- Signs of accelerated erosion are minimal and are appropriate for the site as indicated by ground cover (litter, rock, vegetative cover, etc.) and signs of erosion.
- This objective applies to all ecological sites. A departure from the ecological site description or reference sheet of moderate or greater would not be achieving the standard. A departure of none to slight or slight to moderate is considered achieving the standard.
- Achievement of Standard 1 (appropriate erosion and vegetative cover levels) will ensure properly functioning watersheds and ecological processes in order to sustain healthy biotic populations and communities.

Standard 2 – Riparian/Wetlands

Riparian-wetland areas are in properly functioning condition. If Standard 2 is achieved, stream channel morphology and functions are appropriate for proper functioning condition for existing climate, landform, and channel reach characteristics. Riparian-wetland areas are functioning properly when adequate vegetation, land form, or large woody debris is present to dissipate stream energy associated with high water flows.

Standard 3 – Desired Resource Conditions

Productive and diverse upland and riparian-wetland communities of native species exist and are maintained. If Standard 3 is achieved, ecological sites contain productive and diverse communities of native species, resulting in proper ecosystem function. Under Standard 3, when Desired Plant Community (DPC) objectives for wildlife habitat are being achieved, the site is producing desirable forage, cover and soil protection. For wildlife this means "healthy" rangeland should provide the necessary food and cover to sustain the species.

All key areas will be measured against the ecological site DPC objectives. The objectives will be used to determine whether standards for land health are being achieved or not achieved, and if not achieved, is significant progress being made toward achievement

2. Allotment Management Plan

There is no allotment management plan for either allotment.

3. Desired Plant Community (DPC) Objectives

DPC objectives were developed during this evaluation process by an interdisciplinary team of resource specialists. The species composition objectives were developed by consulting the Ecological Site Guides, developed by NRCS, and site specific information of the potential of the site to produce vegetation. Site guides used are from the Soil Survey of Shivwits Area, Arizona (Part of Mohave County) USDA-NRCS, 2004. The DPC objectives implement RMP objectives and reflect vegetative composition and attributes important for desert tortoise habitat, as well as habitat requirements for other species. The objectives are set to be achieved within a time interval of 20 years from permit renewal. DPC objectives are expressed in figures of Composition by Weight (CBW). Composition data is collected using the Dry Weight Rank sampling method. All key areas are within the Littlefield Community Allotment. (No key areas have been established in the Littlefield Allotment due to its small size and the interspersed landownership pattern.)

Key Area #1 (within desert tortoise habitat)
Ecological Site: Cobbly Limy Upland (6 to 9 inch precipitation zone [p.z.])

- Maintain total ground cover between 25 and 35%.
- Maintain native shrubs at 60-80% CBW
- Maintain forbs at 2-8% CBW.

Rationale: On the field visit, the team determined that the reason for a lack of bursage, bush muhly, range ratany, big galleta and other species listed in the site guide was the soil inclusion (i.e., natural variation within the site), which prevented a maturation of the plant community due the lack of and prevention of the formation of a limy or calcic substrate to help hold water. The substrate is mostly igneous and

metamorphic granites with no limy layer as required to develop a Limy Cobbly Upland Deep 6-9. This allows only deep rooted species, such as creosote, to develop on the site.

Key Area #3 (within desert tortoise habitat)

Ecological Site: Cobbly Limy Upland Deep (6 to 9 inch p.z.)

- Maintain total ground cover between 25 and 35%.
- Maintain native perennial grasses (galleta, fluffgrass) between 5-20% composition by weight (CBW).
- Maintain browse (bursage, Mormon tea, ratany, goldenhead) at 20-30% CBW.
- Maintain shrubs at 35%-50% CBW.
- Maintain forbs at 1-10% CBW.

Rationale: The desired plant community was designed by the interdisciplinary team from the ecological site guide shown for this key area. It was noted by the team, that even though Key Area #3 is the same ecological site as Key Area #4, there is natural variation within sites, as this key area has a higher composition of perennial grasses. The species and composition listed above are generally those shown in the ecological site guide. Other species desired in the plant community are also included, as they will ensure perennial forage for wildlife and livestock. The current functional groups of plants provide habitat for desert tortoises and other wildlife species. The species not shown in the site guides are still native species and are appropriate for this ecological zone.

Key Area #4 (within desert tortoise habitat)

Ecological Site: Cobbly Limy Upland Deep (6 to 9 inch p.z.)

- Maintain total ground cover between 25 and 35%.
- Maintain native browse (bursage, Mormon tea, golden eye, ratany) at 45-60% CBW.
- Maintain native shrubs (creosotebush, turpentine bush) at 15-30% CBW.
- Maintain forbs at 1-10% CBW.

Rationale: The desired plant community was designed by the interdisciplinary team from the ecological site guide shown for this key area. The species and composition listed above are generally those shown in the ecological site guide. Other species desired in the plant community are also included, as they will ensure perennial forage for wildlife and livestock. The current functional groups of plants provide habitat for desert tortoises and other wildlife species. The species not shown in the site guides are still native species and are appropriate for this ecological zone. This key area is at or near a desired state. It should be noted that although this key area is the same ecological site as Key Area #3, there is natural variability that exists within the same ecological site – hence the variation in DPC objectives between the two key areas.

Key Area #5 (within desert tortoise habitat)

Ecological Site: Limy Upland (6 to 9 inch p.z.)

- Maintain total ground cover between 15-25%.
- Maintain native perennial grass (Indian ricegrass, big galleta,) at 1-10% CBW.

- Maintain native browse (Mormon tea, ratany, bursage) at 27-45% CBW.
- Maintain native shrubs (creosote bush, cactus) at 35-55% CBW.
- Maintain forbs at 1-10% CBW.

Rationale: The desired plant community was designed by the interdisciplinary team from the ecological site guide shown for this key area. The species and composition listed above are generally those shown in the ecological site guide. Other species desired in the plant community are also included, as they will ensure perennial forage for wildlife and livestock. The current functional groups of plants provide habitat for desert tortoises and other wildlife species. The species not shown in the site guides are still native species and are appropriate for this ecological zone. This key area is at or near a desired state.

Key Area #6a

Ecological Site: Shallow Sandy Loam Upland Calcareous (10 to 14 inch p.z.)

- Maintain total ground cover between 30-40%.
- Maintain native perennial grasses (galleta, bluegrama, desert needlegrass, Indian ricegrass) at 3-15% CBW.
- Maintain native browse cliffrose, Mormon tea) at 10-25% CBW.
- Maintain native shrubs (desert peach, snakeweed, yucca, turpentine bush, blackbrush) at 45-65% CBW.
- Maintain forbs at 1-10% CBW.

Rationale: This key area burned in the mid-20th century (probably the 1940s), and has since recovered to high early seral stage. The determination of species and their level for a desired plant community was determined by the site guides, other old burn scars, and the same rangesites in unburned areas. Species such as cliffrose, Mormon tea, mallow, Indian ricegrass, grama grass, and needlegrass are all important forage plants for wildlife and livestock. Other plant species are important to the overall diversity of the plant community.

Key Area #6b

Ecological Site: Shallow Sandy Loam Upland Calcareous, 10 to 14 inch p.z. – *area burned in 2005*

- Maintain total ground cover between 30-40%.
- Maintain native perennial grasses (galleta, squirretail, desert needlegrass) at 3-15% CBW.
- Maintain native browse (cliffrose, Mormon tea) at 10-25% CBW.
- Maintain native shrubs (blackbrush, yucca, desert peach, turpentine bush) at 45-65% CBW.
- Maintain forbs at 1-10% CBW.

Rationale: This key area burned in the 1940s and again in 2005 so the species shown for the desired plant community in the burn scars are those that have recovered from burns in nearby areas that are the same ecological sites, have not recently burned, and from the ecological site guides. Some species, such as cliffrose,

are shown at higher desired levels than the site guides as they are transition native species, but also are good browse for deer and livestock.

Key Area #1-7

Ecological Site: Limestone Slopes, 13 to 17 inch p.z.)

- Maintain total ground cover between 15-25%.
- Maintain native perennial grasses (muttongrass, blue grama, squirretail) at 1-6% CBW.
- Maintain native browse (Gambel oak, cliffrose) at 6-20% CBW.
- Maintain shrubs (pinyon, juniper, sagebrush, snakeweed, turpentine bush, cactus, desert peach, blackbrush, silktassel) at 45-65% CBW.
- Maintain forbs at 1-5% CBW.

Rationale: The desired plant community was designed by the interdisciplinary team from the ecological site guide shown for this key area. The species and composition listed above are generally those shown in the ecological site guide. Other species desired in the plant community are also included, as they are desirable for forage for wildlife and livestock. The species not shown in the site guides are still native species and are appropriate for this ecological zone.

This key area burned in the 1940s and again in the 2000s so the species shown for the desired plant community in the burn scars are those that have recovered from burns in nearby areas that are the same ecological sites, have not recently burned, and from the ecological site guides. Some species, such as cliffrose and muttongrass, are shown at higher desired levels than the site guides as they are transition native species, but also are good browse for deer and livestock.

Key Area #1-13

Ecological Site: Limestone Slopes, 13 to 17 inch p.z.)

- Maintain total ground cover between 30-40%.
- Maintain native perennial grass (muttongrass, blue grama, squirreltail, junegrass) at 13-25% CBW.
- Maintain native browse (Gambel oak, serviceberry, buckbrush) at 16-30% CBW.
- Maintain native shrubs (pinyon, juniper, sagebrush, manzanita, snowberry) at 45-65% CBW.
- Maintain forbs at 1-5% CBW.

Rationale: The desired plant community was designed by the interdisciplinary team from the ecological site guide shown for this key area. The species and composition listed above are generally those shown in the ecological site guide. Other species desired in the plant community are also included, as they are desirable for forage for wildlife and livestock. The species not shown in the site guides are still native species and are appropriate for this ecological zone.

This key area burned in the 1940s and again in the 2000s so the species shown for the desired plant community in the burn scars are those that have recovered from

burns in nearby areas that are the same ecological sites, have not recently burned, and from the ecological site guides. Some species, such as cliffrose and muttongrass, are shown at higher desired levels than the site guides as they are transition native species, but also are good browse for deer and livestock.

Summary:
As described above, the Littlefield and Littlefield Community allotments are partially within designated critical habitat for the Mojave population of the desert tortoise – key areas 1, 3, 4, and 5 are in desert tortoise habitat. The physical and biological habitat features (referred to as primary constituent elements) that are essential for the conservation of the species are:

1) Space for individual and population growth, and for normal behavior;
2) Food, water, or other nutritional or physiological requirements;
3) Cover or shelter;
4) Sites for breeding, reproduction, rearing of offspring; and
5) Habitats that are generally protected from disturbance or are representative of the historic geographical and ecological distributions of a species (USFWS 1994b).

Vegetation attributes for composition, structure, and cover are used to detail a site-specific plant community which will provide the primary constituent habitat elements for desert tortoise. The DPC objectives for this allotment (presented as functional groups) provide for known desert tortoise forage plants (native perennial grasses and forbs – Element #2 above), or those important to their needs for cover, shelter or denning (browse and other shrub species – Element #3 above) – see Table 2. The DPC objectives were established and based upon monitoring data collected at each key area and the associated species in the ecological site guides. The DPC objectives are also intended to provide forage and habitat components for other wildlife, forage for livestock, ground cover to protect the soils and watershed values, and ethno-botanicals for the Southern Paiute (Kaibab and Shivwits).

In setting the species composition levels of each functional group, it is recognized that all species vary in levels across a given site and over time. A range is therefore given for each species due to this natural variance, which is shown in the vegetation data in Appendix D and Table 6. (Key areas 6a and 6b, and key areas 1-7 and 1-13, which are all outside desert tortoise habitat, also exhibit the range of natural variability that exists within the same ecological site.) The time interval to accomplish the objectives is 20 years after the permit renewal.

Table 2. Important Forage and Shelter Plants for the Desert Tortoise

Grasses	
Six-weeks three-awn	*Aristida adscensionis*
Grama grass	*Bouteloua* sp.
Fluffgrass	*Erioneuron pulchellum*
Big galleta grass	*Hilaria rigida*
Bush muhly	*Muhlenbergia porteri*
Indian ricegrass	*Oryzopsis hymenoides*
Sand dropseed	*Sporobolis cryptandrus*
Desert needle grass	*Stipa speciosa*
Six-weeks fescue	*Vulpia octoflora*
Shrubs	
White bursage	*Ambrosia dumosa*
Blackbrush	*Coleogyne ramosissima*
California buckwheat	*Eriogonum fasciculatum*
Mormon tea	*Ephedra* sp.
Spiny hopsage	*Grayia spinosa*
Little-leaf ratany	*Krameria parvifolia*
Creosote bush	*Larrea tridentata*
Forbs	
Windmills	*Allionia incarnate*
Two-seeded milkvetch	*Astragalus didymocarpus*
Woolly bottlebrush	*Camissonia boothii*
Desert pincushion	*Chaenactis fremontii*
Nievitas	*Cryptantha* sp.
Rattlesnake weed	*Euphorbia albomarginata*
Sandmat	*Euphorbia micromera*
Deer vetch	*Lotus strigosus*
Desert dandelion	*Malacothrix glabrata*
Combbur	*Pectocarya recurvata*
Plantain	*Plantago* sp.
Desert globemallow	*Sphaeralcea ambigua*

Source: U. S Fish and Wildlife Service 2010a.

According to monitoring data, most of the above plants occur in the allotments on the Arizona Strip, including Littlefield and Littlefield Community, that are within desert tortoise critical habitat. Many of the perennial plants listed above are in the key areas. However, it should be noted that not all of the species occur at all of the key areas due to site variation (see the trend and ESI tables – Tables 6 and 8). The Ecological Site Guides allow for annual plants, but do not list them by species due to their great variation in occurrence year to year. Annual plants are important food sources for the tortoise (Ernst and Lovich 2009; Oftedal et. al 2002). The annual forbs listed above occur in the key areas of this allotment, but last only two months in the spring and then turn to dried plant litter. They fluctuate in abundance

according to the winter and spring moisture. If monitoring is done while the annuals are present, they are recorded for reference.

C. Issues identified in scoping.

1. Issues relating to Rangeland Health

a. Willow Spring riparian area, is it at PFC?

b. Fire recovery in Hatchet Valley and Elbow Canyon

c. Utilization is too high on the slope between Boulder Canyon and Elbow Canyon.

d. Desert tortoise populations are still declining

e. Feral pigs in Hedricks and Hancock canyons

2. Issues not relating to Rangeland Health, and not discussed further in this document.

a. Fences are not being maintained

The boundary fences were repaired in early 2008. Routine maintenance is occurring between operators to ensure livestock remain on the proper allotment.

b. OHV use, Hedricks and Hancock Canyons and on the slope west of Figure 4 Canyon.

Patrols need to be increased in this area to enforce closure of Hancock and Hedricks Canyon to ATV use.

c. Wildlife do not have access to water on the Hatchet Valley pipeline.

This area has been rested from grazing since the 2005 burn, and water in this pipeline was also turned off at that time. However, the water was turned back on in 2009, and water is currently available to wildlife in the area.

d. Trespass cattle of the previous permittees on neighboring ranges.

A change of permittee took place in late 2008 that appears to have eliminated the trespass problems.

IV. Management Evaluation

A. Purpose of Evaluation

The purpose of this land health evaluation is to determine if the existing soil, water, and vegetative resources are meeting/making progress toward meeting or are not meeting the Arizona Standards for Rangeland Health. These resources are managed according to the Arizona Strip RMP, Grand Canyon-Parashant National Monument RMP, and activity plans, which identify terms and conditions for management of public lands within the Littlefield Community and Littlefield allotments. If the current livestock grazing practices are determined to be causing non-attainment of Standards, then they will be modified to comply with the Guidelines for Grazing Administration. This assessment will also evaluate and update existing activity plan objectives to ensure multiple use objectives are tied to the indicators for rangeland health.

B. Summary of Studies Data

1. Livestock Actual Use

Table 3. Actual Use – Littlefield Community Allotment			
Period of Use	AUMs Available	AUMs Used	% of Permitted Use
2003	2,615	119	5%
2004		854	33%
2005		2235	85%
2006		2235	85%
2007		2235	85%
2008		In transition to new permittee*	
2009		408	16%
2010		1,123	43%
2011		1,054	40%

Table 4. Actual Use – Littlefield Allotment			
Period of Use	AUMs Available	AUMs Used	% of Permitted Use
2003	119	30	25%
2004		0	0
2005		89	75%
2006		89	75%
2007		89	75%
2008		In transition to new permittee*	
2009		93	78%
2010		82	69%
2011		82	69%

* The exact number of AUMs is unknown as the former permittee's cattle were being rounded up all autumn and shipped out. It took several months to get all cattle rounded up due to the size of the allotment.

2. Precipitation

Precipitation over the last 20 years has been normal or above for 11 of those years; 37 of the last 80 seasonal (spring, summer, fall, and winter) readings have been in the drought range. Drought is defined by the Society for Range Management as "...prolonged dry weather when precipitation is less than 75% of the average amount" (SRM 1989). The other 43 quarters were at or above normal. However, the dry quarters were concentrated in some years, such as 1996, 2002, and 2007. These drought periods were not interspersed with wet periods and therefore had a reducing effect on some of the shrub species (both forage and non-forage); however recent monitoring data has shown improving recovery of those shrubs. Precipitation data for this allotment is collected at the Cottonwood Wash Exclosure rain gauge. Precipitation data can be found in Appendix C.

Precipitation and weather patterns affect the amount of vegetation produced on the allotment; fluctuating amounts and the seasonal distribution of precipitation results in varying amounts of forage from year to year. Normal grazing schedules and livestock management practices may have to be modified during periods of drought. WO IM No. 2002-120 and Arizona IM No. AZ-2002-025 outline guidance strategies when evaluating impacts to rangelands due to drought. The BLM works with livestock permittees to voluntarily reduce livestock numbers on public lands, or portions of or entire allotments may be temporarily closed. Livestock operators and the BLM jointly develop short and long-term strategies for modifying livestock use on public land to ensure the conservation and protection of soil and vegetation resources. For example, the BLM works cooperatively with livestock permittees to match available forage with appropriate livestock numbers. Historically, most livestock operators impacted by drought conditions have voluntarily reduced their numbers without issuance of formal livestock closure notices. (This has been the case on both the Littlefield and Littlefield Community allotments.) If the BLM determines immediate protection of the range resource is merited and the permittee does not voluntarily reduce numbers, closures or modifications to an allotment may be issued effective upon issuance under the authority of 43 CFR 4110.3-3.

3. Utilization

Utilization is defined as the proportion of current year's forage production that is consumed or removed by grazing animals (both livestock and wildlife). Estimates of utilization are made using the key species grazed class method, a procedure in which photo guides are used to estimate utilization. Utilization was read at the key areas.

These allotments have a 45% utilization objective in pastures within desert tortoise habitat. With the high occurrence of drought in recent years, this utilization level has sometimes been exceeded at some key areas, namely Key Area #3 in the Hancock Canyon area. For example, utilization was exceeded in 2002, 2006, 2007, and 2008. However, livestock numbers were reduced in 2008 and the utilization from 2009-2012 showed a marked reduction due to livestock rotation and active

management by a new permittee. Table 5 below shows the utilization data that has been compiled for this evaluation.

Table 5. Utilization Data – Littlefield and Littlefield Community Allotments

Key Areas 1 & 2	Year															
	88	**89**	**90**	**91**	**92**	**93**	**94**	**95**	**96**	**99**	**06**	**08**	**09**	**10**	**11**	**12**
Ratany	0	24	17	9	6	0	0	0	0	>1	0	0	0	0	13	4
Bursage	0	41	22	3	4	0	0	0	0	>1	0	0	0	0	11	6

Key Area 3	86	87	88	89	90	92	96	99	02	06	07	08	09	10	11	12
Galleta	42	47	46	28	39	8	34	21	58	74	73	74	20	37	32	34
Mormon tea	41	70	30	67	68	9	0	5	80	53	48	70	8	19	24	34
Bursage	17	29	25	28	20	9	12	5	nr	34	32	12	9	6	8	16

Key Area 4	87	88	90	91	92	96	00	02	06	08	09	10	11	12
Bursage	13	4	19	15	3	4	2	0	0	0	0	>1	0	4
Mormon tea	31	0	44	21	3	7	2	0	0	0	0	8	0	3
Ratany	27	0	26	11	4	1	6	0	0	0	0	0	0	0
Galleta			20	3	3	2	2	0	0	0	0	0	0	6

Key Area 5	86	87	89	90	91	92	96	97	99	00	08	09	10	11	12
Bursage	5	11	20	20	11	3	0	0	1	1	0	0	0	0	8
Winterfat	10	26	26	20	6	4	5	0	4	14	0	0	0	0	0
Ratany	31	17	32	20	8	5	1	0	1	1	0	0	0	0	0

Key Area 6a	09	10	11
Cliffrose	3	26	22
Mormon tea	33	29	25

Key Area #6b	07	09	10	11
Mormon tea	55	45	14	27
Cliffrose	57	31	26	23

Key Area #1-7	83	84	85	87	88	89	90	06	07	08	09	10	11
Cliffrose	41	65	62	45	11	20	18	*	0	0	0	13	18
Mormon tea	75	72	68	80	13	24	70	*	0	0	0	17	25
Three awn	45	60	37	41	21	15	36	*	0	0	0	6	19

Key Area #1-13	84	85	87	88	89	90	07	09	10	11
Garrya	66	38	48	16	27	18	41	0	0	4
Muttongrass	75	44	25	39	35	26	57	0	10	28
Buckbrush	70	47	45	30	31	33	5	0	11	27
Squirreltail					25	21	57	7	10	28

* Burned in 2005 and no reading in 2006

4. Trend

The trend of an area may be judged by noting changes in vegetation attributes such as species composition, density, cover, production, and frequency. Vegetation data is collected at different points in time on the same key area, and the results are then compared to detect change.

Trend monitoring was collected using the Pace-Frequency method, which measures the occurrence frequency of forage and non-forage vegetative species. Cover data, which determines the percent of bare ground, litter, rock and live basal vegetation, is also collected. Ground cover is determined by dividing the total number of hits for all categories except bare ground by the total number of hits (including bare ground) – see page 73 of TR 1734-4 (BLM 1996). Change in ground cover is an important aspect of trend. It is also used to determine if favorable or unfavorable conditions exist for germination and establishment of new plants, and to estimate nutrient cycling. In addition, the occurrence frequency of all plant species is collected. The first readings established a baseline for comparison to all future readings. Overall trend is considered up when the sum percentages of key species, basal cover, and surface litter increase by 10+ percent from the first reading to the last shown reading. The trend is static or not apparent if it shows a change of 0 to 10% or 0 to -10% from the first to the last reading. Down trend is a reading with the sum of those attributes (key species, basal cover and surface litter) of more than -10% from the first reading.

The following table (Table 6) shows the species frequency, which is the ratio between the number of sample units that contain key species and the total number of sample units, comparing the most recent data to the base year. Overall trend at each key area is the direction of change in frequency observed from the initial reading (base year) and the current reading, as depicted by the arrows, i.e., (↗) up, (↘) down, and (→) static or no apparent trend (if numbers are between 1-10%).

Table 6. Littlefield Community and Littlefield Allotment Trend Data

Species	**Key Area #1**						
	1982	1985	1992	1994	1997	2001	2010
Creosotebush	15	26	31	22	21	29	29
Ratany*		1		1			0
Cholla	2	1	2	1	2	1	1
Cheesebush	0	0	0		1	0	1
Filaree	0	0	0	88	0	0	79
Red brome	0	0	0	66	0	0	4
Med grass	0	0	0	38	0	0	8
Phacelia spp	0	0	0	16	0	0	0
Plantago	0	0	0	1	0	0	0
Ground Cover							
basal vegetation	0	1	1	1	9	3	2
surface litter	4	18.5	63	53	24	46	43
Overall Trend for Key Area #1: (↗) up							

Species	Key Area #3						
	1982	1988	1992	1997	2001	2007	2012
Snakeweed	21	38	17	4	1	4.5	10
Creosotebush	9	9	6	7	10	8	6
Turpentine bush	10	13	17	7	10	10	10
Ratany*	2	3	3	2		2.5	4
Bursage*	1		4	2	1	1.5	1
Fluffgrass	1	17			1	0	0
Galleta*	0	1	7	2	1	1.5	8
3 awn	1	17	18	3	1	0	0
Bush muhly*	1	3	2			0	0
Goldeneye		t			1	.5	1
Mormon tea*	0	1			1	0	T
Red brome	0	87	0	78	0	0	84
6 weeks grama	0	92	0		0	0	0
Fescue	0	95	0		0	0	0
Filaree	0	73	0	78	0	0	22
Mallow	0	8	0		0	0	0
Plantago							6
Ground Cover							
basal vegetation	4	8.1	19	5	1	3	2
surface litter	19	62	68	70	59	22	53
Overall Trend for Key Area #3: : (↗) up							

Species	Key Area #4						
	1982	1985	1988	1992	2001	2010	
Bursage*	32	11	38	43	30	34	
Creosotebush	9	27	18	18	11	15	
Ratany*	2	1	T	3	2	3	
Cholla	0	1	2	2	1	t	
Mormon tea*	0	2	T		1	0	
Goldeneye	0	1	2	0	0	1	
Fluffgrass	0			0	1	0	
Red brome	0		98	0	0	t	
Filaree	0		6	0	0	40	
Plantago			12	0	0	26	
Ground Cover							
basal vegetation	2	0	3	4	9	4	
surface litter	18	17.5	36	38	28	30	
Overall Trend for Key Area #4: (↗) up							

Species	Key Area #5						
	1982	1985	1992	2001	2008	2013	
Bursage*	14	22	30	13	8	9	
Cholla	4	2	5	1	1.5	3	
Creosotebush	11	16	25	19	16	25	
Ratany		1	1	1	.5	0	
Porcupine				1	0	1	
Mammilaria				1	0	0	
Big galleta*	0	0	0	0	1	0	
Filaree						17	
Plantago						89	
Red Brome						72	
Med grass						16	
Ground Cover							
basal vegetation	0	1	2	5	0	2	
surface litter	9	19	52	26	41	33	
Overall Trend for Key Area #5: (↗) up							

Species	Key Area #6a (established in 2007)							
	Burned in the 1940s						2007	2009
Cliffrose*							17	16
Desert peach							3.5	1.5
Snakeweed							26	15
Mormon tea*							6	4
Blue yucca							3.5	5
Turpentine bush							11.5	22
Blackbrush							4.5	4.5
Apache plume							0	1
Mallow							3	9
Marigold							1	0
Filaree							16	0
Red brome							8	0
Indian ricegrass*							0	.5
Squirreltail*							0	1.5
Three awn							0	1
Ground Cover								
basal vegetation							1.5	3
surface litter							79	39
Overall Trend for Key Area #6a: (↘) down								

Species	Key Area #6b (established in 2007)							
	Burned in 2005						2007	2009
Blackbrush							.5	1
Snakeweed							6	9
Blue yucca							1.5	3
Desert peach							0	0
Turpentine bush							2.5	4
Mormon tea							.5	1.5
Mallow							14	15
Filaree							59	0
Red brome							43	0
Sideoats grama							0	.5
Squirreltail							0	.5
Flax							0	.5
Ground Cover								
basal vegetation							1	1
surface litter							34	30
Overall Trend for Key Area #6b: (→) static or not apparent								

Species	Key Area #1-7 (burned in 2005)						
	1983	1986	1997	2001	2009		
Sagebrush	13	2	5	15	.5		
Snakeweed	56	75	20	20	6		
Turpentine bush	21	10	13	29	4.5		
Cholla	5	3	5	10	7.5		
Buckwheat	5	2			0		
Desert peach	5	2	14	9	3.5		
Buckbrush	4	7			0		
Blackbrush	5	6	5	7	1.5		
Cliffrose	3	4	2	3	0		
Pinyon	1	1			0		
Juniper				3	1		
Goldeneye	1		2		0		
Three awn	13	5	0		0		
Fluffgrass	1	1	0		0		
Indian ricegrass		1	0		0		
Mallow	13	13	1		0		
Penstemon	3	6	1	2	2		
Gaura spp			9		0		
Red brome			81		0		
Others			4				
Wolfberry				1			
Desert holly				2	0		
Rhus				1	.5		

Ground Cover							
basal vegetation	2	3.5	0	2	2		
surface litter	22	21	36	27	17		
Overall Trend for Key Area #1-7: (→) static or not apparent							

Species	**Key Area #1-13**						
	1983	1986	2001	2009			
Serviceberry	6	7	18	11			
Sagebrush	34	34	35	17			
Silktassel	31	31	11	11			
Manzanita	7	14	16	26			
Buckbrush	6	4	2	5			
Mt. mahogany	1	2	1	0			
Muttongrass	48	54	38	16			
Cholla	1	1		0			
Rock mat	2	4	0	0			
Pinyon		1	4	3			
Turbinella		1	3	1			
Snowberry			7	1			
Gambel oak				1			
Juniper				1			
Ground Cover							
basal vegetation	2	6	2	1			
surface litter	31	46	32	58			
Overall Trend for Key Area #1-13: (→) static or not apparent							

Overall trend at a key area is determined by assessing the sum percentages of the following attributes: key species, live vegetation cover/basal cover, and ground cover (surface litter). Both basal cover and surface litter are important attributes when evaluating Standard #1. It is possible to have one of the attributes, such as key species, remain static and have an overall trend of upward (or downward).

The frequency trends are mostly "not apparent" or static with some up trends in the wet years of the 1980s and 1990s coupled with some down trends during the recent dry years. Trends at Key Area #1 are all "not apparent" except the creosote bush and surface litter, which are up. This part of the allotment receives very little grazing use due to the lack of palatable forage. Key Area #3 was identified as a high use area by livestock. It has the most grass along with Mojave Desert vegetation. Historical heavy use may have limited the expansion and increase of bursage; however, the location of this key area is on the edge of the blackbrush zone where bursage diminishes in composition, which could also account for its low frequency. Since 2008, utilization levels have been reduced by 30-40% for key species due to livestock rotation and active management by the new permittee. The grasses have, through the years, increased in wet years but have had no apparent trend recently. This could be due to both drought and grazing.

The trend at key areas 4 and 5 is up – these areas are at PNC (see pages 44-45) so the primary reason for this upward trend is due to the increase in surface litter since the key areas were established in 1982. Key areas 6a and 6b are new key areas but initial monitoring shows static trend for Key Area 6b and down for Key Area 6a. Both are in early seral stage of ecological status due to burns, both historic and recent. The burns have had a strong effect on the succession of the plant community. Key Area #1-7 is static and was burned again in 2005. The frequency trend is static and will be slow to recover for all of these key areas. Key Area #1-13 is in the mountain shrub zone and is at a mid-seral stage. Manzanita has shown a healthy increase and the muttongrass is down. This down trend could be due to succession as the site guide shows only a 1% presence for this grass and the increase in all the shrubs could have a reducing effect on the grasses. In summary, of the 8 key areas, 3 are in up trend, 4 in static, and 1 is down.

5. Lithology and Soils

a. Lithology

The Littlefield Community and Littlefield allotments consist mainly of limestone, Navajo sandstone, gypsiferous mudstone, granite, and gneiss. Landforms are mountains, mesas, ridges, bajadas, fan and stream terraces, fan terrace dunes, and cliffs that have slopes ranging from one to seventy percent. Soils are sandy, gravelly, or cobbly, very shallow to very deep and well to excessively well drained.

b. Soils – Shivwits SSA 623

04 Arizo gravelly sandy loam, 1 to 5 percent slopes, nonflooded, (coalescent fan piedmont), granite and gneiss; Limey Upland (Deep), 6" to 9" ppt

05 Arizo very gravelly sandy loam, 1 to 5 percent slopes, flooded, (floodplain, fan), granite and gneiss; Sandy Wash, 6" to 9" ppt

13 Blind family-Shelley complex, 5 to 15 percent slopes, stony, (fan piedmont), granite, gneiss; Cobbly Limey Upland (Deep), 6" to 9" ppt

16 Cave-Harrisburg-Grapevine complex, 1 to 15 percent slopes (fan); Cave and Harrisburg=Limey Upland, 6" to 9"; Grapevine=Limey Upland (Deep), 6" to 9"

20 Dermala fam-Guy fam-Rock Outcrop complex, 10 to 40 percent slopes (mesa scarp) basalt; Basalt Slopes, 13" to 17"

34 Hindu-RO-Gypill complex, 35 to 70 percent slopes, (cliffs, scarps, mtns), gyp, LS, SS, CG; Hindu=Limestone Hills, 6" to 9"; Gyphill=Gypsum Hills, 6" to 9"

39 Hobog very gravelly sandy loam, 5 to 30 percent slopes, (plateau, mesa), limestone, Navajo sandstone; Shallow Upland, 9" to 12"

42 Katzine-Rock outcrop-Yumtheska complex, 35 to 70 percent slopes, (mountain canyons and cliffs), Supai sandstone, Callville & Red Wall limestones; Limestone Slopes, 13" to 17"

43 Meadview-Cave complex, 2 to 30 percent slopes, stony, (fan terrace), limestone, volcanics; Meadview=Limey Upland (Deep), 6" to 9" ppt; Cave=Limey Upland, 6" to 9" ppt

44 Meadview very gravelly sandy loam, 2 to 18 percent slopes, (fan terraces) LS, Moenkopi; Limey Upland (Deep), 6" to 9"

51 Meriwhitica-Rock outcrop-Strych complex, 35 to 70 percent slopes, (cliffs, canyons) Callville & Redwall limestones; Meriwhitica=Breaks, 9" to 13"; Strych=Loamy Upland, 9" to 13"

53 Mespun complex, 2 to 10 percent slopes, (duney fan terrace), sandstone; Mespun=Sandy Upland, 9" to 13" ppt; Mespun,Loamy=Sandy Loam Upland, 9" to 13" ppt

57 Nipton-RO-Nickel family complex, 10 to 50 percent slopes, (mountains), gneiss schist, granite; Nipton=Granitic Hills, 9" to 12" ppt; Nickel family=Limey Upland, 9" to 12" ppt

72 Springerville-Delenbaw complex, 3 to 25 percent slopes (mesa) basalt; Springerville and Delenbaw=Clay Loam Upland (gravelly) PJ-Woodland, 13" to 17"

73 Strych very gravelly loam, 2 to 10 percent slopes (fan) mixed; Loamy Upland, 9" to 13"

76 Tassi-Risno complex, 5 to 35 percent slopes, (benches), limestone, sandstone; Tassi=Shallow Upland (calcareous), 9" to 13" ppt

84 Virgin Peak-Rock outcrop complex, 10 to 70 percent slopes (mountain) granitics, gneiss; Granitic Hills (Stony), 13" to 17"

94 Yumtheska-Katzine-Rock outcrop complex, 5 to 50 percent slopes, moist (mountain) Supai sandstone, Callville & Redwall limestones; Limestone Slopes (Chaparral, PJ-Woodland), 13" to 17"

SSA 608-Virgin River Valley- SCS 1980

AMC Arada fine sand, 2 to 8 percent slopes, (valley fill terrace), mixed sources; Arid Sandy Limy Upland, 4" to 6" ppt.

ASC Arada fine sand, hardpan variant, 2 to 8 percent slopes, (valley fill terrace), mixed sources; Arid Sandy Limy Upland, 4" to 6" ppt.

BTC Bitter Spring-Arizo association, 2 to 15 percent slopes, (alluvial fans, washes), mixed sources; Arid Limy Upland, 4" to 6" ppt

BD Badlands, 15 to 75 percent slopes, (eroding terrace escarpments), soft sandstones, mudstones, and gypsum; no ecosite.

MOB Mormon Mesa fine sandy loam, 0 to 8 percent slopes, (valley fill terraces), shallow hardpan from limestone and sandstone; Arid Limy Upland, 4" to 6" ppt.

Additional field observations, data and sample collection, and lab testing were done in September of 2011, and the results are shown in Table 7 (following page).

Table 7. Soil Data for Littlefield and Littlefield Community Allotments

Soil Sample	Location	Texture	pH CaCO3	EC	Normal Bulk Density (Db) g/cc	Root restricting Db g/cc*	Sample Db g/cc	% Increase in Db	% Decrease in Porosity
Littlefield-Db1 (1-5") Shelley, mu 13	T39N, R15W sec 18 SENW	vgr-sandy loam	7.7 eo	0.19	1.35	1.75	1.21	minus 10.4	increase 11.0
Littlefield-Db2 (1-6 ") Nipton, mu 57	T39N, R15W sec 09 NWSWNW	vgr-sandy loam -	7.6 es	0.24	1.45	1.75	1.59	10.0	11.7
Littlefield-Db3 (2-6") Grapevine, mu 16	T41N, R15W sec 35 SWSE	gr-fine sandy loam	7.9 ev	0.13	1.30	1.75	1.28	minus 1.5	increase 1.6
Littlefield-Db4 (2-6") Bitter Spring, mu BTC	T39N, R15W sec 06 SESESW	gr-sandy loam -	7.7 es	0.18	1.40	1.75	1.56	11.4	12.5

* NRCS soil quality information sheet "Rangeland Soil Quality – Compaction", May 2001. Most root systems are greatly affected at these Db levels, especially young grasses. The initiation of root restriction for many plants may start below these Db levels.

Except for the recent gravelly alluvial fans and sandy floodplains, most of the soils on the allotments are shallow to deep gravelly sandy loams over caliche or bedrock. Due to the compression resistant gravelly sandy textures, the soils have zero to moderate compaction, and all are well below root restricting bulk density. Very little sheet or rill erosion is evident, likely due to low precipitation, high infiltration rates of the sandy soils, some litter, low compaction, and surface gravels and cobbles of 25 to 80 percent. Crypotgamic cover is fair to good except where gravelly desert pavement or alluvium dominates the surface. As in the first field assessment, no significant areas of impacts detrimental to soils or vegetation were found.

6. Ecological Site Inventory

The "Dry Weight Rank" vegetative sampling method was used to measure composition, which is the proportion (percentage) of various plants in relation to the total at a particular area. This vegetation attribute is also used to describe ecological sites. An ecological site is a distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation. It is the product of all the environmental factors responsible for its development. Ecological sites have developed a characteristic kind and amount of vegetation. The natural plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in annual production (BLM 2001). While the natural plant community of a particular ecological site is

recognized by characteristic *patterns* of species associations and community structure, the *specific species* present from one location to another may exhibit natural variability. The natural plant community is not a precise assemblage of species for which the proportions are the same from place to place or even in the same place from year to year. Variability is the rule rather than the exception.

The distinctive plant communities associated with each ecological site (including the variability which frequently occurs) can be identified and described, and are called ecological site descriptions. These ecological site descriptions (or guides) are provided by the NRCS. The ecological site's potential for change in composition over time was considered along with other vegetation attributes to quantify desired plant community objectives for each key area. The potential composition is determined by the applicable soil type and precipitation zone. These potentials are described in the NRCS Ecological Site Guides, and were used to set the DPC objectives.

Ecological status is the present state of the vegetation at an ecological site in relation to the potential natural community (PNC). A PNC is "the biotic community that would become established if all successional sequences were completed without interferences by humans under the present environmental conditions". It may include "acclimatized or naturalized nonnative species" (BLM 2005 and BLM 2001). PNC differs from "historic climax plant community" in that an historic climax plant community is "the plant community that existed before European immigration and settlement" (BLM 2001). The BLM uses "potential natural community" terminology rather than "historic climax plant community" because PNC recognizes past influences by man. It is an expression of the relative degree to which the kinds, proportions, and amount of plants in a plant community resemble that of the PNC for the site. It is a coefficient of community similarity, which gives an ecological rating of the plant community.

Ecological status expresses the relative degree to which the kinds, proportions, and amounts of plants in a plant community resemble that of the potential natural plant community for the site. Ecological status changes slowly for most of the sites in this area and seral stages should not be confused with Desired Plant Communities. Ecological status is reported in the following four classes, or seral stages, which are the developmental stages of ecological succession (and corresponds to percent similar to the PNC):

- **Early Seral:** 0-25% of the expected potential natural community exists.
- **Mid Seral:** 26-50% of the expected potential natural community exists.
- **Late Seral:** 51-75% of the expected potential natural community exists.
- **PNC:** 76-100% of the expected potential natural community exists.

Table 8 displays ecological site inventory data for both the Littlefield Community and Littlefield allotments. The site guide used for the information below is the Soil Survey of Shivwits Area, Arizona, Part of Mohave County, NRCS, 1994.

Table 8. Littlefield Community and Littlefield Allotment Ecological Site Inventory Data

Key Area # 1: Cobbly Limy Upland 6-9" Last monitoring data collected in 2010			
Key Area and Plant Species	**Current Composition**	**Site Guide Composition %**	**Current Score[4]**
Creosotebush	94%	20-30%	30
Cholla	2	1-3	2
Perennial forbs	2	1-3	2
Annual forbs	2	1-2	2
Score: 36 – Mid Seral (representative of 103 ac.)			

Key Area # 3: Cobbly Limy Upland Deep 6-9" Last monitoring data collected in 2012			
Key Area and Plant Species	**Current Composition**	**Site Guide Composition %**	**Current Score**
Cresosotebush	13%	20-30%	20
Bursage	2	40-50	2
Snakeweed	23	1-5	5
Mormon tea	2	0-3	2
Goldenhead	2	0-4	2
Turpentine bush	20	0-1	3
Ratany	10	1-5	5
Galleta	28	5-10	10
Score: 49 – Mid Seral (representative of 410 ac.)			

Key Area #4: Cobbly Limy Upland Deep 6-9" Last monitoring data collected in 2010			
Key Area and Plant Species	**Current Composition**	**Site Guide Composition %**	**Current Score**
Bursage	61%	40-50%	50
Creosotebush	20	20-30	20
Ratany	6	1-5	5
Cholla	10	1-3	3
Goldenhead	2	0-4	2
Annual forbs	1	1-2	1
Annual grass	trace[5]	1-2	0
Score: 81 – PNC (representative of 9,751 ac.)			

[4] "Current score" = lower of either Column 2 (current composition) or Column 3 (site guide composition).
[5] trace = species present at key area, but no hits made at transect.

Key Area #5: Limy Upland 6-9" Last monitoring data collected in 2008			
Key Area and Plant Species	**Current Composition**	**Site Guide Composition %**	**Current Score**
Creosotebush	42%	19-32%	32
Bursage	31	32-45	31
Opuntia	19	3-8	8
Range ratany	4	1-6	4
Big galleta	4	0-1	1
Score: 76 – PNC (representative of 855 ac.)			

Key Area 6a: Shallow Sandy Loam Upland Calcareous 10-14" Unburned Last monitoring data collected in 2009			
Key Area and Plant Species	**Current Composition**	**Site Guide Composition %**	**Current Score**
Cliffrose	25%	3-11%	11
Desert peach	2	0-11	2
Snakeweed	18	2-5	5
Mormon tea	1	3-9	1
Yucca	11	3-8	8
Turpentine bush	11	0-11	11
Blackbrush	11	32-64	10
Indian ricegrass	2	0-5	2
Squirreltail	1	0-5	1
Aristida	2	0-5	2
Forbs	16	1-11	11
Score: 64 – Late seral (unknown acres)			

Key Area 6b: Shallow Sandy Loam Upland Calcareous 10-14" Burned 2005 Last monitoring data collected in 2009			
Key Area and Plant Species	**Current Composition**	**Site Guide Composition %**	**Current Score**
Cliffrose	3%	3-11%	3
Blackbrush	5	32-64	5
Mormon tea	5	3-9	5
Snakeweed	24	2-5	5
Yucca	9	3-8	8
Turpentine bush	13	0-11	11
Squirreltail	1	0-5	1
Sideoats grama	2	0-5	2
Forbs	38	1-11	11
Score: 50 – Mid Seral (unknown acres)			

Key Area 1-7: Limestone Slopes 13-17" Woodland Last monitoring data collected in 2009 (burned in 2005)			
Key Area and Plant Species	**Current Composition**	**Site Guide Composition %**	**Current Score**
Sagebrush	2	5-25	2
Snakeweed	19	1-5	5
Turpentine bush	17	0	0
Cactus	26	0	0
Desert peach	11	1-5	5
Sumac bush	2	0	0
Blackbrush	5	0	0
Juniper	5	1-5	5
Perennial forbs	13	1-4	4
Score: 21 – Early Seral (representative of 417 ac.)			

Key Area 1-13: Limestone Slopes 13-17" Woodland Last monitoring data collected in 2009			
Serviceberry	20	1-15%	15
Manzanita	17	0	0
Gambel oak	3	1-5	3
Tubinella oak	4	1-5	4
Silktassel	10	Up to 25	10
Desert ceanothus	1	0	0
Sagebrush	20	5-25	20
Snowberry	1	0	0
Pinyon	3	1-10	3
Juniper	1	1-5	1
Muttongrass	19	10-25	19
Forbs	1	1-4	1
Score: 76 – PNC (representative of 2,427 ac.)			

Discussion:

Desert Tortoise Habitat: Key areas 1, 3, 4 and 5 are in desert tortoise habitat. The ecological site data (as shown in Table 8) shows the vegetation composition sampled at the key areas. Key Area #1, which is located northwest of Elbow Canyon, has creosote bush and little else. This is due to an inclusion in the larger Cobbly Limy Upland Deep 6-9. The inclusion has a substrate of metamorphic and igneous rock dominated by granites. This prevents a limy or calcic layer to develop and hold moisture near the surface, so only a deep rooted plant like creosote bush can occur.

Key Area # 3, the Hancock Canyon area, has a high mid-seral stage. When analyzing the ecological site data, it appears the composition of bursage is in lower than expected levels. However, when analyzing these data along with the trend data, we

see bursage has also been at low frequency levels since monitoring was established. In addition, the diversity as manifested by compositions of galleta grass, range ratney, and other palatable shrubs indicates the deficiency in bursage is more ecologically driven than a result of livestock use because this same variation in plant species from Key Area #3 to Key Area #4 (same ecological site) is reflected in non-palatable species as well. The BLM acknowledges high utilization levels at this key area up until 2008 on galleta and Mormon tea. Average use levels on bursage over 16 years of data entry is 16%. Since 2008, use levels on key species have been in the 30% range.

It should be noted that the Cobbly Limy Upland Deep 6-9" represents 17,107 acres of the allotment. Of those acres 9,751 (57%) are at PNC, 6,843 (40%) are in late seral, and 513 (3%) are in mid seral condition.

Key Areas #4 and #5 are currently at or near desired plant community levels. Grazing use is light to slight.

Outside Desert Tortoise Habitat: Key Areas #6a and #6b were established in 2007 to provide trend data in a pasture that did not have a key area. One trend transect is in a 1940s burn and the other is in the 2005 burn in Tom and Cull Valley. This area has had repeated fires through the decades. Normally this area would be a blackbrush range with few forage species. This is now good browse range with cliffrose being the standard bearer of this category, since the burns. The 2005 burned key area is 13 points lower than the unburned (that is, no recent burns) in its ecological rating. The 2005 burn area was seeded in early 2006 and a small quantity of sideoats grama, *Kochia* spp, and small burnet have germinated and are easily noted.

Key Area #1-7 was burned in 2005. Prior to that, it ranked early seral. It burned some years ago also and did not have time to recover to mid seral. This site has a lot of cholla cactus.

Key Area #1-13 is in the higher elevation part of the Littlefield Community Allotment. It ranks at mid seral and has a good composition with a fair grass component along with native browse. Utilization has generally been moderate. Recovery to a full-fledged chaparral site (dominated by manzanita and silk tassel, with other shrubs a minor part of the community) is occurring since the burns that occurred in the 1940s through 1960s.

In the early 1990s, an ecological site inventory was completed on the entire Littlefield Community Allotment (see Table 9). This data represents the ecological status and acres of each site. As depicted in these data, there can be a different ecological status within sites due to natural variability in such elements as soil texture and depth, aspect, and surface and subsurface chemistry.

Table 9. Littlefield Community Ecological Site Inventory Summary

Littlefield Community Allotment #4827			
Ecological Site Inventory Summary			
Ecological Site	**Acres**	**Percent of Allotment**	**Ecological Status**
Shallow Upland 6-9"	1,995	3%	PNC
Shallow Upland 6-9" (burned)	1,025	2%	Early seral
Cobbly Limy Upland Deep 6-9"	9,751	14%	PNC
Cobbly Limy Upland Deep 6-9"	6,843	10%	Late Seral
Cobbly Limy Upland 6-9"	513	1%	Mid Seral
Limy Upland 6-9"	855	1%	PNC
Limy Upland 6-9"	2,097	3%	Late Seral
Limy Upland Deep 6-9"	3,435	5%	Late Seral
Sandy Wash 6-9"	87	0.5%	Late Seral
Granitic Hills	5,233	8%	Mid Seral
Granitic Hills (burned)	902	1%	Mid Seral
Limestone Slopes 10-14"	2,427	3%	PNC
Limestone Slopes 10-14" (burned)	417	1%	Early Seral
Sandy Loam Limy	440	1%	PNC
Unclassified	32,102	47%	Unclassified
Total Acres Inventoried: 68,122			
Acres unclassified (acres with no ecological classification, i.e., transition zones, rock outcrops, inclusions, etc.): 32,102 (47%)			
Inventoried acres in PNC Ecological Status: 15,028 (22%)			
Inventoried acres in Late Seral Ecological Status: 12,462 (18%)			
Inventoried acres in Mid Seral Ecological Status: 6,648 (10%)			
Inventoried acres in Early Seral Ecological Status: 1,442 (3%)			

Since this survey was completed, some circumstances and conditions have changed. For example, fires have burned or re-burned portions of the allotment in the Virgin Mountains and Hatchet and Tom & Cull Valleys. In addition, some sites in the unclassified category now have been classified; however a site description or guide remains incomplete.

7. Special Status Species

Threatened, Endangered, and Candidate Species

California condor: The California condor was listed as endangered in 1967. In the late 1970s, the species was reduced to a population of less than 25 birds. The decision was made to bring all of the wild condors into captivity to begin a captive breeding program; the last wild condor was secured in April of 1987. In 1996, California condors were re-introduced into Arizona in the Vermilion Cliffs under the ESA's 10(j) rule (non-essential experimental). Additional releases of 16 condors occurred in 1998 and 1999 from the Hurricane Cliffs, northeast of Diamond Butte. The reintroduction program continues annually as captive-reared birds are released along the Vermilion Cliffs. Each released condor is equipped with radio telemetry or GPS satellite transmitters and numbered wing tags to allow observers to track their movements. As of April 2013, there were 73 condors in the wild in northern Arizona. Lead poisoning from spent lead ammunition is the principal mortality agent for this flock of condors since condors are scavengers and prefer to eat large, dead mammals such as deer, elk, pronghorn, bighorn sheep, cattle, and horses (The Peregrine Fund 2013).

Condors range widely, easily covering over 100 miles in a day, and their current range includes the entire Arizona Strip, throughout the Grand Canyon, into adjacent Utah and Nevada, and south of the Grand Canyon in Arizona. Condors are most commonly observed near the release site on the Vermilion Cliffs, at Navajo Bridge near Marble Canyon, on the Kaibab Plateau, and the South Rim of the Grand Canyon. The Littlefield and Littlefield Community allotments are within the non-essential experimental population area for the California condor, but it would be a rare event for condors to occur in the area of these allotments (USFWS 2011a).

Southwestern willow flycatcher: The southwestern willow flycatcher was listed as endangered on February 27, 1995; critical habitat was designated on November 18, 2005 (USFWS 2005) and revised on January 3, 2013 (USFWS 2013) and includes the 100-year floodplain in the Virgin River. Designated critical habitat is present on the perimeter of approximately 6 linear miles of these allotments (the Virgin River serves as the boundary between the allotments).

This species has declined in population due to riparian habitat loss and fragmentation resulting from the draining of wetlands; channeling and levying of streambeds; construction of canals, drains, and impoundments; livestock grazing and off-road vehicle use in riparian areas and wetlands; and the invasion of riparian habitat by invasive species. Other probable factors contributing to population decline include predators and brood-parasitism by brown-headed cowbirds, as well as the tamarisk leaf beetle, which defoliates tamarisk during the breeding season, leaving nests in tamarisk exposed to heat and predators due to loss of cover and increasing fire risk in these riparian areas due to higher fuel loading from leaf litter.

The southwestern willow flycatcher is a riparian-obligate species that prefers dense canopy cover, a large volume of foliage, and surface water during mid-summer. Breeding birds occupy habitat along rivers, streams, wetlands, and lakes where dense growths of willow, seepwillow, buttonbush, tamarisk, or other plants are present, often with a scattered overstory of cottonwood and/or willow. Flycatcher habitat occurs along the Virgin River in Arizona, with the largest patch at the confluence of Beaver Dam Wash and the Virgin River (just outside the boundaries of the Littlefield Community and Littlefield allotments). The segment of the Virgin River within these allotments has a considerable amount of willow, but it also contains a large component of tamarisk. Livestock can access this portion of the Virgin River riparian area. In the past, livestock grazed the herbaceous rushes and sedges and invasive grasses on the river banks quite heavily. However, the season of use for this allotment is now such that no grazing occurs during the growing season (i.e., from bud break to leaf drop – during the spring and summer months) in order to maintain the suitability of habitat. Riparian condition monitoring for this stretch of the Virgin River (conducted in 2012) indicates the riparian area is functional – at risk (FAR) with an upward trend (see Appendix E). Periodic floods, such as occurred in 2005 and 2010, did a lot of rearranging of the main stem of the river – the channel was realigned and large areas were scoured. However, this is a normal cycle in this river's history. The FAR rating is a result of the 2010 flood, and the associated scouring described above. (See pages 64-65, 78-79, and 94-95 of this evaluation report for a detailed discussion on this riparian area.)

Yuma clapper rail: This species was listed as endangered on March 11, 1967 (32 FR 4001) due to a decline in the population linked to loss of habitat. Channelization and marsh development are primary causes of habitat loss. The Yuma clapper rail nests and forages in areas with wet substrates (mudflats and sandbars) and dense herbaceous (e.g., cattails and bulrushes) or woody vegetation (e.g., tamarisk). The interface between water, soil, and vegetation seems to be a more important habitat characteristic than the species of plant that covers the site. The species nests on the ground in areas of dense vegetation near the water's edge, showing a preference for banks that are slightly higher than adjacent marshes. Sightings of this species have occurred in the marsh habitat at the confluence of Beaver Dam Wash and the Virgin River (just outside the boundaries of the Littlefield Community and Littlefield allotments).

Mexican spotted owl: The Mexican spotted owl was listed as threatened on April 15, 1993. The range of the Mexican spotted owl extends from the southern Rocky Mountains in Colorado and the Colorado Plateau in central and southern Utah, southward through Arizona and New Mexico and into northern Mexico. Although the Mexican spotted owl's entire range covers a broad area of the southwestern United States and Mexico, it does not occur uniformly throughout its range. Instead, it occurs in disjunct localities that correspond to isolated forested mountain systems, canyons, and in some cases steep, rocky canyon lands. Surveys have revealed that the species has an affinity for older, uneven-aged forests, and the species is known to inhabit a physically diverse landscape in the southwestern United States and Mexico. On the Colorado Plateau (which includes the majority of the Arizona Strip), spotted

owls use narrow, steep-walled canyons where ledges and caves provide cover from high temperatures, as well as nest sites and foraging habitat. In essence, complex, rocky terrain has been substituted for old-growth forest (Willey and Ward 2003). The Arizona Strip District is surrounded by areas where Mexican spotted owls have been detected, including Grand Canyon, Zion, and Canyonlands national parks, and Grand Staircase-Escalante National Monument.

Designated critical habitat was established for this species in 2001 and revised in 2004. No designated critical habitat occurs within these allotments. However, a tool for predicting suitable canyon habitats that may have higher potential for species occupancy and nesting birds than other nearby canyons is the Willey and Spotskey Mexican spotted owl habitat model (created in 1997 and revised in 2001). This model uses a geographic information system to identify key features of owl habitat and then map the extent of suitable habitat (Willey and Spotskey 2000). The model uses terrain parameters to determine depth and width of canyons (owls need cooler microsites for nesting and roosting) and other features (such as distance to water and north facing cliff sites). The model predicts the canyons most likely to support nesting owls; from this it can then be determined if any "higher quality" habitat (according to the model) exists. It is important to note that any model is only an analysis tool, and experience with the current owl model has shown it to be accurate in some cases, but not in others (such as delineating cliff faces outside of canyons as high potential owl habitat).

According to the 1997 Willey model, the eastern part of the Littlefield Community Allotment (in the Virgin Mountains) contains 2,166 acres of potential habitat. Habitat in this allotment consists of both potential forest and canyon habitats. Potential habitat was visually surveyed to assess the accuracy of the model's predictions. Potential forest habitat contains almost exclusively pinyon-juniper woodlands and ponderosa pine stands, with one small stand of white fir at the summit of Mount Bangs (8,012 feet in elevation). Due to the overall absence of mixed conifer forest, and the relatively open canopy present, these sites were all assessed to be unsuitable. Potential canyon habitat is found throughout the Virgin Mountains, consisting primarily of short, wide canyons with few to no cool microsites due to their overall exposure. The Virgin River Gorge has considerable shade but contains busy Interstate 15. The most promising canyon in the allotment, Figure 4 Canyon, is long and has considerable shade deep within the canyon, but is most likely still too wide to provide cool microsites for nesting and roosting. Most assessed canyons also had little or no riparian or woody vegetation, and little ground litter and woody debris. While there may be small pockets of suitable canyon habitat present in the allotment (consisting of canyon walls with crevices, ledges or caves), most is thought to be unsuitable.

Mojave Desert tortoise: The Mojave population of the desert tortoise was listed under the ESA as threatened on April 2, 1990 (USFWS 1990). Critical habitat was designated on February 8, 1994 (USFWS 1994b). The recovery plan developed in 1994 (USFWS 1994a) divided the range of the desert tortoise into six recovery units

and established 14 desert wildlife management areas (DWMAs) throughout the recovery units. Recovery units for the desert tortoise are special units that are geographically identifiable and are essential to the recovery of the entire listed population. DWMAs are areas where recovery efforts are concentrated. Establishment of recovery units and DWMAs was intended, in part, to facilitate an ecosystem approach to land management and desert tortoise recovery, as stipulated by section 2(b) of the ESA. The recovery plan was revised in May 2011 and recovery units were adjusted in light of new information, with the goal of balancing both distinctiveness and variability to ensure that local adaptation and critical genetic diversity are maintained since the long-term persistence of extensive, unfragmented habitats is essential for the survival of the species. The revised recovery plan reduces the number of recovery units from six to five, and changes some boundaries, although the collective boundary of recovery units (when taken as a whole) has not changed and still encompasses the entire range of the species. The recovery units were revised based upon identification of geographic barriers that coincide with observed variation among tortoise populations (USFWS 2011b). No areas in Arizona are affected by the recovery unit boundary revisions.

Under the revised recovery plan, the focal areas for recovery within each recovery unit are "tortoise conservation areas." These tortoise conservation areas include desert tortoise habitat within critical habitat units, ACECs, DWMAs, national monuments, national wildlife refuges, National Park Service lands, the Red Cliffs Desert Reserve, and other areas managed for desert tortoises. Tortoise conservation areas capture the diversity of the Mojave population of the desert tortoise within each recovery unit and are considered the minimum baseline within which to focus recovery efforts (USFWS 2011b).

The Littlefield and Littlefield Community allotments lie within the Northeastern Mojave Recovery Unit and the Gold Butte-Pakoon critical habitat unit. None of the Littlefield Allotment is designated critical habitat for the tortoise, while most of the Littlefield Community Allotment west of the Virgin Mountains is designated critical habitat.

Desert tortoises are most active during the spring and early summer when annual plants are most common. Additional activity occurs during warmer fall months and occasionally after summer rain storms. In Arizona, tortoises are generally considered to be active from approximately March 15 through October 15, although activity has been observed as early as February and as late as November (depending on climatic conditions). Desert tortoises spend the remainder of the year in burrows, escaping the extreme conditions of the desert.

Desert tortoise home range sizes vary with respect to location and year. Over its lifetime, each desert tortoise may require more than 1.5 square miles of habitat and make forays of more than seven miles at a time. Tortoises use multiple burrows within their home ranges to aid in escaping temperature extremes while out foraging.

During droughts, tortoises forage over larger areas, increasing the likelihood of injury or mortality through encounters with humans and predators.

Documented threats to the Mojave population of the desert tortoise were identified in the 1994 recovery plan, and continue to affect the species today. The revised recovery plan (USFWS 2011b) discusses these threats to the desert tortoise and its habitat in detail; a brief summary of these threats is included below. Threats identified in the revised recovery plan include:

- ***The present or threatened destruction, modification, or curtailment of desert tortoise habitat or its range.***

This threat includes permanent habitat loss across large areas, such as urbanization, proliferation of roads and highways, off-highway vehicle activity, landfills and other waste facilities, poor grazing management, and habitat invasion by non-native invasive species. Another threat that has come to the forefront is the increased frequency of wildfire due to the invasion of desert habitats by non-native plant species. The proliferation of non-native plant species has contributed to an increase in fire frequency in tortoise habitat by providing sufficient fuel to carry fires, especially in the inter-shrub spaces that are mostly devoid of native vegetation. Alien annual grasses alter the fuel structure and fire behavior in the Mojave Desert making it more susceptible to frequent fires. Stems of alien annual grasses (including *Bromus* species) remain rooted and upright into the summer fire season and can accumulate over successive years whereas those of most native forbs crumble soon after senescence[6] (Brooks and Esque 2002). Changes in plant communities caused by non-native plants and recurrent fire can adversely affect the desert tortoise by altering habitat structure and species available as food plants. Off-highway vehicle activity, roads, livestock grazing, agricultural uses, and other activities contribute to the spread of non-native species (or the displacement of native species) and the direct loss and degradation of habitats. For example, unmanaged livestock grazing, especially where plants are not adapted to large herbivorous mammals or where the non-native species are less palatable than the natives, can preferentially remove native vegetation, leaving non-native plants to grow under reduced competition (USFWS 2011b).

The revised recovery plan identifies livestock grazing and related actions as a threat to the species. Among the threats described from livestock grazing are competition for forage plants between the two species, trampling of tortoise by cows and crushing of burrow and shelter sites, crushing of tortoise by ATVs or other vehicles associated with livestock operations, and increased predation on tortoise resulting from attraction of predators to livestock water developments.

Livestock grazing can have direct and indirect impacts on desert tortoises and their habitats through trampling that results in direct mortality, either while above ground or in burrows, and degradation of vegetation and soils, including the spread of non-native plants or the displacement of native plants. The magnitude of the threat on

[6] The growth phase in a plant or plant part (as a leaf) from full maturity to death.

desert tortoise populations remains unclear, and the degree of impact depends on a number of factors including, but not limited to, resiliency of soil and vegetation types, type of livestock, stocking rates, season of use, and years of use with and without rest (USFWS 2011b). Cattle can potentially step on tortoises and injure or kill them should cattle be present during the tortoise active season (March 15-October 15). The likelihood of this is greater for hatchling or juvenile tortoises that are small and presumably difficult for cattle to see. However, no livestock use is authorized in tortoise habitat in these allotments during the tortoise active season. There are no records of tortoise being injured or killed as a result of trampling by livestock on these allotments, although there are records from the Beaver Dam Slope in both Arizona and Utah.

Similarly, cattle can step on and cause burrows to cave in, thereby disturbing essential thermal cover or even entrapping/injuring/killing a tortoise within. Tortoise burrows and cover sites are typically on the side slopes of washes or beneath shrub or other vegetation mounds; burrows may be as much as 30 feet long. Livestock typically attempt to avoid stepping directly on holes or openings in the ground, as evidenced by the large number of intact ground squirrel burrows present on this allotment. There is a greater likelihood that livestock would step on and collapse a portion of a burrow away from the opening.

It is possible that ATVs could cause burrows to cave in, with the same effects as described in the previous paragraph. However, the Arizona Strip Field Office RMP restricts motorized vehicles to designated roads, with the exception of ATV use by livestock operators for administrative purposes. The use of ATVs in cattle ranching operations is not common on these allotments and no such encounters have been reported on these allotments. In addition, no livestock use is authorized in tortoise habitat during tortoise active season (March 15-October 15), reducing the possibility of direct encounters.

Oldemeyer (1994) suggests that the primary evidence that grazing adversely affects desert tortoises relates to an overlap in food habits of livestock and tortoises. Grazing is thought to reduce cover of shrubs and annual forbs. Studies in the eastern Mojave Desert on foraging behavior and food preferences of range cattle and desert tortoises showed that a dietary overlap (spatial and temporal) exists and that this overlap is greatest in the spring when fresh annual plants preferred by both desert tortoises and livestock are at their peak biomass and densities. Competition for these food plants is expected to be greatest when annual plants start to dry in the spring, before cattle and tortoises switch to other forage plants (Avery and Neibergs 1997).

Hohman and Ohmart (1980) reported that forbs comprised the largest percentage of the diet of cattle and tortoises on the Beaver Dam Slope[7]. These annual plants comprised over 95% of the diet for tortoises and 57% for cattle. Overlap between the diets of tortoises and cattle in April of 1977, was 40%. During May, forbs accounted

[7] The Beaver Dam Slope is located just north of the Littlefield and Littlefield Community allotments, at the base of the Beaver Dam Mountains.

for 54% of the diet of tortoises but only 5% for cattle, which had shifted to using palatable shrubs. During April, succulent annual forbs and grasses were present in low to moderate amounts, indicating some competition for forage was likely occurring. Permitted livestock use in tortoise habitat on these allotments is from October 16 to March 14. This allows for the growth of desert vegetation during the spring and summer without any grazing use, resulting in ephemeral plant growth for forage for desert tortoise without competition from livestock, thus giving tortoises a better chance at obtaining important food sources. Most of the food plants in their diet contain high levels of potassium, which is toxic, and low levels of protein (nitrogen). Unlike many other reptiles, desert tortoises lack functional salt glands that would normally assist in eliminating excess potassium. When water is available, tortoises excrete liquid urine, but they are able compensate during times of little to no available water by going for months without discharging from their bladder (Dantzler and Schmidt-Nielsen 1966). During this time they will store uric acid in their bladders. Tortoises use this uric acid to accumulate potassium and other electrolytes in their bladder until opportunities to drink again allow them to eliminate (Jørgensen 1998, Oftedal 2002, Oftedal et al. 2002).

A potassium excretion potential (PEP) index is a method of measuring the impact of varying diets on an animals' osmoregulation and protein assimilation (Oftedal 2002). Plants with a high PEP index indicate that there is more than enough water and protein in the food for a tortoise to excrete excess potassium, while those with a low PEP index implies that there are inadequate amounts of water and nitrogen in food for the tortoise to excrete excess potassium. Thus, plants with high PEP help the tortoises both rehydrate and ultimately produce uric acid that can assist in binding the excess potassium. The availability of high PEP plants in the spring is especially important to tortoises that may not get the opportunity to drink during the hot summer months. Additionally, access to and ingestion of high PEP plants may be essential to short and long term nitrogen balance, overall health in the face of infectious disease, and female reproductive output (Oftedal 2002). Henen (2002) evaluated whether body reserves help females produce eggs independent of rainfall and food availability, and found that female desert tortoises used large seasonal and annual changes in metabolism and body water, protein and energy reserves to survive and produce eggs. Although lipid reserves are important to female desert tortoises, nitrogen or crude protein appears to be the primary limiting resource for producing eggs. By reducing metabolic rates 90%, females conserved enough body reserves to produce eggs during extreme drought conditions, which is an effective "bet-hedging" reproductive pattern in an extreme and unpredictable environment such as occurs in the Mojave Desert.

A shortage of high PEP plants may underlie the steep population crashes of desert tortoises throughout the Mojave Desert (Oftadal 2002). Desert tortoises are known to actively seek out plants with a PEP index that are both uncommon and highly patchy (Jennings 1993). Major tortoise foods with a high PEP index include, but are not limited to, evening primrose (*Camissonia claviformis*) and desert dandelion (*Malacothrix glabrata*). The most important foods seem to be desert annuals, plants

with a life span of less than 30 days and are generally only available from April to June (Ernst and Lovich 2009).

- ***Overutilization for commercial, recreational, scientific, or educational purposes.***

This threat refers to the deliberate maiming or killing of tortoises (previously referred to as vandalism) and collection of desert tortoises by humans for food or as pets were cited as potential threats to the species. Data and anecdotal observations indicate that collection for personal or commercial purposes was significant in the past. While illegal collection of desert tortoises still occurs and collection could possibly impact local populations, there is no quantitative estimate of the magnitude of this threat (USFWS 2011b).

- ***Disease or predation.***

To date the available evidence indicates that upper respiratory tract disease (URTD), as caused by the bacteria *Mycoplasma agassizii* and *M. testudineum*, is probably the most important infectious disease affecting desert tortoises. Less is known about other diseases that have been identified in the desert tortoise (*e.g.*, herpesvirus, cutaneous dyskeratosis, shell necrosis, bacterial and fungal infections, and urolithiasis or bladder stones).

In the 1970s, desert tortoises with signs of the disease were observed on the Beaver Dam Slope of Arizona/Utah, a site where many captive tortoises were being released. Surveys in 1989 and 1990 indicated that URTD was widespread on the Beaver Dam Slope (Jacobson 1992). Disease has been considered an important threat to the desert tortoise since its emergency listing in 1989. Changing ecological conditions as a result of natural events or human-caused activities may stress individual tortoises and result in a more severe clinical expression of URTD (Brown et al. 2002). However, what is currently known with certainty about disease in the desert tortoise relates entirely to individual tortoises and not populations; virtually nothing is known about the demographic consequences of disease (Tracy et al. 2004). Disease is a natural phenomenon in wild populations of animals and can contribute to population declines by increasing mortality and reducing reproduction. The disease probably occurs mostly in relatively dense desert tortoise populations, as mycoplasmal infections are dependent upon higher densities of the host (Tracy et al. 2004).

The role of environmental contaminants in directly inducing toxicosis-related diseases (*i.e.*, liver diseases) and increasing susceptibility to infectious diseases has recently been suggested as a significant source of mortality. Illegal dumping of hazardous wastes may expose tortoises to increased levels and possible consumption of toxic substances and affect populations on a localized level where these activities are concentrated. It has been postulated that elemental toxicity may compromise the immune system of desert tortoises or otherwise detrimentally affect physiological function, rendering them more susceptible to disease, but further investigation is needed.

Desert tortoises, particularly hatchlings and juveniles, are preyed upon by several native species of mammals, reptiles, and birds. The common raven (*Corvus corax*) has been the most highly visible predator of small tortoises, while coyotes (*Canis latrans*) have been commonly implicated in deaths of adult tortoises. Over the past several decades, ravens have increased in number by a factor of 15 in parts of the Mojave Desert. There are a variety of anthropogenic (or human-caused) reasons for this. This many-fold increase above historic levels is due in large part to recent human subsidies of food, water, and nest sites (Knight et al.1993, Boarman 1993, Boarman and Berry 1995). For example, ravens are able to use power structures as nesting substrates and consequently have increased in abundance in areas that have had power poles added (Kristan and Boarman 2007). While not all ravens may include tortoises as significant components of their diets, these birds are highly opportunistic in their feeding patterns and concentrate on easily available seasonal food sources, such as juvenile tortoises. The population-level effects of these or other predators are unknown (USFWS 2011b).

Woundfin: The woundfin was listed as endangered in 1970. Populations of this species continue to decline due to habitat modifications including dam construction; dewatering from agriculture, mining, and urbanization; and management of non-native species. The mainstem Virgin River and its 100-year floodplain extending from the confluence of La Verkin Creek, Utah to Halfway Wash, Nevada, was designated critical habitat on January 16, 2000. This includes the section of river that runs through Arizona (and these allotments). The red shiner (*Cyprinella lutrensis*), an introduced species, also occurs in the Virgin River. Red shiners compete for food and available habitats and are known to prey on the eggs and early life stages of native fishes, including woundfin.

Woundfin live in swift parts of silty, warm stream, seemingly avoiding clear waters and are very seldom found in quieter pools. Within the Virgin River, the species seems to be restricted to approximately 50 miles of perennial reaches in Utah, Arizona, and Nevada. This species is sporadically found within the Arizona portion of the river; population density estimates for this reach are not available, although numbers are thought to be low due to the absence of suitable habitat features. Captures of woundfin minnow in the lower part of the river are extremely rare.

Virgin River chub: The Virgin River chub was listed as endangered on August 24, 1989. Populations continue to decline due to habitat modifications including dam construction; predation; dewatering from agriculture, mining, and urbanization; and management of non-native species. Critical habitat was designated on January 26, 2000 along the main channel of the Virgin River and its 100-year floodplain along the entire Arizona portion of the river (including these allotments). Red shiners compete for food and available habitats and are known to prey on the eggs and early life stages of native fishes, including Virgin River chub.

Virgin River chubs occur only in the mainstem of the Virgin River, and very rarely in the immediate mouths of its major tributaries. Water in the Virgin River is

generally warm, turbid, and saline, with the primary vegetation on its banks being tamarisk. Virgin River chubs are most often associated with deep runs or pool habitats of slow to moderate velocities with sand and instream cover, such as root snags and large boulders. Other habitat elements also include side channels, secondary channels, backwaters, and springs.

Population abundance and density estimates are not available for this species. The Virgin River Gorge (in the northwestern part of the Littlefield Community Allotment) provides suitable habitat that is considered among the best available for this species. Virgin River chub are consistently observed in that portion of the river.

BLM Sensitive Species and Migratory Birds

The bald eagle was delisted from the Federal ESA on August 9, 2007 (USFWS 2007). This species is not known to nest anywhere on the BLM's Arizona Strip District, although it may occur as a transient on these allotments. The bald eagle is a seasonal (winter) migrant that may roost in the large cottonwood trees that occur along the Virgin River. Bald eagles are both scavengers and predators. Golden eagles use their agility and speed combined with extremely powerful talons to snatch up prey including rabbits, marmots, ground squirrels, and large mammals such as fox, wild and domestic cats, and young deer. They will also eat carrion if prey is scarce, as well as reptiles. Birds, including large species up to the size of swans and cranes as well as ravens have all been recorded as prey. Golden eagles nest in high places including cliffs, trees, or human structures such as telephone poles. There are no known nests within these allotments.

The American peregrine falcon was virtually eradicated from eastern North America by pesticide poisoning in the mid-20th century. After significant recovery efforts, the peregrine falcon was delisted in 1999. Powerful and fast-flying, this falcon hunts medium-sized birds, dropping down on them from high above in swift, spectacular dives. The peregrine falcon nests in a scrape, normally on cliff edges. Optimum habitat is considered to be steep cliffs overlooking woodlands, riparian habitats or other areas supporting abundant avian prey species. Cliff nests are generally located under an overhang, on ledges with vegetation, and south-facing sites are favored (Wikipedia 2011a). One historic peregrine falcon nest is known in the Virgin River Gorge in the northwestern part of the Littlefield Community Allotment. This nest site was last monitored in 2011 and was determined to be unoccupied.

Ferruginous hawks are large hawks that inhabit the grasslands, deserts, and open areas of western North America – they are the largest American hawk and are often mistaken for eagles due to their size. Ferruginous means "rusty color" and refers to the bird's colored wings and legs. During the breeding season, the preference is for grasslands, sage, and other arid shrub country. Nesting occurs in the open areas or in trees including cottonwoods, willows and swamp oaks along waterways. They nest in trees if they are available, including riparian strips, but the presence of water does not appear to be critical. The ferruginous hawk primarily hunts small to medium-

sized mammals but will also take birds, reptiles, and some insects. Mammals generally comprise 80 to 90 percent of the prey items or biomass in the diet with birds being the next most common mass component. The diet varies somewhat geographically, depending upon the distribution of prey species (Wikipedia 2011b).

Burrowing owls inhabit open areas, such as grasslands, pastures, coastal dunes, desertscrub, and the edges of agricultural fields, and wherever there is sufficient friable soil for a nesting burrow at elevations between 650 and 6,140 feet in Arizona. The presence of other nesting burrows (such as that of a badger, prairie dog, tortoise or other animal) seems to be a requirement for the species; a decline in the population of burrowing mammals may adversely affect owls through a lack of available burrows. Burrowing owls forage primarily at twilight but have been observed to hunt any time of the day or night. Insects are often taken during daylight and small mammals after dark. Observed causes of mortality include human disturbance through agricultural and construction activities and collisions with vehicles (the owls habitually sit and hunt on roads at night). Human activities that reduce quality of prey habitat and thus lower food supplies result in poorer reproductive success in females (Haug et al. 1993). This species is known to use habitat similar to that found on these allotments, although specific sightings have not been recorded.

The yellow-billed cuckoo is a candidate species for federal listing (June 13, 2002, 67 FR 40657). Declines in populations may be due to habitat loss. Yellow-billed cuckoos are a riparian-obligate species, which means that they require large blocks of riparian woodlands to thrive. Their habitat includes a mixture of mature cottonwood/willow galleries and tamarisk/mesquite thickets where they build their nest 4 to 30 feet above the ground (AGFD 2002). Yellow-billed cuckoos have been observed in the cottonwood/willow galleries at the confluence of Beaver Dam Wash and the Virgin River (which is just outside the Littlefield and Littlefield Community allotments), although they are not expected to occur anywhere else on these allotments.

The pinyon jay occurs in western North America from central Oregon to northern Baja California and east as far as western Oklahoma, although it wanders further afield outside of the breeding season. It is a permanent resident of pinyon-juniper woodlands and low-elevation ponderosa pine forests in the southwestern United States. This species is highly social, often forming very large flocks of 250 or more birds. Pinyon jays begin breeding in January or early February, nesting occurs from late February to April, and young pinyon jays fledge approximately 3 weeks following hatching. When the pinyon crop fails, pinyon jays forego late-winter breeding and instead breed in August when crops of pinyon seeds are ripe. The seed of the pinyon pine is the staple food for this bird, but they supplement their diet with fruits, berries, and insects. Pinyon jays influence seed dispersal, establishment, and genetic structure of pinyon pine populations – pinyon seeds are heavy and wingless, and not suited for wind dissemination, so their dispersal requires animals such as pinyon jays (Wikipedia 2011c).

The northern goshawk inhabits forested regions of the Northern Hemisphere. This goshawk prefers coniferous forests, but will also inhabit deciduous and mixed forests

from sea level to subalpine areas. Adult goshawks return to their nesting territories by March or April and begin laying eggs in April or May. Territories often encompass a variety of habitats, however the immediate nest area is often found in a mature forest. This species hunts birds and mammals in a variety of woodland habitats, often utilizing a combination of speed and obstructing cover to ambush birds and mammals. Goshawks are often seen flying along adjoining habitat types, such as the edge of a forest and meadow, flying low and fast hoping to surprise unsuspecting prey. The most important prey species are small mammals and birds such as doves, rabbits, and ground squirrels. The main threat to Northern goshawks internationally today is the clearing of forest habitat on which both they and their prey depend (Wikipedia 2011d).

A variety of sensitive bat species have been captured on this and neighboring allotments including spotted bats, California leaf-nosed bats, and Townsend's big-eared bats. These species are known primarily from locations near the Virgin River, where foraging for insects is most productive, although they could be found elsewhere on the allotment, especially near water and trees, for feeding and roosting.

Spotted bats have been found from low desert in southwestern Arizona to high desert and riparian habitats in northwestern Arizona and Utah to conifer forests in northern Arizona and other western states. They are found in desertscrub, riparian, pinyon-juniper, and montane coniferous forests at elevations up to 8,670 feet. They roost in small cracks found in cliffs and stony outcrops. They forage on large flying insects, primarily moths (AGFD 2003).

The California leaf-nosed bat is the only bat in North America, north of Mexico, with large ears and leaf-like projections on the nose. They have very large ears and an erect triangular flap on the nose. These bats do not migrate or hibernate. Because their wings are short and broad they are not suited for long distance flight needed for migration. Preferred habitats are caves, mines, and rock shelters, mostly in desert scrub. Roost sites are usually located near foraging areas. They eat various insects such as crickets, some beetles, grasshoppers, katydids, June beetles, diving beetles; and sphinx and other types of moths. They will capture prey either in flight or off of foliage or the ground. They are the only bats in North America known to catch caterpillars and are among the very few insect-eating bats that supplement their diets with cactus fruit (Arizona-Sonora Desert Museum 2011a).

Townsend's big-eared are a medium-sized bat with very long ears – when the ears are laid back they extend to the middle of its body. They use a variety of habitats, almost always near caves or other roosting areas. They can be found in pine forests and arid desert scrub habitats. When roosting they do not tuck themselves into cracks and crevices like many bat species do, but prefer large open areas. They specialize in eating moths and other insects such as beetles, flies and wasps (Arizona-Sonora Desert Museum 2011b).

Allen's big-eared bat is one of the most poorly known bat species in North America. It was not discovered in the United States until 1955. This species is often found near boulder piles, cliffs, rocky outcroppings, or lava flows. Preferred habitats for the species include rocky and riparian areas in woodland and scrubland regions. This bat is also known to roost in abandoned mine shafts (Pima County 2011). Little is known about the breeding activity of the species, but females have been found with single young during the late spring and early summer (UDWR 2005a). Colonies are most often found in rocky places near riparian habitat or woodlands. These bats feed on moths, soldier beetles, dung beetles, leaf beetles, roaches, and flying ants, either catching them in flight or gleaning them from foliage. Their enormous ears combined with unique lappets easily distinguish them from all other species (Bat Conservation International 2011).

The relict leopard frog was first described in 1875 from a specimen collected near the Virgin River in Washington County, Utah. Subsequent reports and museum specimens provide evidence that this species had a relatively restricted range along portions of the Virgin, Muddy and Colorado Rivers, particularly in small springs that fed into those major drainages. The relict leopard frog was believed to be completely extinct until three populations were found in Nevada during the early 1990s. Since their first rediscovery in 1991, additional populations have been discovered at several springs. One of the seven populations identified since 1991 was on private lands in Arizona near Littlefield; this population has subsequently been extirpated. Because so few relict leopard frogs have been found, little is known about their feeding and reproductive habits. Adults probably eat insects, whereas tadpoles likely eat plants, detritus, and algae. The species may breed in the spring, but exact times are unknown. Relict leopard frogs are active year-round, and are most often observed in shallow water along channel or pool margins, with individuals spaced 3 - 6 feet apart along certain stream lengths. Extant relict leopard frog populations are restricted to narrow habitat corridors, with a sharply defined boundary between riparian corridor and desert (Relict Leopard Frog Conservation Team 2005). Adults may prefer relatively open shorelines where dense vegetation does not dominate. Breeding habitat includes pools or slow moving side areas of streams, with or without emergent vegetation (USFWS 2012a).

Virgin River Fishes: The Virgin River maintains a diverse, but temporally variable, fish community of both native and introduced species. The fish fauna in the Virgin River includes six native species: woundfin and Virgin River chub (both discussed above), desert sucker, flannelmouth sucker, speckled dace, and Virgin spinedace. Fourteen introduced species also occur in the river, including red shiner.

The desert sucker is found in Nevada, Utah, Arizona and New Mexico. Its body is sharply bi-colored: olive-brown on top and deep-yellow below. The sucker's lower lip is about three times as thick as the upper lip. Many people confuse large individuals with carp because of similar coloration. The desert sucker can be found in a variety of habitats from warm water rivers to trout streams. It prefers ripply waters, rapids and flowing streams with gravelly bottoms (Wikipedia 2011e).

The flannelmouth sucker is identified by its enlarged, lower lips. Historically, this species ranged in the Colorado River Basin, including parts of Wyoming, Utah, Colorado, New Mexico, Nevada, California, and Arizona; however, this species has been entirely extirpated from many parts of its range. While flannelmouth suckers are restricted to larger rivers, its larvae tend to live in shallow areas. During breeding season (March through July), the fish tend to "run" upstream specifically to spawn, and then immediately leave towards the mainstream. Larvae also like deeper water when they are not feeding. In addition, adult suckers prefer great amounts of cover and shade during the daytime (Wikipedia 2011f).

The speckled dace is a small minnow native to the western United States, as well as to parts of southwestern Canada and northern Mexico. It has adapted to many different types of habitat, ranging from cold swift-flowing mountain headwaters to warm intermittent desert streams and springs. Speckled dace are benthic feeders (they feed on the bottom), eating primarily insect larvae and other invertebrates, although algae and fish eggs are also consumed. The species spawns during the spring and summer over gravel areas that have been cleaned by territorial males. The speckled dace is a schooling species that is most active at night. In many parts of their range, speckled dace are important forage fish for sport fish species (Utah Division of Wildlife Resources 2005b).

On May 18, 1994, the Virgin spinedace was proposed for listing as threatened under the ESA (59 FR 25875). A conservation agreement to protect the species was developed by the USFWS in 1995, and the BLM was one of the signatories to the agreement. Populations continue to decline due to habitat modifications including dam construction; loss of water from agriculture, mining, and urbanization; and management of non-native species. This species seems to prefer cool, clear, swift moving water and a bottom substrate of rubble, cobbles, or sand. Its range is limited to tributary streams and forks of the Virgin River; the river's mainstream in Arizona seems to be too warm and turbid. It is occasionally found around the mouth of the occupied tributaries, such as Beaver Dam Wash. It has also been collected in the Virgin River near Littlefield, although these occurrences have generally been associated with tributary inflows.

8. Wildlife Habitat

Mule deer populations are monitored annually by the AGFD. While there is no estimate of mule deer numbers available specifically for these allotments, population trends should parallel data collected for Game Management Unit 13B (see Appendix F). The mule deer population in the unit exists at low densities, in some areas less than one per square mile. The population, while not at levels attained in the 1970s, has shown signs of growth in recent years. Over the past five years, fawn production has varied from 42 to 93 fawns per 100 does, as documented by AGFD survey counts; the 5-year fawn to doe ratio is approximately 57:100 (AGFD 2013). The buck to doe ratio appears strong. Despite wide fluctuations, AGFD considers the mule deer population in Unit 13B to be stable. Black Rock Mountain and southern portions of Grand Canyon-Parashant

National Monument (south and east of these allotments) contain the highest densities of mule deer in Unit 13B. However, mule deer are found year-round in most of the unit.

Mule deer populations on the Arizona Strip have fluctuated greatly. In the 1960s and 1970s there were many more mule deer on the western portion of the Arizona Strip than today. The mule deer populations appeared to crash by the early 1980s and have exhibited slow population growth and recovery. A variety of causes for this decline have been suggested including long-term drought, predation, competition from livestock, successional changes in the habitat, disease, and increased visitor use.

There has been little or no evidence of a serious disease problem within these allotments. However, Unit 13B has a long history of predator management. Coyotes and mountain lions are the primary predators of mule deer in 13B. Active livestock grazing operations occur within Unit 13B. Limited water resources, forage availability, and ability to navigate fences have all been identified as possible limiting factors to mule deer populations in 13B. The BLM and AGFD work cooperatively together to resolve these issues. While urban encroachment is not an issue in 13B, the populations of St. George, Utah, Mesquite, Nevada, and Las Vegas, Nevada have provided a source of increased recreational visitor use to the area. The popularity of antler collection and OHV recreation has increased in Unit 13B (AGFD and BLM 2010).

Desert bighorn sheep habitat has been identified from habitat analysis that evaluates a combination of slope, topography, aspect, vegetation, proximity to escape cover, and water availability (Bighorn Sheep Core Team 2006). To escape predators, bighorn sheep prefer rough, rocky terrain with slopes greater than 20%, as is found throughout the Virgin Mountains portion of the Littlefield Community Allotment. Bighorn sheep may be found throughout the Virgin Mountains, including within the Littlefield Community Allotment. This area is within the Virgin Mountains Wildlife Habitat Area (WHA), allocated for desert bighorn sheep. Vegetation in this WHA is primarily Mojave Desert shrub community; dominant species include creosote bush and Joshua trees at lower elevations, and blackbrush merging into pinyon-juniper woodlands at higher elevations. Reliable permanent waters include the Virgin River, a number of perennial springs in Hedricks, Frehner, and Elbow Canyons, and two wildlife catchments at Figure 4 Canyon and above Hatchet Valley (all within the Littlefield Community Allotment). Bighorn sheep also likely obtain some of the moisture they need from succulent vegetation. During the hot summer months, the sheep stay in shaded areas near water as much as possible and are seldom found more than three miles from dependable water sources. When rain or snowfall occurs, bighorn sheep expand their use of suitable habitat and range out from permanent waters. They also commonly drink from ephemeral pools of water found in rock pockets.

Key habitat use areas for bighorn sheep include concentration areas along the Virgin River and at reliable waters in the Virgin Mountains. More than 80% of the suitable habitat within the Virgin Mountains WHA is unoccupied, though the reasons for this are not fully understood (Bighorn Sheep Core Team 2006). However, the population

in this WHA is considered stable enough that hunts were initiated in 1989, and AGFD has conducted several captures to transplant animals to other areas within the state – the most recent of these captures occurred in 2007.

9. Riparian/Fisheries Habitat

The Littlefield Community Allotment has two significant riparian areas. One is Willow Spring in Elbow Canyon and the other is the Virgin River (which also borders the south side of the Littlefield Allotment). The Littlefield Community Allotment has several other springs in the Virgin Mountains. None of these are monitored for functioning condition since they do not meet the criteria for priority riparian areas (see Decision #MA-RP-01 from both the Arizona Strip Field Office and GCPNM RMPs).

Willow Spring, a 12-acre wet meadow area, was rated (in the past) as properly functioning but at risk. It was considered to be at risk as a result of continuous livestock entry with grazing and excessive trampling of the soil. Efforts to plug holes in the fence and to keep gates closed in the past met with only small successes for short periods of time. With the change in permit holder in September 2008, the gates have remained closed and no trespass has occurred. The IAT ranked the Willow Spring riparian area as PFC (proper functioning condition) on January 13, 2009 (see Appendix E).

The Virgin River segment or reach within the allotments (Segment 9) amounts to 300-400 acres, which includes the wet zone, woody regeneration zone and the floodplain. About half of the land along the river is privately owned and the other half is public land. Segment 9 was last assessed in 2012 and was rated as functional – at risk[8] (see Appendix E). The floods of 2005 and 2010 did a lot of rearranging of the main stem of the river[9]. Large areas were scoured, but are recovering (i.e., regeneration of vegetation is occurring); this flooding is a normal cycle in the river's history.

In the past, livestock grazed the herbaceous rushes and sedges and invasive grasses on the river banks quite heavily. Willows, if present, were utilized when green. With implementation of seasonal restrictions for protection of the desert tortoise, cattle are now gone from this part of the allotments in the spring and summer months, allowing the streamside vegetation and willows to grow. The greenline transects in the woody regeneration zone (the narrow band of vegetation parallel to the river) in the segment of river within these allotments are displayed in Table 10.

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[8] "Functional – at risk" means that "riparian-wetland areas … are in functional condition but an existing soil, water, or vegetation attribute makes them susceptible to degradation" (BLM 1993).

[9] Functioning condition monitoring of this portion of the Virgin River riparian area, to assess riparian condition since the December 2010 flood, occurred in February 2012 (this monitoring is different than the greenline transect monitoring discussed on page 65). This monitoring found channel realignment – and associated changes in riparian vegetation – occurred as a result of that event. However, regeneration of vegetation is occurring, and this segment of the river is vertically stable.

Table 10. Riparian Transect Data – Virgin River Segment within Littlefield Community and Littlefield Allotments

Woody Species	1998	2004	Flood 2005	2006	2008	2010*
Native Willow/ Seep Willow	404	139	33	95	184	67 (seep willow) 438 (willow)
Tamarisk	15	203	162	128	630	182

* Greenline monitoring occurred prior to the December 2010 flood; the transect has not been read since the flood.

The dramatic greenline change in willow and tamarisk occurred due to the big flood of 2005 when the channel changed location into the upland tamarisk and left the existing channel and willows high and dry. The 2008 greenline showed an increase in willows, seep willow, and tamarisk from 2006. Similar changes have also likely occurred as a result of the December 2010 flood event.

Cross-section of this segment (0 = water's edge):

River left bank
0-6 feet: Sedge/cattail
7-15 feet: Willow
15-42 feet: Seep willow, willow/seep willow
42-66 feet: Arrowweed grove
67-130 feet: Scour bar
131-180 feet: Arrowweed, willow, cliff

River right bank
0-9 feet: Sedge/willow
10-40 feet: Arrowweed, willow, clover
41-62 feet: Willow and arrowweed
63-83 feet: Arrowweed, tamarisk, willow
84-264 feet: Old channel sand then upland

The 2010 riparian transect data demonstrated an increase in willows, which have shown large increases, particularly since 2004. Tamarisk decreased dramatically from 2008 to 2010; the tamarisk is now infested with the tamarisk beetle, and the willow is doing well again. Phagramites have also shown a large increase along the river.

Fisheries habitat on these allotments consists of the Virgin River (see discussion on Virgin River fishes on pages 57-58 and 61-62 of this evaluation report). No other waters exist on these allotments to support fish. Treatment of the Virgin River to eradicate nonnative fish species was expected to occur in 2011, but was postponed for the Arizona portion of the river due to a moratorium on use of rotenone and other piscicides[10] prompted by concerns over the potential human health and ecological impacts that may result from rotenone exposure.

10. Wild Horses and Burros

There are no wild horses or burros, or habitat management areas, in these allotments.

[10] A piscicide is a chemical substance which is poisonous to fish. The primary use for piscicides is to eliminate a dominant species of fish in a body of water, as the first step in attempting to populate the body of water with a different fish. They are also used to combat parasitic and invasive species of fish.

C. Information and/or Data Pertaining to Issues (from III.C.1.)

1. Issues relating to Rangeland Health

a. Willow Spring riparian area, is it PFC?

Prior to the grazing permit transfer in September of 2008 and removal of the former permittees' cattle, the gates at the Willow Spring riparian area were opened persistently every year, which put the wet area at a rating of "functioning at risk". With the recent rest from the trampling, the wet area was rated again as PFC (see Appendix E).

b. Fire recovery in Hatchet Valley and Elbow Canyon

Key Areas 6b and 1-7: Both of these key areas occur in Hatchet Valley and were burned in 2005. They also burned in previous decades. The plant communities are recovering but have a higher composition of annuals due to these fires. (See DPCs for these key areas.) Total acres burned in 2005 were 18,526. There are components of the plant community that do not meet Standard #3 and are addressed in the DPC section of this document.

There is no key area in the burned area of Elbow Canyon so specific data as described above is not available. Past visits have indicated recovery in this area is also taking place as the shrubs are re-sprouting and perennial grasses are more evident. Bi-annual and annual forbs demonstrate a strong foothold in the burn as well.

c. Utilization is too high on the slope between Boulder Canyon and Elbow Canyon

Key Area #3 (Hancock Area) has had some years of high utilization (60-80% use on current year's growth) on galleta and Mormon tea, which could affect attainment of desirable status. This involves 410 acres. However, since the grazing permit was transferred to a new permittee (in 2008), this high utilization has not continued (see utilization data on page 34).

d. Desert tortoise populations are still declining

The recovery program for the Mojave population of the desert tortoise requires range-wide, long-term monitoring to determine whether recovery goals are met. Monitoring of this species has been occurring for many years. Before the tortoise was listed, populations were monitored either using strip transects (where indications of tortoise presence – live or dead tortoises, scats, burrows, or tracks – were converted to estimates of abundance based on transects conducted in areas of better-known tortoise density) or by using capture-recapture population estimates on a limited number of (usually) 1 square mile study plots. Although data have continued to be collected on transects and study plots in recent years, both methods

Table 10. Riparian Transect Data – Virgin River Segment within Littlefield Community and Littlefield Allotments

Woody Species	1998	2004	Flood 2005	2006	2008	2010*
Native Willow/ Seep Willow	404	139	33	95	184	67 (seep willow) 438 (willow)
Tamarisk	15	203	162	128	630	182

* Greenline monitoring occurred prior to the December 2010 flood; the transect has not been read since the flood.

The dramatic greenline change in willow and tamarisk occurred due to the big flood of 2005 when the channel changed location into the upland tamarisk and left the existing channel and willows high and dry. The 2008 greenline showed an increase in willows, seep willow, and tamarisk from 2006. Similar changes have also likely occurred as a result of the December 2010 flood event.

Cross-section of this segment (0 = water's edge):

River left bank
0-6 feet: Sedge/cattail
7-15 feet: Willow
15-42 feet: Seep willow, willow/seep willow
42-66 feet: Arrowweed grove
67-130 feet: Scour bar
131-180 feet: Arrowweed, willow, cliff

River right bank
0-9 feet: Sedge/willow
10-40 feet: Arrowweed, willow, clover
41-62 feet: Willow and arrowweed
63-83 feet: Arrowweed, tamarisk, willow
84-264 feet: Old channel sand then upland

The 2010 riparian transect data demonstrated an increase in willows, which have shown large increases, particularly since 2004. Tamarisk decreased dramatically from 2008 to 2010; the tamarisk is now infested with the tamarisk beetle, and the willow is doing well again. Phagramites have also shown a large increase along the river.

Fisheries habitat on these allotments consists of the Virgin River (see discussion on Virgin River fishes on pages 58-59 and 62-63 of this evaluation report). No other waters exist on these allotments to support fish. Treatment of the Virgin River to eradicate nonnative fish species was expected to occur in 2011, but was postponed for the Arizona portion of the river due to a moratorium on use of rotenone and other piscicides[10] prompted by concerns over the potential human health and ecological impacts that may result from rotenone exposure.

10. Wild Horses and Burros

There are no wild horses or burros, or habitat management areas, in these allotments.

[10] A piscicide is a chemical substance which is poisonous to fish. The primary use for piscicides is to eliminate a dominant species of fish in a body of water, as the first step in attempting to populate the body of water with a different fish. They are also used to combat parasitic and invasive species of fish.

C. Information and/or Data Pertaining to Issues (from III.C.1.)

1. Issues relating to Rangeland Health

a. Willow Spring riparian area, is it PFC?

Prior to the grazing permit transfer in September of 2008 and removal of the former permittees' cattle, the gates at the Willow Spring riparian area were opened persistently every year, which put the wet area at a rating of "functioning at risk". With the recent rest from the trampling, the wet area was rated again as PFC (see Appendix E).

b. Fire recovery in Hatchet Valley and Elbow Canyon

Key Areas 6b and 1-7: Both of these key areas occur in Hatchet Valley and were burned in 2005. They also burned in previous decades. The plant communities are recovering but have a higher composition of annuals due to these fires. (See DPCs for these key areas.) Total acres burned in 2005 were 18,526. There are components of the plant community that do not meet Standard #3 and are addressed in the DPC section of this document.

There is no key area in the burned area of Elbow Canyon so specific data as described above is not available. Past visits have indicated recovery in this area is also taking place as the shrubs are re-sprouting and perennial grasses are more evident. Bi-annual and annual forbs demonstrate a strong foothold in the burn as well.

c. Utilization is too high on the slope between Boulder Canyon and Elbow Canyon

Key Area #3 (Hancock Area) has had some years of high utilization (60-80% use on current year's growth) on galleta and Mormon tea, which could affect attainment of desirable status. This involves 410 acres. However, since the grazing permit was transferred to a new permittee (in 2008), this high utilization has not continued (see utilization data on page 35).

d. Desert tortoise populations are still declining

The recovery program for the Mojave population of the desert tortoise requires range-wide, long-term monitoring to determine whether recovery goals are met. Monitoring of this species has been occurring for many years. Before the tortoise was listed, populations were monitored either using strip transects (where indications of tortoise presence – live or dead tortoises, scats, burrows, or tracks – were converted to estimates of abundance based on transects conducted in areas of better-known tortoise density) or by using capture-recapture population estimates on a limited number of (usually) 1 square mile study plots. Although data have continued to be collected on transects and study plots in recent years, both methods

suffer statistical deficiencies and logistical constraints that render them unsuited for monitoring trends in abundance applicable either range-wide or to individual recovery units (USFWS 2010b).

In 1999 the Desert Tortoise Management Oversight Group endorsed the use of line distance sampling for estimating range-wide desert tortoise density, and this methodology began to be used in 2001 (Buckland et al., 2001). Distance sampling methods use measurements taken from the center of the transect lines to tortoises to model detection as a function of distance from the path walked by sampling personnel. Density estimates from any brief window of time would be expected to detect only catastrophic declines or remarkable population increases. Therefore, the first five years of this monitoring (2001-2005) were not to document trends, but to gather information on baseline densities and year-to-year recovery unit to recovery unit variability. In 2001, five live and nine dead tortoises were observed within the Gold Butte-Pakoon DWMA – none of the live animals were within either the Littlefield or Littlefield Community allotment; one of the carcasses was located within the Littlefield Community Allotment. In 2002, no live tortoises were encountered while two carcasses were observed within the DWMA; neither of the carcasses was within either of these allotments. In 2003, ten live tortoises were encountered in the DWMA (two of these in Littlefield Community Allotment), while 24 carcasses were observed (one of these in Littlefield Community Allotment). In 2004, five live tortoises were encountered (none of these within either the Littlefield or Littlefield Community allotment) and ten carcasses were observed (one of these within Littlefield Community Allotment). In 2005, three live tortoises were encountered in the DWMA (none of these were within either the Littlefield or Littlefield Community allotment) and six carcasses were observed (one of these within Littlefield Community Allotment) (USFWS 2006).

Monitoring efforts since 2001 (since line-distance sampling began) have generated the following data (shown in Table 11) to facilitate density estimates (USFWS 2009; USFWS 2010b; USFWS 2010c; USFWS 2012b).

Table 11. Gold Butte-Pakoon Desert Tortoise Monitoring Results

Year	Area Monitored	Sampling Dates	# of live tortoises observed*	Density (per km^2)	
				Gold Butte-Pakoon	NE Recovery Unit
2001	1,603 km^2	May 10 – June 22	5/0	1.2	2.4
2002	Data not provided	April 24 – April 25	0/0	---	None calculated
2003	162 km^2	April 30 – June 17	10/2	1.8	3.7
2004	1,923 km^2	April 21 – May 19	5/0	0.7	1.2
2005	1,977 km^2	April 12 – June 7	3/0	0.2	1.8
2006	Not monitored				
2007	1,977 km^2	April 17 – May 29	4/0	1.2	1.7
2008	1,977 km^2	April 13 – May 16	0/0	0	0.9
2009	1,977 km^2	April 27 – May 30	8/1	2.2	3.4
2010	1,977 km^2	April 7 – April 22	22/1	1.8	3.2
2011	1,977 km^2	April 6 – April 19	18/0	1.6	3.4

* First number represents total number across the entire DWMA; second number represents number associated with the Littlefield Community and Littlefield Allotments.

Results from the line distance sampling effort listed tortoise populations in the area as low. Density estimates from the monitoring are lower than estimates from earlier studies (Luckenbach 1982, Berry 1984). Precise comparisons cannot be made because the historical monitoring efforts were conducted using different techniques at different scales and with different goals. At this time, the data collected is only statistically valid at the recovery unit level. While annual estimates may be imprecise (due to a variety of factors such as vegetation that differentially obscures vision with distance, or different detection protocols used by individual crews), over a period of years any underlying trend in the number of tortoises should be obvious (USFWS 2010b).

e. Feral pigs in Hedricks and Hancock canyons.

Feral pigs have been observed in portions of the Littlefield Community Allotment, in the Cougar Spring area and in any canyon that has water sources in the Virgin Mountains. Hunters are allowed to take the pigs to reduce or eliminate the population, but hunting them is difficult due to the rough and remote nature of the area and lack of access.

V. Conclusions

A. Pertaining to Objectives

1. Land Use Plan Objectives[11]

Arizona Strip Field Office RMP
and
Grand Canyon – Parashant National Monument RMP

Water

DFC-RP-06
All surface water will meet, or be improving towards, Arizona State water quality standards.

DFC-WS-03
Surface water availability at seeps and springs will be appropriate for the soil type, climate, and landform.

These objectives are being met. Water quality and quantity are at appropriate levels at all springs. While there are no water quality monitoring stations at any of the springs in the allotment, site visits to these springs by BLM staff do not indicate that issues with water quality standards exist. Willow Spring (Littlefield Community Allotment) is the only one with a riparian area that meets priority status (as defined in the RMPs); the riparian area at this spring is rated in PFC. The Littlefield Community Allotment has several other springs in the Virgin Mountains, none of which meet the criteria for priority riparian areas due to small size and ephemeral flows, as listed in the RMPs. A section of the Virgin River fails state standards for selenium and suspended solids. This is due to selenium input from the Littlefield Springs and sediment loading from upstream runoff in Utah and Arizona.

Soil Stability

*DFC-VM-03/**DFC-VM-04** (Vegetation – All Ecological Zones)*
Vegetative communities will provide sufficient plant cover and litter accumulation to protect soils from wind and water erosion and enhance nutrient cycling and productivity, even during drought years.

DFC-WS-06
The natural hydrologic functions of all watersheds will be intact.

DFC-WS-07
Soils will exhibit infiltration, permeability, and erosion rates appropriate for the soil type, climate, and landform.

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[11] Similar RMP objectives have been grouped together with one conclusion per grouping.

DFC-WS-08
Physical soil crusts will show an increase in organic cover including cryptobiotic colonies, moving them towards being organic crusts.

All of these objectives are being met. A Standard #1 documentation worksheet was completed at Key Areas #1, #5, #6a and #6b (see Appendix E). The documentation worksheet evaluates seven indicators (surface litter, bare ground, rock, flow patterns, gullies, rills, and plant pedestaling) that determine the functional condition of upland sites as it relates to infiltration, permeability, and erosion rates. All seven indicators were rated at "None to Slight" at both key areas. The "None to Slight" determination means there was no or only a slight departure of those indicators from normal or the natural range of variation. The determination for all key areas is that they were functioning properly and meeting Standard #1. Soil, cryptobiotic soil crusts, and vegetative condition and watershed function are at acceptable levels and are appropriate for the site. The soils are resistant to compaction and there is no evidence that they have been adversely altered by grazing or other activities overall. Due to very gravelly or rocky surface ground cover on the bajadas and mountain slopes, cryptogams are a minor component of the surface. Accelerated erosion is minimal and is not readily observed. To reconfirm this, recent field trips were conducted by an experienced soil scientist, and additional soil condition data was collected and samples analyzed (see pages 40-42 of this evaluation report for a detailed soils discussion). As in the first field assessment, no significant areas of impacts detrimental to soils or vegetation were found.

Ecological Processes

DFC-VM-04/ ***DFC-VM-05*** *(Vegetation – All Ecological Zones)*
Ecological processes and functions will be protected, enhanced, and/or restored by allowing tools that are necessary and appropriate to mitigate adverse impacts of allowable uses and undesirable disturbances, and contribute to meeting the Standards for Rangeland Health ***… and enhance Monument values****.*

DFC-RP-03
Ecological functions and processes will be intact with vegetative species composition and cover appropriate to the site.

DFC-WS-04
Ecological functions and processes will be intact at all seeps and springs.

DFC-WF-01
Ecological conditions will be within the range of natural variability and will be functional for dependent animal species.

*DFC-WF-11/****DFC-WF-12***
The natural biological diversity of fish, wildlife, and plant species will be maintained or, where necessary and feasible, restored throughout the Arizona Strip FO

***(Monument)**. Habitats will be managed on an ecosystem basis, ensuring that all parts of the ecosystem and natural processes are functional.*

Willow Spring in Elbow Canyon is fenced, which protects the wet meadow. In the past, the gate was periodically opened which provided access for livestock. However, the grazing permit was transferred in 2008, which has positively affected the Willow Spring riparian area. With this recent rest from the trampling, the wet area was ranked again at PFC on January 13, 2009.

The uplands that have not burned are in mid-seral to PNC ecological stages (see ESI and frequency trend data for key areas 2-5). The burned areas are all in low to low-mid seral (see data or key areas 6b and 1-7). This allotment has wide vegetative diversity where burns have not occurred recently, as well as in old burn areas (see data for key areas 1-13 and 6a); new burns have less diversity. The fires from 2005 all have the potential to attain what the old burns have attained, which is a wide diversity within 20-30 years. The areas in Tom and Cull that burned in 2005 have not yet met these objectives, but the other areas not recently burned are meeting the objectives.

Livestock use in tortoise habitat occurs only in the winter months, before the growing season of most desert plants. This maintains the ecological processes and functions at necessary levels, mitigates disturbances, and minimizes impacts to desert tortoises and their critical habitat by reducing direct competition for forage. Eliminating grazing during the vegetative growing season allows plants to replenish root reserves and therefore increase vigor. While drought (and possibly past high utilization by livestock) have affected the frequency of some species (such as bursage), the ESI and trend data show that the plant communities are intact as a whole in areas that have not burned (the majority of the allotments), the natural biodiversity of plants is at good levels, and most of the seral stages are PNC to late seral (as shown in Table 9), representative of stable plant communities. The field visit evaluation showed that the allotment was meeting Standard 1 (see pages 93-94 of this assessment report), and subsequent monitoring has confirmed this.

Invasive Plants

*DFC-VM-05/**DFC-VM-06** (Vegetation – All Ecological Zones)*
Invasive plant species will be contained, controlled, or eliminated and native species restored to meet desired plant community (DPC) objectives.

DFC-RP-11
Invasive plants and animals such as tamarisk, Russian olive, and brown-headed cowbird will be reduced or eliminated.

*DFC-VM-34/**DFC-VM-38** (Vegetation – Mojave-Great Basin Transition Ecological Zone)*
Management of Mohave-Great Basin Transition Ecological Zone plant communities

will focus on removing invasive non-native plants, especially cheatgrass, Sahara mustard, and red brome, and preventing habitat degradation due to wildfire.

These objectives are being met to the extent possible. Invasive species, such as red brome and Sahara mustard, occur over a broad area during wet years; 2005 (an extremely wet year) had a large amount of red brome and Sahara mustard on the lower slopes of the Virgin Mountains. However, on normal to dry years (see precipitation data in Appendix C) such as 2006, 2007, 2008, 2009, and 2010, little to no red brome or Sahara mustard grew. The presence of stable plant communities, such as occur across most of the area within these allotments, allows little to no growth of these invasive plants except in very wet years (see Tables 6 and 8).

In the 2005 burns in Tom and Cull Valley, globemallow and filaree have dominated. There has been little to no red brome recently due to dry autumns; however, should a wet autumn occur the burns in Tom and Cull could have a red brome bloom. See Key Area 6b frequency data (Table 6) and ESI data (Table 8).

There is no Russian olive within these allotments; tamarisk occurs in the river segment that flows through this allotment. The tamarisk leaf beetle is currently just moving into and affecting this invasive species; it remains to be seen how much the beetle will affect the tamarisk. The BLM plans to establish plots to monitor these effects.

No Net Loss

*DFC-VM-28/**DFC-VM-32** (Vegetation – Mojave Desert Ecological Zone)*
There will be no net loss of acres of Mohave Desert plant communities (i.e., long-term or permanent removal from the landscape). A no net loss objective will not preclude restoration, rehabilitation, or related management actions.

***DFC-VM-15** (Vegetation – Great Basin Ecological Zone – Sagebrush Communities)*
There will be no net loss of total acres within sagebrush communities (i.e., long-term or permanent removal from the landscape). A no net loss objective will not preclude restoration, rehabilitation, or related management actions.

DFC-VM-33/***DFC-VM-37*** *(Vegetation – Mojave-Great Basin Transition Ecological Zone)*
There will be no net loss in acres of Transition plant communities (i.e., long-term or permanent removal from the landscape). A no net loss objective will not preclude restoration, rehabilitation, or related management actions.

DFC-VM-42 (Vegetation – Interior Chaparral Ecological Zone)
There will be no net loss of acres of Interior Chaparral plant communities (i.e., long-term or permanent removal from the landscape). A no net loss objective will not preclude restoration, rehabilitation, or related management actions.

These objectives are being met. There has been no net loss of any plant communities; wildfires have set the seral stage back to an earlier stage in some areas, but have not resulted in a long-term or permanent removal of the plant communities from the landscape.

Livestock Grazing

DFC-GM-02
Livestock use and associated management practices will be conducted in a manner consistent with other resource needs and objectives to ensure that the health of rangeland resources is preserved or improved so that they are productive for all rangeland values. Where needed, public rangeland ecosystems will be improved to meet objectives.

DFC-GM-04
Monument values will be maintained, protected, and improved.

Livestock grazing (i.e., season of use, utilization levels, etc.) is managed to maintain or improve the ecological condition of the allotments. Livestock use in desert tortoise habitat only occurs during tortoise inactive season (October 15 to March 15). This allows for the growth of desert vegetation during the spring and summer without any grazing use, resulting in ephemeral plant growth for forage for desert tortoise and other wildlife species without competition from livestock, thus giving wildlife species a better chance at obtaining important food sources.

In the past, the Littlefield Community Allotment has not had use consistent with other resource needs. Management practices of the previous permitttees resulted in the following: a) Willow Spring riparian area was grazed because the gate was frequently opened during the spring and summer seasons; b) Key Area #3 was grazed too heavily in years prior to 2008; c) livestock from this allotment were a persistent trespass problem on the neighboring Sullivan Canyon Allotment grass seedings; and d) the 2005 burn areas, in the south pasture of Hatchet Valley, had a small, but chronic trespass problem. However, the permit transferred to a new entity in 2008 and these problems were corrected and are no longer occurring. Improvement in rangeland resources is already occurring – for example, the ecological condition of the Willow Spring riparian area has improved from functioning at risk to PFC (see discussion on page 65 of this assessment report). Thus, these objectives are now being met.

Desired Plant Community

DFC-GM-01
Healthy, sustainable rangeland ecosystems will be maintained or improved to meet Arizona's Standards for Rangeland Health, and produce a wide range of public values such as wildlife habitat, livestock forage, recreation opportunities, clean water, and functional watersheds.

*DFC-VM-02/**DFC-VM-03** (Vegetation – All Ecological Zones)*
Native vegetative communities will be protected. A mosaic of native perennial and non-invasive annual vegetative communities will be present across the landscape with diversity of species, canopy, density, and age class reflecting its local ecological site potential and naturally occurring habitat conditions.

***DFC-VM-14** (Vegetation – Great Basin Ecological Zone – Sagebrush Communities)*
Sagebrush (primarily Artemisia tridentata) communities will consist of a healthy, diverse mosaic of different height and age structures with a thriving community of native grasses and forbs. Mosaics may include stands of young and old sagebrush, openings (ranging from bare ground to short or sparse vegetation to high-density grasslands), wet meadows, seeps, healthy streamside (riparian) vegetation, and other interspersed shrub and woodland habitats.

***DFC-VM-18** (Vegetation – Great Basin Ecological Zone – Sagebrush Communities)*
Existing stands of sagebrush will have a balance between shrub and perennial grass cover, for open to moderate shrub canopy cover (5 to 25%), and multiple height classes. This mosaic will include young, sparse stands to support Vesper sparrows and lark sparrows, and older, dense stands to benefit Brewer's sparrows, sage sparrows, black-throated sparrows, gray flycatchers, and sage thrashers.

***DFC-VM-19** (Vegetation – Great Basin Ecological Zone – Sagebrush Communities)*
Sagebrush communities will include small, grassy openings to support long-billed curlews and burrowing owls.

***DFC-VM-20** (Vegetation – Great Basin Ecological Zone – Sagebrush Communities)*
Sagebrush communities will include large, continuous blocks (≥300 acres) of unfragmented sagebrush habitat, including mosaics of open to moderate shrub canopy cover (5 to 25%) and multiple age and height classes to benefit sage-dependent species.

***DFC-VM-21** (Vegetation – Great Basin Ecological Zone – Sagebrush Communities)*
Sagebrush communities will include openings of short vegetation surrounded by sagebrush for ground foraging by sage thrashers, loggerhead shrikes, Brewer's sparrows, and sage sparrows.

***DFC-VM-22** (Vegetation – Great Basin Ecological Zone – Sagebrush Communities)*
Sagebrush communities will include openings of short vegetation (2 to 8 in.) with wide visibility to provide breeding habitat for long-billed curlews, and burrowing owls.

***DFC-VM-23** (Vegetation – Great Basin Ecological Zone – Sagebrush Communities)*
Sagebrush communities will include native grass and forb cover in balance with open to moderate (5 to 25%) shrub canopy cover and within ecological site potential. Perennial grass components will be at or above 10%. Native forb composition will be at or above 5%.

***DFC-VM-25** (Vegetation – Great Basin Ecological Zone – Pinyon-Juniper Communities)*
Healthy, diverse woodland communities will consist of a mosaic of trees, shrubs, grasses, and forbs. Mosaic patches can include stands of young and old pinyon-juniper, openings, wet meadows, seeps, and other interspersed shrub habitats. The communities will be composed of a variety of different height structures and age classes, with a thriving understory community of native grasses, forbs, and shrubs.

***DFC-VM-28** (Vegetation – Great Basin Ecological Zone – Pinyon-Juniper Communities)*
Stands of pinyon-juniper will include a balance between tree, shrub, and perennial grass cover to support pinyon jay and mule deer. This mosaic will include stands of old growth pinyon-juniper to support juniper titmouse; large openings of grasses, forbs and shrubs to support mule deer and provide foraging habitat for raptors such as sharp-shinned hawk, northern goshawk, Coopers hawk, American kestrel, and red-tailed hawk; and areas of sparse to dense tree canopy cover to support pinyon jay.

DFC-VM-26 (Vegetation – Mojave Desert Ecological Zone)
Endemic plant species and associated communities such as creosote bush, Joshua tree, Mojave yucca and cacti, will be present along with other shrubs, grasses, and wildflowers. These communities can include stands of young and old shrubs, sparse vegetation, scattered to larger expanses of creosote bush or Joshua trees, seeps, healthy streamside vegetation, and other interspersed grassland and shrub habitats.

*DFC-VM-30/**DFC-VM-34** (Vegetation – Mojave-Great Basin Transition Ecological Zone)*
Endemic plant species and associated communities such as black brush, Joshua tree, Mojave yucca, and cacti will be present along with other shrubs, grasses, and wildflowers. These communities can include stands of young and old shrubs, sparse vegetation, scattered to larger expanses of black brush to various mixes of black brush, Joshua trees, pinyon-juniper, yucca, and shrub habitats.

*DFC-VM-32/**DFC-VM-36** (Vegetation – Mojave-Great Basin Transition Ecological Zone)*
Priority plant species and associated communities such as black brush, Joshua tree, Mojave yucca, and cacti will be present along with other shrubs, grasses, and wildflowers. These communities can include stands of young and old shrubs, sparse vegetation, scattered to larger expanses of black brush to various mixes of black brush, Joshua trees, pinyon-juniper, yucca, and shrub habitats.

DFC-VM-39 (Vegetation – Interior Chaparral Ecological Zone)
The Interior Chaparral Ecological Zone will consist of diverse populations of endemic vegetative species, particularly shrubs, and a mosaic of age class distributions of these species.

DFC-VM-40 (Vegetation – Interior Chaparral Ecological Zone)
Endemic plant species and associated communities such as manzanita, silk tassel, and live oak will be present, along with other shrubs, grasses, and forbs.

DFC-RP-01
Riparian areas, ***including Monument objects,*** *will consist of a diversity of vertical and horizontal structures, vegetative age classes, and endemic species.*

*DFC-WF-16/****DFC-WF-17***
Mule deer habitat in pinyon-juniper woodland sites will include a healthy diverse mosaic of trees, shrubs, grasses, and forbs.

These objectives are being met to the extent possible. The sagebrush and pinyon-juniper communities make up approximately 10% (8,000 acres) of the allotment. These vegetation types within allotment support a diversity of wildlife (including avian species, reptiles, and large and small mammals), provide forage for livestock, recreation opportunities, and functional watersheds. The DPC objectives that have been developed for this allotment consider these public values. Communities of healthy diverse habitat including vertical and horizontal structures, vegetative age classes, and endemic species are present throughout the allotment.

The allotments provide habitat for a diversity of wildlife (including avian species, reptiles, and large and small mammals), provide forage for livestock, provide recreational opportunities, and provide functional watersheds. As described on pages 26-32 of this evaluation report, DPC objectives have been developed on the allotments to maintain and/or enhance these public values, including providing the primary constituent habitat elements for desert tortoise. Site visits to the allotments determined that soils are within normal parameters and functioning properly. Invasive species are being managed to the extent possible.

Plant communities present in the allotments include native shrubs (such as creosote, yucca, bursage, blackbrush, and ratany) and perennial grasses (such as galleta, Indian ricegrass, squirreltail, and sideoats grama). These communities occur in a mosaic pattern of burned and unburned areas. Ground cover meets or exceeds the DPC objectives at all sites and most of the functional groups meet the DPC objectives. Areas that have not burned consist of a healthy mix of native shrubs, perennial grasses, and forbs (see Table 12). The sites that have a "not met" conclusion (key areas 3, 6b, and 1-7 for browse, and key area 1-7 for native perennial grasses) are due to the early and mid seral state that the key areas are in from the recent or near recent fires through the east side of the Virgin Mountains. Many of the plant species are recovering from being burned off. The sagebrush and blackbrush zones in the Littlefield Community Allotment have suffered some losses in Tom and Cull Valley from fire. As neither of these shrubs are re-sprouters, their recovery is a long (multi-decadal) process. The other zones, which have plants that are re-sprouters, have either quickly recovered or are recovering from burns in the same area, especially the Interior Chapparal Zone. These objectives are therefore being met to the extent possible.

Riparian

DFC-RP-02
Riparian areas will be protected, enhanced, and/or restored by allowing tools that are necessary and appropriate to mitigate adverse impacts of allowable uses and undesirable disturbances, and contribute to meeting the Arizona Standards for Rangeland Health ***… and enhance Monument objects and values***

DFC-RP-04
Where sites have the potential for overstory vegetation, the canopy cover of overstory and understory vegetation will be at or approaching maximum density.

DFC-RP-05
All riparian areas will be in, or moving towards, proper functioning condition.

DFC-RP-07
Flowing water systems will provide contiguous water and associated riparian vegetative cover, where possible.

DFC-RP-08
Availability of surface water at seeps and springs will be appropriate for the soil type, climate, and landform and will support a diverse population of endemic plant and wildlife species.

DFC-RP-10
Riparian communities will provide habitat for common species such as rush, cottonwood, willow, and yellow-breasted chat, as well as rare species such as southwestern willow (SW) flycatcher, common black hawk, Lucy's warbler, and speckled dace where consistent with site potential.

DFC-WS-05
Flowing water systems will provide continuous flowing water and associated riparian vegetative cover, where possible.

DFC-TE-15/DFC-TE-19
Essential habitats, important migration routes, required flows, and water quality will be protected and maintained in lentic and lotic systems in the Arizona Strip FO.

DFC-TE-28
Riparian areas will be in proper functioning condition and be of sufficient quantity and quality to provide adequate foraging areas for bald eagles, peregrine falcon, common black hawk, and other special status raptors.

DFC-TE-35
Riparian areas will be in proper functioning condition and be of sufficient quantity and quality to provide adequate foraging areas for SW flycatcher, Yuma clapper rail, yellow-billed cuckoo, and other special status birds.

DFC-TE-37
Riparian areas that can physically support SW flycatcher habitats due to floodplain width and gradient will attain the vegetation structure, plant species diversity, density, and canopy cover to be suitable habitat.

DFC-TE-38
Riparian vegetation will be sufficiently dense and structurally complex to minimize or eliminate the effects of SW flycatcher predators and preclude brown-headed cowbirds from finding SW flycatcher nests.

DFC-TE-39
Cattail and dense marsh habitats will be abundant and provide habitat for Yuma clapper rails.

DFC-TE-40
Cottonwood gallery forests will be abundant and provide habitat for yellow-billed cuckoos.

DFC-TE-41
Potential roosting and nesting sites for riparian dependent special status birds will be abundant.

These objectives are being met. Although some attributes listed in the above objectives (such as canopy cover of vegetation) are not measured, the functioning condition of the Virgin River, as well as other riparian attributes, are measured (see pages 64-65 of this evaluation report). As stated previously, the riparian area along this portion of the Virgin River was rated functional – at risk (see Appendix E). Surveys of the Virgin River/Beaver Dam confluence area (just outside these allotments) have verified the presence of southwestern willow flycatcher, Yuma clapper rail, and yellow-billed cuckoo. This is the only known place on the Arizona Strip where these species are found. The flood of 2005 depleted riparian vegetation along the Virgin River and Beaver Dam Wash, but it had mostly recovered by 2007. The river also flooded in 2010, and regeneration of riparian vegetation is again occurring. This flooding/scouring/regeneration is a normal process for the Virgin River system. Greenline data shows cottonwood, willow, and cattail, as well as tamarisk, are present. The data also shows healthy riparian vegetation zones from the wet zone to the uplands. Tamarisk beetles have been released upstream (in Utah) to control this invasive species. Nesting cover for southwestern flycatchers and other riparian nesting species is expected to be temporarily reduced due to this beetle. There is concern that if tamarisk is removed, flycatcher habitat will not be replaced with native vegetation because of the extremely alkaline soil that can be left behind by the tamarisk. However, as described previously, this stretch of the Virgin River has a healthy presence of native riparian species which are increasing. It is therefore anticipated that removal of tamarisk would allow these native species to further increase.

The riparian area at Willow Spring is recovering from past continuous use by cattle. The gate has remained closed since late 2008 and regrowth of willows, rushes and

sedges has occurred. When the riparian area was reassessed in early 2009, it was found to be at PFC.

Wildlife Habitat

DFC-VM-35 (Vegetation – Mojave-Great Basin Transition Ecological Zone)
Endemic animal species such as desert tortoise, chuckwalla, and desert bighorn sheep will be present and thriving with more than adequate food, water, and cover resources.

DFC-VM-41 (Vegetation – Interior Chaparral Ecological Zone)
Endemic animal species such as black-chinned sparrow and mule deer will be present and thriving with more than adequate food, water, and cover resources.

DFC-WF-02
Native wildlife communities will be protected. A complete range of diverse, healthy, and self-sustaining populations of native animal species will occupy all available suitable habitats.

These objectives are mostly being met. Although there remain problems with non-native vegetation (growth of red brome and Sahara mustard in wet years), the allotments are in good shape overall (i.e., trend and ecological condition) and contains nutritious, high PEP plants. DPC objectives for this allotment have been developed to incorporate wildlife needs (such as forage, cover, shelter, and nesting sites of endemic wildlife species including the desert tortoise), thus ensuring healthy populations of native species. The allotments include several ecological zones (Mojave Desert, Mojave Desert-Great Basin Transition, Interior Chaparral, Great Basin-Sagebrush, and Great Basin-Pinyon Juniper); plant communities present in the allotments include native shrubs and perennial grasses, which provide habitat for a variety of native wildlife communities. These communities occur in a mosaic pattern of burned and unburned areas. Ground cover meets or exceeds the DPC objectives, and most of the functional groups meet the DPC objectives (see Table 12). The sites that have a "not met" conclusion (key areas 3, 6b, and 1-7 for browse, and key area 1-7 for native perennial grasses) are due to the early and mid seral state that the key areas are in from the recent or near recent fires through the east side of the Virgin Mountains. Many of the plant species are recovering from being burned off. The sagebrush and blackbrush zones in the Littlefield Community Allotment have suffered some losses in Tom and Cull Valley from fire. As neither of these shrubs are re-sprouters, their recovery is a long (multi-decadal) process. The other zones, which have plants that are re-sprouters (such as manzanita and silk tassel), have either quickly recovered or are recovering from burns in the same area, especially the Interior Chapparal Zone.

Summer crucial mule deer habitat has not burned in recent years; however, portions of bighorn sheep habitat have burned since 1992. Within the burned area, shrub compositions have been affected over the short term, so only Key Area 1-13 met the palatable shrub objective (see "Wildlife Forage Needs" section on pages 80-81).

Nevertheless, these burns provide an herbaceous forage resource that can benefit mule deer, bighorn sheep, and other wildlife species, especially for lactating females.

Habitat Connectivity

DFC-WF-06
Habitat connectivity and wildlife movement between ecological zones will be maintained.

DFC-TE-14
Habitat connectivity will be maintained, providing sufficiently frequent contact between tortoises to maintain genetic diversity.

These objectives are being met through most of the allotments, and there are no known barriers to wildlife movement within the allotment. Although Interstate 15 (which is the northern boundary of the Littlefield Allotment) is a major barrier for movement of tortoises and other wildlife species, this is outside of the BLM's management control.

The Littlefield Allotment has not had the devastating wildfires that have occurred just north in Utah, or on other parts of the Arizona Strip. Consequently, this allotment contains mature and healthy Mojave Desert vegetation, which provides cover and other habitat attributes for wildlife. Portions of the Littlefield Community Allotment have burned in recent years, primarily at the southern end and at higher elevation areas (in the sagebrush and blackbrush zones). The sagebrush and blackbrush zones in the Littlefield Community Allotment (outside of desert tortoise habitat) have suffered some losses in Tom and Cull Valley from fire, and may require several decades to fully recover. However, the burned areas resulting from the fire of 2005 have become an important part of the vegetation diversity important for many of the wildlife species in the area. Even though this area is at a lower vegetation seral stage, it provides a highly valuable foraging area for small mammals, raptors, and big game species. In unburned areas of this allotment, there appears to be sufficient forage and cover for desert tortoise and other wildlife species to provide sufficient habitat connectivity. For example, Key Areas #4 and #5 are currently at or near desired plant community levels – they contain native perennial grasses and native shrubs (such as creosote, bursage, Mormon tea, and ratany), and are at late seral or PNC.

Habitat connectivity and wildlife movement are also taken into consideration for all project level planning, including travel management, to reduce or mitigate impacts from proposed activities so that movements of tortoises and other species will not be adversely affected.

Wildlife Forage Needs

*DFC-WF-14/**DFC-WF-15***
Forage in crucial summer mule deer habitat will include at least 10% grasses and

forbs composition by weight (CBW) and at least 30% palatable browse species CBW at all key areas, where consistent with site potential.

*DFC-WF-29/**DFC-WF-30***
Forage in desert bighorn sheep habitat areas will include at least 20% grasses, 20% forbs, and 20% palatable shrub species CBW, where consistent with site potential.

Key areas within mule deer and bighorn sheep habitat have the following current forage compositions; site potential for each key area is shown in parentheses:

Key Area	Grass	Forbs	Palatable Shrubs
6a	5% (4%)	16% (3%)	26% (12%)
1-7 (burned)	0 (3%)	13% (5%)	20% (60%)
1-13	19% (3%)	0% (5%)	49% (60%)

Summary for mule deer

6a: Grasses/forbs met; palatable shrubs not met (but 30% objective not consistent with site potential).

1-7: Grasses/forbs met (although this 10% combined CBW should include both grasses and forbs rather than all grasses or forbs); palatable shrubs not met.

1-13: Grasses/forbs met (although this 10% combined CBW should include both grasses and forbs rather than all grasses or forbs); palatable shrubs not met.

Summary for bighorn sheep

6a: Grasses not met (but 20% objective not consistent with site potential); forbs not met (but 20% objective not consistent with site potential); palatable shrubs met.

1-7: Grasses not met (but 20% objective not consistent with site potential); forbs not met (but 20% objective not consistent with site potential); palatable shrubs met.

1-13: Grasses not met (but 20% objective not consistent with site potential); forbs not met (but 20% objective not consistent with site potential); palatable shrubs met.

Summer crucial mule deer habitat has not burned in recent years; however, portions of bighorn sheep habitat have burned since 1992. The site guide for 6a does not indicate that 30% palatable shrubs CBW is within the potential of the site, although it should be noted that current palatable shrub composition is substantially higher than the 12% that would be expected. Within the burned area, shrub compositions have been affected over the short term, so only Key Area 1-13 met the palatable shrub objective. Nevertheless, these burns provide an herbaceous forage resource that can benefit both mule deer and bighorn sheep, especially for lactating females. These specific areas may no longer meet the RMP objectives, but when incorporated into the entire habitat, it becomes a part of the natural range of variability and as such is progressing toward meeting objectives.

Fences

DFC-WF-05
Fences will be the minimum necessary for effective livestock control or other administrative purposes. Fences will be wildlife passable, consistent with the species found in the area.

*DFC-WF-19/**DFC-WF-20***
All fences in mule deer habitat will be deer passable.

These objectives are being met. There are no known issues regarding unsafe wildlife fences on these allotments. Should any wildlife safety issues be identified, fence modification will occur as funding allows.

Healthy Wildlife Populations

DFC-WF-03
Forage, water, cover, and space will be available to wildlife of sufficient quantity and quality to support productive and diverse wildlife populations.

*DFC-WF-12/**DFC-WF-13***
Mule deer habitat will provide the necessary forage, water, and shelter components for healthy, self-sustaining populations within the range of natural variability.

*DFC-WF-27/**DFC-WF-28***
Desert bighorn habitat will provide the necessary forage, water, and shelter components for healthy, self-sustaining populations within the range of natural variability.

*DFC-WF-34/**DFC-WF-35***
Desert cottontail habitat will provide the necessary forage, water, and shelter components for healthy, self-sustaining populations within the range of natural variability.

*DFC-WF-36/**DFC-WF-37***
Migratory bird habitats will provide the necessary forage, water, and shelter components for healthy, self-sustaining populations within the range of natural variability.

*DFC-WF-44/**DFC-WF-45***
Carnivore habitat will provide the necessary forage, water, and shelter components for healthy, self-sustaining populations within the range of natural variability.

These objectives are mostly being met. As discussed above (in the "Wildlife Forage Needs" section), the RMP forage objective for grasses and forbs within crucial summer mule deer habitat was met at all of the key areas. Summer crucial mule deer habitat has not burned in recent years, but portions of bighorn sheep habitat have

burned since 1992. Within the burned area, shrub compositions have been affected over the short term, so only Key Area 1-13 met the palatable shrub objective for both mule deer and bighorn sheep. However, these burns do provide an herbaceous forage resource that can benefit both of these species, as well as other wildlife species, especially for lactating females. These specific areas may not meet the RMP objectives, but when incorporated into the entire habitat, it becomes a part of the natural range of variability and as such is progressing toward meeting objectives.

As described on pages 64-65 and 78-79 of this evaluation report, the two riparian areas within these allotments (Willow Spring and the Virgin River) consist of healthy and diverse riparian vegetation. This provides the necessary habitat components for riparian-dependent wildlife species.

Sustainability needs (such as forage, cover, and shelter) for wildlife including mule deer, bighorn sheep, migratory birds and carnivores were taken into consideration when the DPC objectives for these allotments were developed (see Desired Plant Community conclusions above). Wildlife waters are inspected by the BLM and AGFD and maintained/repaired as funding allows. Wildlife population and habitat monitoring will continue. Impacts to wildlife and their sustainability needs are taken into consideration and analyzed during all project-level planning in order to minimize impacts from proposed activities. In addition, the BLM will continue to work cooperatively with AGFD to identify and resolve issues that may be affecting mule deer and bighorn sheep populations in Unit 13B.

Wildlife Population Numbers

*DFC-WF-13/**DFC-WF-14***
Mule deer populations will be at or near maximum levels sustainable for the habitat.

*DFC-WF-28/**DFC-WF-29***
Desert bighorn sheep populations will be at or near maximum levels sustainable for the habitat.

*DFC-WF-35/**DFC-WF-36***
Desert cottontail rabbits will be present in sufficient quantity to provide an adequate prey base for raptors, carnivores, and other predatory species, as well as ample recreational opportunities for hunting and wildlife viewing.

*DFC-WF-37/**DFC-WF-38***
*Migratory birds that nest in the **Monument and** in the Arizona Strip FO will have resources of sufficient quantity and quality to provide for nesting sites and to fledge young successfully.*

Progress towards meeting these objectives is ongoing. Unit 13B, which includes these allotments, is considered a low productivity area for mule deer, although their populations in the unit are generally stable. As stated previously in this land health evaluation report, the eastern half of the Littlefield Community Allotment is considered

yearlong, summer, and summer crucial habitat for mule deer; deer exist in this allotment in low densities. Factors suppressing mule deer population recovery have been identified and include limited summer range, lack of precipitation, high predation, and unrealistic estimates of the carrying capacity of the area for deer. The BLM will continue to work cooperatively with AGFD to resolve these issues (where possible).

The bighorn sheep count in 13B was lower in 2008 than previous years, likely due to the removal of 82 sheep between 2005 and 2007 for translocation to other areas (AGFD 2013). The sheep population in this unit was surveyed again in late 2011 by AGFD; the total estimated population for 13B North (the Virgin Mountains population) had increased 26% since the last (previous) survey was done in 2008 (see Appendix F).

The IAT examined the indicators of Standard 1 (soil conditions and ground cover) and determined that there was "None to Slight" departure from normal. In addition, habitat attributes (including shrubs and native perennial grasses) which provide forage, cover, shelter, and nesting sites for a variety of wildlife species have been taken into consideration when developing DPC objectives for these allotments and incorporated into these objectives. These objectives provide for sufficient plant cover and litter accumulation to protect soils from wind and water erosion, encouraging nutrient cycling and productivity. Management of the allotment (including no grazing between March 15 and October 15 in critical tortoise habitat) would continue progression toward achieving desired objectives, which will facilitate wildlife population numbers reaching maximum levels sustainable for the habitat.

Wildlife Waters

DFC-WF-04
All waters will be safely accessible to wildlife.

*DFC-WF-17/**DFC-WF-18***
Water sources within mule deer habitat will be safely accessible to deer and other wildlife.

*DFC-WF-18/**DFC-WF-19***
Water sources within mule deer habitat will be spaced no more than 3 miles apart.

*DFC-WF-30/**DFC-WF-31***
Water sources within bighorn sheep habitat areas will be safely accessible to bighorn and other wildlife.

*DFC-WF-31/**DFC-WF-32***
Water sources within bighorn sheep habitat will be spaced no more than 4 miles apart.

*DFC-WF-42/**DFC-WF-43***
Water sources within game bird habitats will be safely accessible by all wildlife.

DFC-RP-09
A sufficient quantity of water with safe access for wildlife will be available, where appropriate.

Progress toward meeting these objectives is ongoing. Wildlife and livestock water catchments are inspected and repaired/maintained as funding allows; those found to be hazardous to wildlife are modified. The catchments located within these allotments are now fenced (or planned to be fenced, as funding allows) with a pipe fence designed by AGFD to allow deer and wildlife free access but preclude livestock. Additionally, a mule deer management plan, which outlines objectives to better manage this species, has been jointly developed by the BLM and AGFD. This plan includes objectives to provide additional wildlife waters (to meet the water spacing requirement for mule deer and bighorn sheep) and repair and maintain existing wildlife waters (to ensure reliable water sources).

Special Status Species Habitat

DFC-VM-27 (Vegetation – Mojave Desert Ecological Zone)
Endemic animal species such as desert tortoise and chuckwalla will be present and thriving with more than adequate food, water, and cover resources.

DFC-TE-03
The Arizona Strip and ***The Monument*** *will provide a block of remote, contiguous habitat that will serve as refugia for populations of special status species.*

DFC-TE-13
Desert tortoise habitat will provide sufficient forage and cover attributes to support thriving populations of the species.

*DFC-TE-25/**DFC-TE-21***
Habitat areas for special status raptors will provide sufficient forage and cover attributes to support thriving populations of the species.

*DFC-TE-27/**DFC-TE-23***
Potential roosting and nesting sites (for special status raptors) will be abundant.

These objectives are being met to the extent possible. As described in this assessment report (see pages 29-31), the primary constituent elements of habitat that are essential for the conservation of the desert tortoise include important forage plants (that provide nutritional needs) and shelter plants. These allotments provide many of these important forage and shelter plants, including creosote, bursage, ratany, and annual forbs. The Littlefield Allotment has not had the devastating wildfires that have occurred just north in Utah, or on other parts of the Arizona Strip. Consequently, this allotment contains mature and healthy Mojave Desert vegetation.

Portions of the Littlefield Community Allotment have burned in recent years, primarily at the southern end. In unburned areas of this allotment, there appears to be sufficient forage and cover for desert tortoise and other special status species. For example, Key Areas #4 and #5 are currently at or near desired plant community levels – they contain native perennial grasses and native shrubs (such as creosote, bursage, Mormon tea, and ratany), and are at late seral or PNC. Key Area #3 also contains important forage plants for tortoise, including bursage, big galleta, and Mormon tea, although these species should be more abundant. In the past, utilization on these species (by cattle) was too high. However, utilization in recent years has been substantially lower (due to a new permittee), which should aid in these plants increasing.

In burned areas of the allotment, recovery is occurring. For example, the area in which Key Areas #6a and #6b are located has had repeated fires through the decades. The site contains a variety of shrubs, including cliffrose and turpentine bush. The 2005 burn area was seeded in early 2006 and small quantities of sideoats grama, Kochia spp, and small burnet have germinated and are easily noted. Key Area #1-13 is in the higher elevation part of the Littlefield Community Allotment. It ranks at mid seral and has a good composition of native plants – a fair grass component along with native browse. Utilization has generally been moderate. Recovery to a full-fledged chaparral site (dominated by manzanita and silk tassel, with other shrubs a minor part of the community) is occurring since the burns that occurred in the 1940s through 1960s.

Sustainability needs such as prey items, forage, cover, roosting and nesting sites, and quantity of suitable habitat for desert tortoise, special status raptors and riparian-dependent special status bird species have also been taken into consideration when developing the DPC objectives for these allotments. These habitat elements, including the primary constituent habitat elements for desert tortoise, were incorporated into the DPC objectives. All of these factors will ensure habitat constituents for listed species are provided.

Healthy Special Status Species Populations

DFC-TE-11
Desert tortoise populations within the ACECs and Desert Wildlife Management Area (DWMA) will be healthy and self-sustaining. Populations will be stable or increasing. Population declines will be halted.

DFC-TE-12
*Desert tortoise populations outside of the ACECs and WHA will be healthy and stable. Declines (**Impacts to the population of the)** in the WHA will be minimized to the extent possible through mitigation.*

*DFC-TE-24/**DFC-TE-20***
Special status raptor populations will be healthy and self-sustaining throughout their range.

*DFC-TE-29/**DFC-TE-25***
Rodent populations, as a prey base (for special status raptors), within the Arizona Strip FO will be abundant.

The BLM is progressing towards meeting these objectives. As described on pages 66-68 of this report, long-term monitoring of the Mojave population of the desert tortoise has been occurring for many years in order to determine population trends. While it is likely too soon to make a definitive determination on population trends, recent monitoring data appears to show that the population of desert tortoise in the Northeastern Mojave Recovery Unit (of which these allotments are a part) may have stabilized (see Table 11). The BLM will continue to work with the USFWS to implement best management practices that will assist in the recovery of the desert tortoise.

Sustainability needs such as prey items, forage, cover, roosting and nesting sites, and quantity of suitable habitat for special status species have been taken into consideration when developing the DPC objectives for this allotment. The plant communities in unburned areas are healthy, are in late seral stage, and are functioning properly. In unburned areas, there appears to be sufficient forage and cover for special status species, including desert tortoise. The plant communities in the Mojave Desert ecological zone provide a mixture of creosote, bursage, native perennial grasses, and annual forbs, all of which are essential to the survival of the desert tortoise. The higher elevation part of the Littlefield Community Allotment has a good composition of native grasses and native browse. Recovery to a full-fledged chaparral site (dominated by manzanita and silk tassel, with other shrubs a minor part of the community) is occurring since the burns that occurred in the 1940s through 1960s.

Burned areas of the Littlefield Community Allotment, including approximately 7,700 acres of critical tortoise habitat, could require decades to return to late seral stage. Management proposed for the allotments, including winter-only grazing in tortoise habitat, eliminates competition for forage and protects perennial shrubs in these areas by not authorizing grazing during the vegetative growing season. The impact of grazing on plant growth depends greatly on when the grazing occurs during the growing season and at what stage of the plant's life cycle. Plants are generally less damaged by grazing early in the season when time, soil moisture, and nutrients needed for regrowth are abundant. Plants are most likely to be damaged by grazing when the plant is beginning to produce flowers and seeds. At this time, the plant has high energy demands to produce seeds, complete growth for the season, and store energy to get through the dormant season (University of Idaho and Idaho Rangeland Resource Commission 2011). During the winter, shrubs are not actively photosynthesizing and plants do not try to re-grow after being grazed. Thus, winter-only grazing in tortoise habitat would continue to achieve or move toward achieving desired objectives, as well as maintain habitat features for desert tortoises (and other special status species) in these allotments. This management will facilitate wildlife population numbers (including those of special status species) maintaining or reaching levels sustainable for the habitat to the extent possible.

No Net Loss of Special Status Species Habitat

DFC-TE-04 and DFC-TE-08
There will be no net loss in the quality or quantity of special status species habitat throughout the Arizona Strip FO.

DFC-TE-10
There will be no net loss in the quality or quantity of desert tortoise habitat within the ACECs or WHA.

*DFC-TE-20/**DFC-TE-16***
*No net loss will occur in the quality and quantity of suitable habitat for endemic amphibians and aquatic invertebrate species within the Arizona Strip FO/ **Monument**.*

*DFC-TE-26/**DFC-TE-22***
*No net loss will occur in the quality and quantity of suitable habitat for special status raptors within the Arizona Strip FO/**Monument**.*

DFC-TE-33
No net loss will occur in the quality and quantity of suitable habitat for riparian-dependent special status bird species within the Arizona Strip FO.

These objectives are being met to the extent possible. The plant communities in unburned areas are healthy, are in late seral stage, and are functioning properly. However, recent fires have diminished the quality of some habitat in the Littlefield Community Allotment, mostly in the Mojave Desert-Great Basin Transition ecological zone. Approximately 7,700 acres have burned in recent years in critical desert tortoise habitat. This habitat could require decades to return to late seral stage. The management proposed for the allotments, including winter-only grazing in tortoise habitat, would eliminate competition for forage between livestock and tortoises and protect perennial shrubs. As described above (in the "No Net Loss of Special Status Species Habitat" section), plants are generally less damaged by grazing early in the season when time, soil moisture, and nutrients needed for regrowth are abundant. During the winter, shrubs are not actively photosynthesizing and plants do not try to re-grow after being grazed.

Riparian habitat along the edge of the allotments is functional – at risk due to flooding in 2005 and again in 2010 that re-arranged parts of the river's main stem. Although large areas of the river were scoured, regeneration is occurring and recovery continues. This cycle of flooding/scouring and regeneration is a normal part of this river system, and the river in this area is vertically stable. No changes in management are proposed, so progression toward proper functioning condition of the riparian area is not expected to be impeded by actions within the BLM's control. DPC objectives for these allotments were developed that will ensure habitat constituents for desert tortoise and other Mojave Desert species are provided (including creosote, bursage, native perennial grasses, and forbs), as well as habitat features for other special status species in other ecological zones.

Condors

*DFC-TE-31/**DFC-TE-27***
The experimental non-essential population of California condor will be at or above 150 individuals, viable, and stable to increasing in number.

Progress toward meeting this objective is occurring. The BLM works cooperatively with the USFWS, AGFD, and the Peregrine Fund to continue the California condor reintroduction program on the Arizona Strip. The BLM provides financial and in-kind assistance to this program. In addition, conservation measures developed specifically for the California condor are incorporated into all projects that have the potential to affect the species.

Aquatic Habitat

DFC-TE-16
All biologically suitable perennial waters on public lands in the Arizona Strip FO will be occupied by thriving, self-sustaining populations of native fish, as appropriate.

DFC-TE-21
All biologically suitable perennial waters on public lands in the Arizona Strip FO will be occupied by thriving, self-sustaining populations of native, endemic amphibians and aquatic invertebrate species, as appropriate.

DFC-TE-22
New introduced (or re-introduced) populations of relict leopard frog will increase to the point of being viable and self-sustaining.

Non-native fish in the Virgin River are present and compete for resources with native fish. A treatment to remove invasive nonnative fish upstream from these allotments was scheduled for November 2011, but treatment was postponed due to a temporary moratorium on the use of rotenone and other piscicides in the State of Arizona. Elimination of red shiner from the Virgin River is driven by the Virgin River Fishes Recovery Plan (USFWS 1995). Due to the competitiveness of the red shiner and the dramatic declines in the populations of native fish, it is likely that Virgin River chub and woundfin would not persist in the Virgin River in the presence of red shiner. If treatments upstream prove successful, efforts would continue downstream in the future.

Relict leopard frogs have been extirpated from the area; there are no current plans for reintroduction of this species. Aquatic invertebrate populations appear healthy. Progress is therefore being made toward meeting these objectives.

Wilderness Characteristics

DFC-WC-02
Areas where wilderness characteristics will be maintained will be ecologically sustainable and resilient to natural and human-caused disturbances.

This objective is being met. Wilderness characteristics are taken into consideration for all project-level planning so that these characteristics are maintained. In addition, no projects are proposed at this time that would alter the wilderness character of these areas.

Recreation and Visitor Services

DFC-RR-01
Recreation and visitor services will be managed to provide varying levels of both:
1. Structured recreation opportunities that offer a range of specific benefits, activities, and experiences within outdoor settings and/or,
2. Dispersed, unstructured recreation opportunities that focus only on visitor health and safety, user conflict, and resource protection issues (extensive recreation management areas (ERMAs).

DFC-RR-01
Recreation and visitor services will be managed to provide varying levels of structured recreation opportunities that offer a range of specific benefits, activities, and experiences within outdoor settings.

*DFC-RR-04/**DFC-RR-05***
The excellent opportunities that exist to enjoy remote, rustic settings that provide moderate challenge and solitude in the Specialized TMAs will be maintained/enhanced.

*DFC-RR-05/**DFC-RR-06***
In Backways and Specialized TMAs, recreation opportunities associated with somewhat remote settings, such as exploring backcountry roads, vehicle camping, hunting, sightseeing, recreation aviation, and picnicking will be maintained/enhanced on existing roads, provided they will be compatible with the protection and enhancement of sensitive resource values, where appropriate.

*DFC-RR-06/**DFC-RR-07***
In the Primitive TMA, high quality recreation opportunities associated more with primitive recreation experience opportunities and non-motorized uses such as camping, sightseeing, hiking, horseback riding, and hunting, will be maintained/enhanced, provided they will be compatible with the protection and enhancement of sensitive resource values, where appropriate.

DFC-RR-07
In Rural TMA, a wide variety of recreation opportunities associated with near-urban settings, such as walking, OHV play, equestrian, rock crawling, mountain biking, and viewing events, may be maintained/enhanced, provided they will be compatible with the protection of sensitive resource values.

These objectives are being met because a wide variety of recreation experiences are being provided to local and regional community members within the ERMA and SRMAs in these allotments.

Designated Wilderness

DFC-WM-01
The first and dominant goal will be to provide for the long-term protection and preservation of the areas' wilderness character under a principle of non-degradation. The areas' natural condition, opportunities for solitude, opportunities for primitive and unconfined types of recreation, and any ecological, geological, or other features of scientific, educational, scenic, or historical value present will be managed so that they remain unimpaired.

DFC-WM-06
BLM wilderness areas will be managed to be ecologically sustainable and resilient to natural and human-caused perturbations (See Vegetation Management and Fire Management decisions). The BLM will strive to preserve or restore the natural quiet and natural sounds associated with the physical and biological resources of designated wilderness.

The objectives for the management of designated wilderness in these allotments are being met. The Paiute Wilderness is managed to protect its wilderness characteristics – preserving wilderness character is the dominant goal when proposed projects are considered. No projects are proposed at this time that would alter the wilderness character of the Paiute Wilderness.

Wild and Scenic Rivers

DFC-WR-02
Until Congress acts to designate or release from further consideration rivers determined to be eligible and suitable through the previous RMP process and the subsequent Arizona Statewide W&SR Legislative EIS, the following desired conditions will be maintained:

- *Preservation of the stream's free-flowing nature.*
- *Preservation, protection, and, to the greatest extent practicable, enhancement of identified outstandingly remarkable values.*
  - *Virgin River: scenic, geologic, aquatic, and riparian values*
- *Preservation of characteristics that establish the potential classifications as Wild, Scenic, or Recreational:*

- *Wild: free of impoundments, generally inaccessible except by trail, with shorelines essentially primitive and waters unpolluted.*
- *Scenic: free of impoundments and generally inaccessible except by trail. However, shoreline disturbance from highway construction is apparent at several points.*
- *Recreational: several access points and noticeable human developments.*

This objective is being met for the suitable Virgin River wild and scenic river segment (recreational) since the characteristics that established the potential classification will not be affected (i.e., no changes in management are proposed).

National Historic Trails

DFC-HT-01
The following DFCs will apply to the Old Spanish NHT:

- *Visitors seeking to experience the NHT will understand and appreciate the trail's history and significance.*
- *Visitors will appreciate and respect the rights of landowners in the area.*
- *High-potential NHT segments and historic sites will be protected from over-use, inappropriate use, and vandalism.*
- *Scenic values related to historical resources will be protected.*
- *The viability of NHT resources for comprehensive planning will be ensured through effective interim management.*
- *Maximum protection of historic and prehistoric properties within the trail corridor will be provided.*
- *The trail will be managed using the interim provisions of this RMP until a Comprehensive Management Plan/EIS is produced by the Old Spanish NHT planning team.*

These objectives are being met or are in the process of being met. Protection of the high potential Old Spanish National Historic Trail segments and sites is being provided by site-specific management and mitigation. Ongoing inventory and monitoring is occurring along the Old Spanish National Historic Trail to locate and protect high potential segments and sites.

Areas of Critical Environmental Concern

DFC-AC-01
ACECs will provide protection for special status plant and animal species, scenic values, riparian values, and significant cultural resources.

This objective is being met. Protection of the desert tortoise, cultural sites, endangered Virgin River fish, riparian and scenic values within the Virgin Slope and Virgin River Corridor ACECs is being provided by site-specific management. These actions include the following:

- The ACECs are closed to live vegetation harvest, except salvage in areas where surface disturbance has been authorized.
- Livestock grazing in the Virgin Slope ACEC will only occur during the tortoise inactive season (October 15 to March 15).
- In the Virgin River Corridor ACEC, livestock are excluded from suitable flycatcher habitat during the vegetative growing season.

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2. Specific Resource Objectives

Land Health Standards

Standard 1 (Upland Sites):

This allotment was classified in the RMP as category I, which suggests the watershed units currently are in satisfactory erosion condition and are not especially susceptible to wind and water erosion following disturbance. The soils found at lower elevations have a low productivity rate and are moderately to strongly calcareous due to the slight leaching of salts.

Ground cover was measured at all eight key areas; plants, litter, and rock are present in pattern, kind, and amount sufficient to prevent accelerated erosion. At four sites, (Key Areas 1, 4, 5, and 1-13) ground cover increased from the base year. Ground cover at Key Areas 3, 6b, and 1-7 remained static from the base year, while ground cover measurements at Key Area 6a were down. Ground cover data collected between 1982 and 2011 (see Table 12) at each key area indicates fluctuations between readings are not uncommon. These variations are strongly tied to surface litter, which are a reflection of weather – years of high litter accumulation and low bare ground had a wet period prior to the reading, which produced much vegetation. Years of low litter accumulation and high bare ground reflect dry periods before the reading. A Standard #1 documentation worksheet was completed at Key Areas 1, 5, 6a, and 6b (see Appendix E) which represents four of eight key areas on the Littlefield Community Allotment. The documentation worksheet evaluates seven indicators (surface litter, bare ground, rock, flow patterns, gullies, rills, and plant pedestalling) that determine the functional condition of upland sites as it relates to infiltration, permeability, and erosion rates. All seven indicators were rated at "None to Slight" at all four of these key areas. The "None to Slight" determination means there was no or only a slight departure of those indicators from normal or the natural range of variation. Based on this comparison and considering annual variability, the amount of ground cover is appropriate at each study site. Ecological status data indicates three key areas are at PNC, one is in late seral, three in mid-seral, and one early seral.

Table 12. Ground Cover Data for Littlefield Community Allotment

Key Area #1	Bare Ground	Litter	Rock	Live Vegetation	Cryptogam
1982	77	4	19	0	
1992	29.5	62.5	7.5	.5	
1994	8	25	15	2	
1997	56	24	11	9	
Key Area #3					
1982	56	19	22	3	
1988	25	62	13	1	
1992	7	68	25	1	
1997	5	70	16	9	
2001	9	59	25	7	
2007	64.5	21.5	30	4	
Key Area #4					
1982	28	18	52	2	
1988	50	36	12	3	
1992	36	38	23	4	
2001	42	28	22	9	
2010	37	28	29	4	2
Key Area #5					
1982	61	9	30	0	
1992	27	52	18	2	
2001	52	26	17	5	
2008	48	41	11	0	
Key Area #6a					
2007	17	79	7	1.5	
2009	53	39	6	2	
Key Area #6b					
2007	69.5	32	3	.5	
2009	68.5	30	1	.5	
Key Area #1-7					
1983	43	22	33	1	
1997	38	36	0	26	
2001	43	27	8	22	
2009	81	17	3	0	Burned 2005
Key Area #1-13					
1983	19	32	47	2	
1986	16.5	46	32	6	
2001	19	32	19	30	Basal/Canopy
2009	30	58	11	t	

The determination by the IAT was that all key areas are properly functioning and meeting Standard #1.

Standard 2 (Riparian-Wetland Sites): As described on pages 64-65 of this evaluation report, the two riparian sites categorized as priority riparian areas within these allotments are Willow Spring (Littlefield Community Allotment) and the Virgin River (both allotments). Willow Spring, a 12-acre wet meadow area, was rated in

the past as properly functioning but at risk. It was considered to be at risk due to continuous livestock entry with grazing and excessive trampling of the soil. Efforts to plug holes in the fence and to keep gates closed in the past met with only small successes for short periods of time. However, there was a change in permit holder in September 2008; since that time, the gates have remained closed and no trespass has occurred. The Willow Spring riparian area was rated as PFC when most recently evaluated (in 2009).

The Virgin River segment or reach within these allotments amounts to 300-400 acres, and includes the wet zone, woody regeneration zone and the floodplain. The 2012 condition rating for this portion of the river is functioning – at risk (with an upward trend). Flooding in 2005 and again in 2010 re-arranged parts of the river's main stem and even though large areas of the river were scoured, regeneration is occurring and recovery continues; the river in this area is vertically stable. This cycle of flooding/scouring and regeneration is a normal part of this river system.

Greenline data shows cottonwood, willow, and cattail as well as tamarisk are present. The data also shows healthy riparian vegetation zones from the wet zone to the uplands – willows are present and increasing even though tamarisk continues to dominate. The influence of the tamarisk beetle and setbacks to vegetation structure from the 2005 and 2010 flooding may temporarily reduce nesting cover for avian species using the area.

Standard 3 (Desired Resource Conditions): The IAT evaluated trend data, current composition, and conducted an assessment at Key Areas 1, 5, 6a, and 6b relative to criteria for meeting standards, and indicators of rangeland health. As shown in Table 6, trend at Key Areas 1, 4, and 5 are up, while trend at 3, 6b, 1-7, and 1-13 are static. Trend at Key Area 6a is down, due to the decrease in surface litter (79% to 39%). Key Areas 1, 3, 4, and 5 are within tortoise habitat. It was determined that the species composition and cover at Key Areas 1, 4, 5, 6a and 1-13 are appropriate for each site. *Based on this analysis the IAT had consensus that Key Areas #1, 4, 5, 6a, 1-13 were meeting Standard #3.* In addition, Table 12 shows that plant composition at these sites were such that they met the desired plant community objectives, which focus on providing appropriate habitat for desert tortoise and other wildlife species.

At Key Areas 3, 6b, and 1-7, relative criteria for meeting standards, and indicators of rangeland health, resulted in a recommendation that the areas were partially meeting Standard #3 because of the low composition of browse species and perennial grass. It was determined by the IAT that livestock grazing is not the causal factor in only partially meeting DPC objectives and that current livestock grazing would not be a factor in the areas achieving DPC objectives. This determination was based on ESI, utilization, trend and precipitation data, as well as two field visits to the allotment on January 13 and February 3, 2009.

The potential for these sites produce browse species and perennial grasses at levels to reach desired objectives is attainable. Key Area 6b and 1-7 were burned in 2005 and are progressing, but still lack the perennial grass and browse component. Key Area 3 is only four percent short of meeting the browse objective. The low forb

composition at some key areas were not of great concern due to the natural variation that occurs from timing and amounts of precipitation (i.e., during normal or wet years, sufficient forbs would be present).

Desired Plant Community Objectives

Key Area #1 (within desert tortoise habitat)
Ecological Site: Cobbly Limy Upland (6 to 9 inch precipitation zone [p.z.])

- *Maintain total ground cover between 25-35%.*
- *Maintain native shrubs at 60-80% CBW.*
- *Maintain native forbs at 2-8 CBW%*

Conclusion: These objectives are being met or exceeded. Ground cover is at 45%. The composition of native shrubs is 96%, and forb composition is at 4%.

Key Area #3 (within desert tortoise habitat)
Ecological Site: Cobbly Limy Upland Deep (6 to 9 inch p.z.)

- *Maintain total ground cover between 25-35%.*
- *Maintain native perennial grasses (galleta, fluffgrass) between 5-20% composition by weight (CBW).*
- *Maintain browse (bursage, Mormon tea, ratany, goldenhead) at 20-30% CBW.*
- *Maintain shrubs at 35%-50% CBW.*
- *Maintain native forbs at 1-10% CBW.*

Conclusion: These objectives are partially met. Ground cover is at 25%. Native perennial grasses are at 28% and native shrubs are at 56% of the current composition. Browse species composition at 16% does not currently meet the desired objective. However, it is the opinion of the IAT that this objective is attainable under current grazing practices given that ninety-seven percent of this ecological site is at late seral or PNC condition. Forb composition varies annually, and is influenced more by the timing and amount of precipitation, than by current management.

Key Area #4 (within desert tortoise habitat)
Ecological Site: Cobbly Limy Upland Deep (6 to 9 inch p.z.)

- *Maintain total ground cover between 25-35%.*
- *Maintain native browse (bursage, Mormon tea, golden eye, ratany) at 28-50% CBW.*
- *Maintain native shrubs (creosotebush, turpentine bush) at 15-30% CBW.*
- *Maintain native forbs at 1-10% CBW.*

Conclusion: These objectives are being met. Ground cover is at 34%. The composition of native browse species is at 69%, native shrubs are at 30%, and forbs are at 3%. This site is a very stable shrub-dominated plant community with little to no occurrences of perennial grass since monitoring was initiated in 1982.

Key Area #5 (within desert tortoise habitat)

Ecological Site: Limy Upland (6 to 9 inch p.z.)

- *Maintain total ground cover between 15-25%.*
- *Maintain native perennial grass (Indian ricegrass, big galleta,) at 1-10% CBW.*
- *Maintain native browse (Mormon tea, ratany, bursage) at 27-45% CBW.*
- *Maintain native shrubs (creosote bush, cactus) at 35-55% CBW.*
- *Maintain native forbs at 1-10% CBW.*

Conclusion: These objectives are being met or exceeded. Ground cover is at 41%. The composition of perennial grass is at 4%, native browse species are at 35%, and native shrubs are at 61%.

Key Area #6a

Ecological Site: Shallow Sandy Loam Upland Calcareous (10 to 14 inch p.z.)

- *Maintain total ground cover between 30-40%.*
- *Maintain native perennial grasses (galleta, blue grama, desert needlegrass, Indian ricegrass) at 3-15% CBW.*
- *Maintain native browse (cliffrose, Mormon tea) at 10-25% CBW.*
- *Maintain native shrubs (desert peach, snakeweed, yucca, turpentine bush, blackbrush) at 45-65% CBW.*
- *Maintain native forbs at 1-10% CBW.*

Conclusion: These objectives are being met or exceeded. Ground cover is at 42%. The composition of perennial native grasses is at 5%, key browse species composition is 26%, other native shrubs are at 53%, and forbs are at 16%.

Key Area #6b

Ecological Site: Shallow Sandy Loam Upland Calcareous, 10 to 14 inch p.z. – area burned in 2005

- *Maintain total ground cover between 30-40%.*
- *Maintain native perennial grasses (galleta, squirretail, desert needlegrass) at 3-15% CBW.*
- *Maintain native browse (cliffrose, Mormon tea) at 10-25% CBW.*
- *Maintain native shrubs (blackbrush, snakeweed, yucca, desert peach, turpentine bush) at 45-65% CBW.*
- *Maintain native forbs at 1-10 CBW%*

Conclusion: These objectives are partially met. Ground cover is at 33%. Native perennial grasses are at 3% and native shrubs are at 51% of the current composition. The DPC objective not currently meeting is the native browse species. Browse species are currently at 8% composition, which is only two percent below the desired range. The area burned in 2005 which set many of the species back. It is expected to see cliffrose increase through the passage of time which would bring browse into desired levels. The fire disturbance has favored the forb composition which is at 38% composition.

Key Area #1-7

Ecological Site: Limestone Slopes, 13 to 17 inch p.z. – area burned in 2005

- *Maintain total ground cover between 15-25%.*
- *Maintain native perennial grasses (muttongrass, blue grama, squirretail) at 1-6% CBW.*
- *Maintain native browse (Gambel oak, cliffrose) at 6-20% CBW.*
- *Maintain shrubs (pinyon, juniper, sagebrush, snakeweed, turpentine bush, cactus, desert peach, blackbrush, silktassel) at 45-65% CBW.*
- *Maintain native forbs at 1-5% CBW.*

Conclusion: These objectives are partially met. Ground cover is at 26%. Native shrubs are at 85%, and are forbs 15% composition. The two elements not meeting the desired objectives are perennial grasses and browse species. It is difficult to know how much of those components existed pre-fire. This key area was established post fire in an effort to monitor recovery. Two of the more dominant browse species in the immediate transect area are turbinella oak and cliffrose which should become more abundant with time. This should also hold true for perennial grasses. In addition to time, current management practices of reduced livestock numbers and a shortened use period in this area would support attainment of desired vegetation objectives.

Key Area #1-13

Ecological Site: Limestone Slopes, 13 to 17 inch p.z.)

- *Maintain total ground cover between 30-40%.*
- *Maintain native perennial grass (muttongrass, blue grama, squirreltail, junegrass) at 13-25% CBW.*
- *Maintain native browse (Gambel oak, serviceberry, buckbrush) at 16-30% CBW.*
- *Maintain native shrubs (pinyon, juniper, sagebrush, manzanita, snowberry) at 45-65% CBW.*
- *Maintain native forbs at 1-5% CBW.*

Conclusion: These objectives are being met. Ground cover is at 59%. The composition of perennial native grasses is at 19%, key browse species composition is 28%, other native shrubs are at 52%, and forbs are at 1%.

Table 12 presents each DPC objective and whether or not it is currently being met.

Table 12. Desired Plant Community Objectives Determination

Key Area and Plant Species	Current Composition	Desired Plant Composition	Objective Met or Not
Key Area #1 Ecological site: Cobbly Limy Upland Deep, 6-9"			
Ground Cover	45%	25-35%	Met (exceeds)
Native Shrubs	96%	60-80%	Met (exceeds)
Creosotebush	94		
Other shrubs	2		
Forbs	4%	2-8%	Met
Key Area #3 Rangesite: Cobbly Limy Upland Deep, 6-9"			
Ground Cover	25%	25-35%	Met
Native Perennial Grass	28%	5-20%	Met (exceeds)
Galleta	28		
Native Browse	16%	20%-30%	Not Met
Bursage	2		
Ratany	10		
Mormon tea	2		
Goldenhead	2		
Native Shrubs	56%	35-50%	Met
Creosotebush	13		
Turpentine bush	20		
Other shrubs	23		
Key Area #4 Rangesite: Cobbly Limy Upland Deep, 6-9"			
Ground Cover	34%	25-35%	Met
Native browse	69%	45-60%	Met (exceeds)
Bursage	61		
Ratany	6		
Goldenhead	2		
Native shrubs	30%	15-30%	Met
Creosote	20		
Other shrubs	10		
Forbs	1%	1-10%	Met
Key Area #5 Rangesite: Limy Upland, 6-9"			
Ground Cover	41%	15-25%	Met (exceeds)
Native perennial grass	4%	1-10%	Met
Big galleta	4		
Other perennial grass	trace		
Native Browse	35%	27-45%	Met
Bursage	31		
Ratany	4		
Native shrubs	61%	35-55%	Met
Creosotebush	42		

Cactus	19		
Key Area 6a **Ecological Site: Shallow Sandy Loam Calcareous 10-14"**			
Ground Cover	42%	30-40%	Met (exceeds)
Native Perennial Grass	5%	3-15%	Met
Squirreltail	1		
Aristida	2		
Indian ricegrass	2		
Native Browse	26%	10-25%	Met
Cliffrose	25		
Mormon tea	1		
Native Shrubs	53%	45-65%	Met
Desert peach	2		
Blackbrush	11		
Yucca	11		
Turpentine bush	11		
Other shrubs	18		
Forbs	16%	1-10%	Met
Key Area 6b (Burned in 2005) **Ecological Site: Shallow Sandy Loam Calcareous 10-14"**			
Ground Cover	33%	30-40%	Met
Native Perennial Grass	3%	3-15%	Met
Squirretail	1		
Sideoats grama	2		
Native Browse	8%	10-25%	Not met
Cliffrose	3		
Mormon tea	5		
Native Shrubs	51%	45-65%	Met
Blackbrush	5		
Turpentine bush	13		
Yucca	9		
Other shrubs	24		
Forbs	38%	1-10	Met (exceeds)
Key Area 1-7 (Burned in 2005) **Ecological Site: Limestone Slopes 13-17"**			
Ground Cover	26%	15-25%	Met (exceeds)
Native Perennial Grass	0	1-6%	Not Met
Muttongrass	0		
Aristida	0		
Squirreltail	0		
Native Browse	0	6-20%	Not Met
Cliffrose	0		
Oak spp.	0		
Native Shrubs	85%	45-65%	Met – (exceeds)
Sagebrush	2		
Sumac bush	2		
Other shrubs	19		
Turpentine bush	17		
Cactus	26		
Desert peach	11		

Blackbrush	5		
Juniper	5	1-5	
Forbs	15%	1-5%	Met – (exceeds)
Key Area 1-13 Limestone Slopes 13-17"			
Ground Cover	59%	30-40%	Met (exceeds)
Native Perennial Grass	19%	13-25%	Met
Muttongrass	19		
Junegrass	trace		
Squirreltail	0		
Native Browse	28%	16-30%	Met
Serviceberry	20		
Oak spp.	7		
Ceanothus	1		
Native Shrubs	52%	45-65%	Met
Manzanita	17		
Silktassel	10		
Sagebrush	20		
Snowberry	1		
Pinyon	3		
Juniper	1		
Forbs	1	1-5%	Met

Conclusion: Many species in the sites above have a "not met" conclusion due to the early and mid seral state that the key areas are in. These areas have had recent or near recent fires through the east side of the Virgin Mountains, so some of the species are recovering from being burned off and will not be at PNC levels for various time intervals. However, these objectives (the lower end of the objective) should be attainable within 20 years under current livestock management practices.

B. Pertaining to Issues

1. Issues relating to Rangeland Health

a. Willow Spring riparian area, is it PFC?

The riparian area at Willow Spring is recovering from past continuous (and heavy) use by cattle. The gate has remained closed since late 2008 and regrowth of willows, rushes and sedges has occurred. When the riparian area was reassessed in early 2009, it was found to be at PFC.

b. Fire recovery in Hatchet Valley and Elbow Canyon

Key Areas 6b and 1-7 are in the 2005 re-burn and have temporarily lost much of their perennial grasses and browse species. Many of the native shrubs and forbs have begun recovery and are at desired levels.

c. Utilization is too high on the slope between Boulder Canyon and Elbow Canyon

Key Area #3 (Hancock) – This area has good quantities of galleta grass, which in recent years has had heavy use (see utilization data in Table 5). However, the grazing permit was transferred to a new entity in 2008 and heavy utilization is no longer occurring.

The low occurrence of bursage in this key area is also a problem. This involves 2,942 acres. However, this key area is on the edge of the blackbrush zone where bursage diminishes in composition, which could account for its low frequency.

d. Desert tortoise populations are still declining

As described on pages 66-68 of this report, long-term monitoring of the Mojave population of the desert tortoise has been occurring for many years. Monitoring methodology changed in 2001 when line distance sampling began to be used. The first five years of monitoring (2001-2005) were not to document trends, but to gather information on baseline densities. Sample size was also increased to get statistically sound data. While it is too soon to make a definitive determination on population trends, recent monitoring data may indicate that the population of desert tortoise in the Northeastern Mojave Recovery Unit (of which these allotments are a part) may have stabilized (see Table 11).

As discussed on pages 51-57 of this assessment report, a variety of factors (including habitat degradation due to the proliferation of non-native plant species, an increase in fire frequency caused by non-native plants providing sufficient fuel to carry fires, disease, predation by ravens, livestock grazing, and off-road vehicle use) are considered threats to the Mojave population of the desert tortoise. However, little of this portion of the Mojave Desert has burned, resulting in the plant communities within these allotments primarily being at or near desired plant community levels, functioning properly, and containing necessary habitat constituents for the desert tortoise.

Permitted livestock use in desert tortoise habitat on these allotments is from October 15 to March 15. In the past, trespass cattle in the Littlefield Community Allotment were coming down from the non-tortoise habitat in Hancock Canyon to graze around Key Area #3 during that time period. Although this trespass grazing was never observed, utilization studies indicated such use. With the new permittee, this trespass has not occurred as the cattle are moved to the east side of the Virgin Mountains, a considerable distance from tortoise habitat. The winter-only grazing in tortoise habitat allows for the growth of desert vegetation during the spring and summer without any grazing use, resulting in ephemeral plant growth for forage for desert tortoise without competition from livestock, thus giving tortoises a better chance at obtaining important food sources. The winter-only grazing also protects perennial shrubs

by eliminating grazing on these plants during their growing season. During this time, shrubs are not actively photosynthesizing and plants do not try to re-grow after being grazed, meaning they are able to continue storing energy as starches and sugars in roots and crowns to successfully start the next season of growth. Thus, winter-only grazing in tortoise habitat would continue to achieve or move toward achieving desired objectives, as well as maintain habitat features for desert tortoises (and other special status species) in these allotments. This management will facilitate wildlife population numbers (including those of special status species) maintaining or reaching levels sustainable for the habitat to the extent possible.

Since the season of use is during the inactive season for desert tortoises, livestock grazing should not result in direct mortality to tortoises unless a tortoise is injured or killed due to its burrow being stepped on and collapsed. The BLM will continue to work with the USFWS to monitor this species and implement best management practices that will assist in the recovery of the Mojave desert tortoise.

e. Feral pigs in Hedricks and Hancock canyons

The feral pigs throughout the Virgin Mountains need to be hunted to reduce or eliminate the population. There is hunting of the pigs occurring and in time will show its effect.

VI. Technical Recommendations

A. Continue implementing current management practices by conducting consistent utilization monitoring at Key Area #3, ensuring compliance with removal of livestock from tortoise habitat by March 15, reducing livestock numbers during the summer use period (as described on page 5 of this evaluation report), and continue maintaining fences and installing other improvements to facilitate livestock management.

B. Key Areas 1-7 and 6b are re-burn areas. Total livestock would be reduced to 100 head during the June 1 to October 1 period and kept on the east side of the Virgin Mountains. Alternating spring rest in the three pastures on the east side of the Virgins could also occur every other year in a rotation in a best pasture system of use. In addition, move cattle into the upper elevation parts of the allotment by using salt and supplements and water availability. These are all departures from past management, but should help improve vegetative condition of these areas by giving these areas periodic rest.

C. To further implement recommendation "A" above, install the proposed Buggy Draw pipeline which would run from the end of the Cougar Spring pipeline, and become an extension of same – it would run about 3-4 miles into No-Name Valley just west of Hatchet Valley to ease the grazing use around Cougar Spring Reservoir and Cottonwood Spring water. The proposed pipeline would have three troughs.

D. Continue to work with the USFWS to monitor the desert tortoise and implement best management practices that will assist in the recovery of this species.

AUTHORIZED OFFICER CONCURRENCE:

✓ We concur with the recommendations as written.

_____ We do not concur.

_____ We concur, with the following modifications:

Lorraine M. Christian — Sept. 30, 2013
Field Manager — Date
Arizona Strip Field Office

Pamela D. McDop — 10/30/2013
Monument Manager — Date
Grand Canyon-Parashant National Monument

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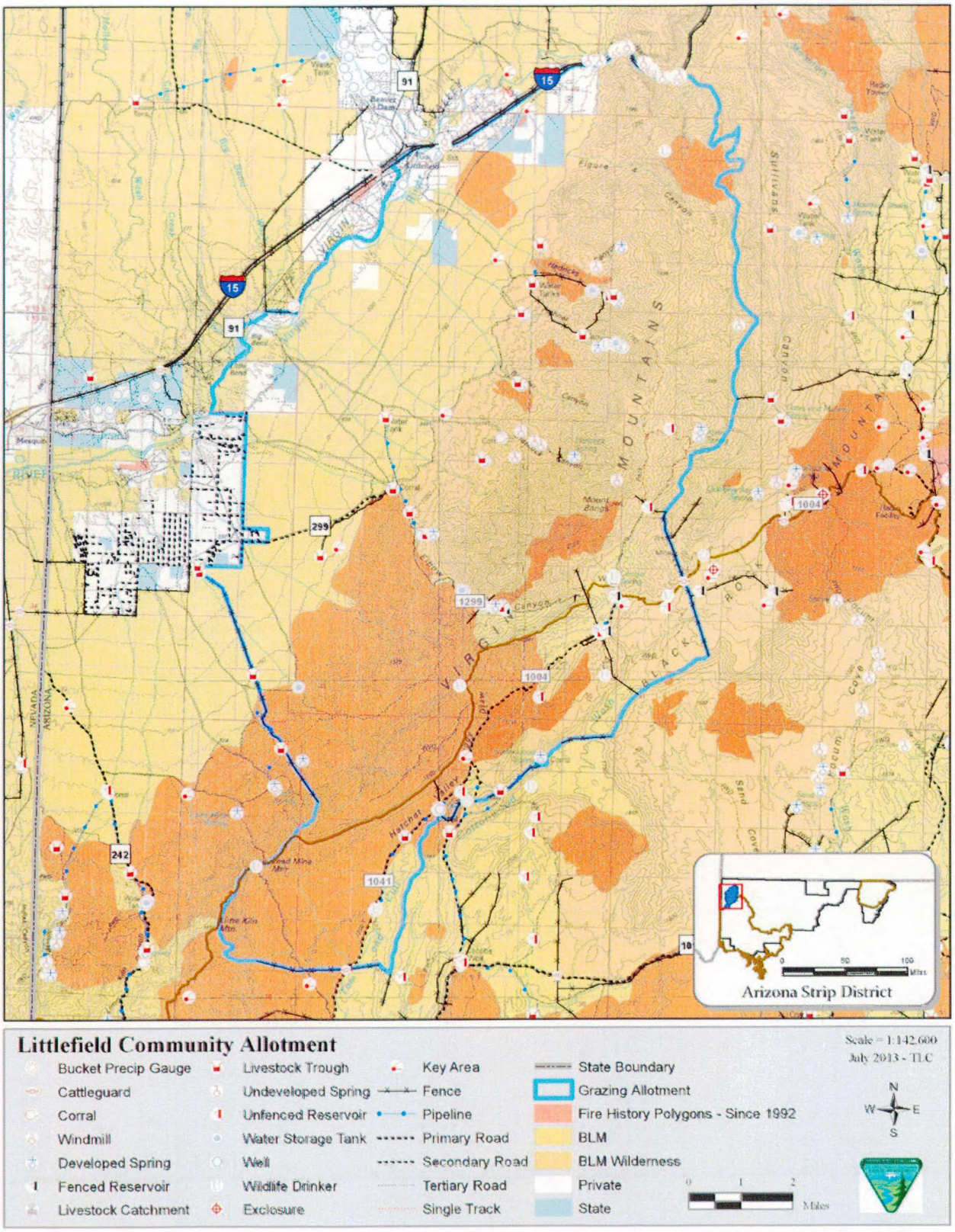
VIII. Plant Species List

Below is a list of plant species (common and scientific names) included in this assessment report.

Table 13. List of Plant Species Included in this Assessment Report

Grasses	
Perennial species	
Grama grass	***Bouteloua* sp.**
Fluffgrass	***Erioneuron pulchellum***
Big galleta grass	***Hilaria rigida***
Bush muhly	***Muhlenbergia porteri***
Indian ricegrass	***Oryzopsis hymenoides***
Sand dropseed	***Sporobolis cryptandrus***
Mesa dropseed	***Sporobolis flexuosus***
Desert needle grass	***Stipa speciosa***
Annual species	
Six-weeks three-awn	***Aristida adscensionis***
Red brome	***Bromus rubens***
Six-weeks fescue	***Vulpia octoflora***
Shrubs	
White bursage	***Ambrosia dumosa***
Seep willow	***Baccharis salicifolia***
Buttonbush	***Cephalanthus* sp.**
Blackbrush	***Coleogyne ramosissima***
Cholla	***Cylindropuntia* sp.**
Mormon tea	***Ephedra nevadensis***
California buckwheat	***Eriogonum fasciculatum***
Mormon tea	***Ephedra* sp.**
Spiny hopsage	***Grayia spinosa***
Little-leaf ratany	***Krameria parvifolia***
Winterfat	***Kraschenninnikovia lanata* (*Ceretoides lanata*)**
Creosote bush	***Larrea tridentata***
Wolfberry	***Lycium torreyi***
Cottonwood	***Populus* sp.**
Indigobush	***Psorothamnus arborescens***
Willow	***Salix* sp.**
Tamarisk	***Tamarix chinensis***
Hairy crinklemat	***Tiquilia canescens***
Joshua tree	***Yucca brevifolia***
Mojave yucca	***Yucca schidigera***
Forbs	
Annual species	
Filaree	***Erodium cicutarium***
Bottlestopper	***Eriogonum inflatum***
Pepperweed	***Lepidium* sp.**
Plantain	***Plantago* sp.**

Bi-annual or Perennial species	
Windmills	***Allionia incarnate***
Two-seeded milkvetch	***Astragalus didymocarpus***
Marigold	***Baileya* sp.**
Sahara mustard	***Brassica tournefortii***
Woolly bottlebrush	***Camissonia boothii***
Sedges	***Carex* sp.**
Desert pincushion	***Chaenactis fremontii***
Sandmat	***Chamaesyce* sp.**
Evening primrose	***Camissonia claviformis***
Mohave croton	***Croton californicus***
Nievitas	***Cryptantha* sp.**
Rattlesnake weed	***Euphorbia albomarginata***
Sandmat	***Euphorbia micromera***
Deervetch	***Lotus strigosus***
Desert dandelion	***Malacothrix glabrata***
Combbur	***Pectocarya recurvata***
Desert globemallow	***Sphaeralcea ambigua***
Goldeneye	***Viguiera* sp.**


Littlefield Community Allotment
Scale = 1:142,600
July 2013 - TLC
Bucket Precip Gauge
Cattleguard
Corral
Windmill
Developed Spring
Fenced Reservoir
Livestock Catchment
Livestock Trough
Undeveloped Spring
Unfenced Reservoir
Water Storage Tank
Well
Wildlife Drinker
Exclosure
Key Area
Fence
Pipeline
Primary Road
Secondary Road
Tertiary Road
Single Track
State Boundary
Grazing Allotment
Fire History Polygons - Since 1992
BLM
BLM Wilderness
Private
State
Miles
Arizona Strip District
Littlefield
Beaver Dam
Virgin
Mount Bangs
Black Rock
Hatchet Valley
Lime Kiln Mtn.
Coal Mine Mtn.
NEVADA
ARIZONA

Appendix A

ARIZONA STANDARDS FOR RANGELAND HEALTH AND GUIDELINES FOR GRAZING ADMINISTRATION

ARIZONA STANDARDS FOR RANGELAND HEALTH AND GUIDELINES FOR GRAZING ADMINISTRATION

INTRODUCTION

The Department of the Interior's final rule for Grazing Administration, issued on February 22, 1995, and effective August 21, 1995, requires that Bureau of Land Management (BLM) State Directors develop State or regional standards and guidelines for grazing administration in consultation with BLM Resource Advisory Councils (RAC), other agencies and the public. The final rule provides that fallback standards and guidelines be implemented, if State standards and guidelines are not developed by February 12, 1997. Arizona Standards and Guidelines and the final rule apply to grazing administration on public lands as indicated by the following quotation from the Federal Register, Volume 60, Number 35, page 9955.

> "The fundamentals of rangeland health, guiding principles for standards and the fallback standards address ecological components that are affected by all uses of public rangelands, not just livestock grazing. However, the scope of this final rule, and therefore the fundamentals of rangeland health of §4180.1, and the standards and guidelines to be made effective under §4180.2, are limited to grazing administration."

Although the process of developing standards and guidelines applies to grazing administration, present rangeland health is the result of the interaction of many factors in addition to grazing by livestock. Other contributing factors may include, but are not limited to, past land uses, land use restrictions, recreation, wildlife, rights-of-way, wild horses and burros, mining, fire, weather, and insects and disease.

With the commitment of BLM to ecosystem and interdisciplinary resource management, the standards for rangeland health as developed in this current process will be incorporated into management goals and objectives. The standards and guidelines for rangeland health for grazing administration, however, are not the only considerations in resolving resource issues.

The following quotations from the Federal Register, Vol. 60, No. 35, page 9956, February 22, 1995, describe the purpose of standards and guidelines and their implementation:

> "The guiding principles for standards and guidelines require that State or regional standards and guidelines address the basic components of healthy rangelands. The Department believes that by implementing grazing-related actions that are consistent with the fundamentals of §4180.1 and the guiding principles of §4180.2, the long-term health of public rangelands can be ensured.
>
> "Standards and guidelines will be implemented through terms and conditions of grazing permits, leases, and other authorizations, grazing-related portions of activity plans (including Allotment Management Plans), and through range improvement-related activities.
>
> "The Department anticipates that in most cases the standards and guidelines themselves will not be terms and conditions of various authorizations but that the terms and conditions will reflect the standards and guidelines.
>
> "The Department intends that assessments and corrective actions will be undertaken in priority order as determined by BLM.
>
> "The Department will use a variety of data including monitoring records, assessments, and knowledge of the locale to assist in making the "significant progress" determination. It is

anticipated that in many cases it will take numerous grazing seasons to determine direction and magnitude of trend. However, actions will be taken to establish significant progress toward conformance as soon as sufficient data are available to make informed changes in grazing practices."

FUNDAMENTALS AND DEFINITION OF RANGELAND HEALTH

The Grazing Administration Regulations, at §4180.1 (43 Code of Federal Regulation [CFR] 4180.1), Federal Register Vol. 60, No. 35, pg. 9970, direct that the authorized officer ensures that the following conditions of rangeland health exist:

> (a) Watersheds are in, or are making significant progress toward, properly functioning physical condition, including their upland, riparian-wetland, and aquatic components; soil and plant conditions support infiltration, soil moisture storage, and the release of water that are in balance with climate and landform and maintain or improve water quality, water quantity, and timing and duration of flow.
>
> (b) Ecological processes, including the hydrologic cycle, nutrient cycle, and energy flow, are maintained, or there is significant progress toward their attainment, in order to support healthy biotic populations and communities.
>
> (c) Water quality complies with State water quality standards and achieves, or is making significant progress toward achieving, established BLM management objectives such as meeting wildlife needs.
>
> (d) Habitats are, or are making significant progress toward being, restored or maintained for Federal threatened and endangered species, Federal Proposed, Category 1 and 2 Federal candidate and other special status species.

These fundamentals focus on sustaining productivity of a rangeland rather than its uses. Emphasizing the physical and biological functioning of ecosystems to determine rangeland health is consistent with the definition of rangeland health as proposed by the Committee on Rangeland Classification, Board of Agriculture, National Research Council (Rangeland Health, 1994, pg. 4 and 5). This Committee defined Rangeland Health ". . .as the degree to which the integrity of the soil and the ecological processes of rangeland ecosystems are sustained." This committee emphasized ". . .the degree of integrity of the soil and ecological processes that are most important in sustaining the capacity of rangelands to satisfy values and produce commodities." The Committee also recommended that "The determination of whether a rangeland is healthy, at risk, or unhealthy should be based on the evaluation of three criteria: degree of soil stability and watershed function, integrity of nutrient cycles and energy flow, and presence of functioning mechanisms" (Rangeland Health, 1994, pg. 97-98).

Standards describe conditions necessary to encourage proper functioning of ecological processes on specific ecological sites. An ecological site is the logical and practical ecosystem unit upon which to base an interpretation of rangeland health. Ecological site is defined as:

". . . a kind of land with specific physical characteristics which differs from other kinds of land in its ability to produce distinctive kinds and amounts of vegetation and in its response to management" (Journal of Range Management, 48:279, 1995). Ecological sites result from the interaction of climate, soils, and landform (slope, topographic position). The importance of this concept is that the "health" of different kinds of rangeland must be judged by standards specific to the potential of the ecological site. Acceptable erosion rates, water quality, productivity of plants and animals, and other features are different on each ecological site.

Since there is wide variation of ecological sites in Arizona, standards and guidelines covering these sites must be general. To make standards and guidelines too specific would reduce the ability of BLM and interested publics to

select specific objectives, monitoring strategies, and grazing permit terms and conditions appropriate to specific land forms.

Ecological sites have the potential to support several different plant communities. Existing communities are the result of the combination of historical and recent uses and natural events. Management actions may be used to modify plant communities on a site. The desired plant community for a site is defined as follows: "Of the several plant communities that may occupy a site, the one that has been identified through a management plan to best meet the plan's objectives for the site. It must protect the site as a minimum." (Journal of Range Management, 48:279, 1995.)

Fundamentals (a) and (b) define physical and biological components of rangeland health and are consistent with the definition of rangeland health as defined by the Committee on Rangeland Classification, Board on Agriculture, National Research Council, as discussed in the paragraph above. These fundamentals provide the basis for sustainable rangelands.

Fundamentals (c) and (d) emphasize compliance with existing laws and regulation and, therefore, define social and political components of rangeland health. Compliance with Fundamentals (c) and (d) is accomplished by managing to attain a specific plant community and associated wildlife species present on ecological sites. These desired plant communities are determined in the BLM planning process, or, where the desired plant community is not identified, a community may be selected that will meet the conditions of Fundamentals (a) and (b) and also adhere to laws and regulations. Arizona Standard 3 is written to comply with Fundamentals (c) and (d) and provide a logical combination of Standards and Guidelines for planning and management purposes.

STANDARD AND GUIDELINE DEFINITIONS

Standards are goals for the desired condition of the biological and physical components and characteristics of rangelands. Standards:

(1) are measurable and attainable; and

(2) comply with various Federal and State statutes, policies, and directives applicable to BLM Rangelands.

Guidelines are management approaches, methods, and practices that are intended to achieve a standard. Guidelines:

(1) typically identify and prescribe methods of influencing or controlling specific public land uses;

(2) are developed and applied consistent with the desired condition and within site capability; and

(3) may be adjusted over time.

IMPLEMENTING STANDARDS AND GUIDELINES

The authorized officer will review existing permitted livestock use, allotment management plans, or other activity plans which identify terms and conditions for management on public land. Existing management practices, and levels of use on grazing allotments will be reviewed and evaluated on a priority basis to determine if they meet, or are making significant progress toward meeting, the standards and are in conformance with the guidelines. The review will be interdisciplinary and conducted under existing rules which provide for cooperation, coordination, and consultation with affected individuals, federal, state, and local agencies, tribal governments, private landowners, and interested publics.

This review will use a variety of data, including monitoring records, assessments, and knowledge of the locale to assist in making the significant progress determination. Significance will be determined on a case by case basis, considering site potential, site condition, weather and financial commitment. It is anticipated there will be cases where numerous years will be needed to determine direction and magnitude of trend.

Upon completion of review, the authorized officer shall take appropriate action as soon as practicable but no later than the start of the next grazing year upon determining that the existing grazing management practices or level of use on public land are significant factors contributing to failure to achieve the standards and conform with the guidelines that are made effective under 43 CFR 4180.2. Appropriate action means implementing actions that will result in significant progress toward fulfillment of the standards and significant progress toward conformance with guidelines.

Livestock grazing will continue where significant progress toward meeting standards is being made. Additional activities and practices would not be needed on such allotments. Where new activities or practices are required to assure significant progress toward meeting standards, livestock grazing use can continue contingent upon determinations from monitoring data that the implemented actions are effective in making significant progress toward meeting the standards. In some cases, additional action may be needed as determined by monitoring data over time.

New plans will incorporate an interdisciplinary team approach (Arizona BLM Interdisciplinary Resource Management Handbook, April 1995). The terms and conditions for permitted grazing in these areas will be developed to comply with the goals and objectives of these plans which will be consistent with the standards and guidelines.

ARIZONA STANDARDS AND GUIDELINES

Arizona Standards and Guidelines (S&G) for grazing administration have been developed through a collaborative process involving the Bureau of Land Management State S&G Team and the Arizona Resource Advisory Council. Together, through meetings, conference calls, correspondence, and Open Houses with the public, the BLM State Team and RAC prepared Standards and Guidelines to address the minimum requirements outlined in the grazing regulations. The Standards and Guidelines, criteria for meeting Standards, and indicators are an integrated document that conforms to the fundamentals of rangeland health and the requirements of the regulations when taken as a whole.

Upland sites, riparian-wetland areas, and desired resource conditions are each addressed by a standard and associated guidelines.

Standard 1: Upland Sites

Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate and landform (ecological site).

Criteria for meeting Standard 1:
(Field Evaluation Form in Appendix E.
Soil conditions support proper functioning of hydrologic, energy, and nutrient cycles. Many factors interact to maintain stable soils and healthy soil conditions, including appropriate amounts of vegetative cover, litter, and soil porosity and organic matter. Under proper functioning conditions, rates of soil loss and infiltration are consistent with the potential of the site.

Ground cover in the form of plants, litter or rock is present in pattern, kind, and amount sufficient to prevent accelerated erosion for the ecological site; or ground cover is increasing as determined by monitoring over an established period of time.

Signs of accelerated erosion are minimal or diminishing for the ecological site as determined by monitoring over an established period of time.

As indicated by such factors as:

Ground Cover
- litter
- live vegetation, amount and type (e.g., grass, shrubs, trees, etc.)
- rock

Signs of erosion
- flow pattern
- gullies
- rills
- plant pedestaling

Exceptions and exemptions (where applicable):

None

Guidelines:

1-1. Management activities will maintain or promote ground cover that will provide for infiltration, permeability, soil moisture storage, and soil stability appropriate for the ecological sites within management units. The ground cover should maintain soil organisms and plants and animals to support the hydrologic and nutrient cycles, and energy flow. Ground cover and signs of erosion are surrogate measures for hydrologic and nutrient cycles and energy flow.

1-2. When grazing practices alone are not likely to restore areas of low infiltration or permeability, land management treatments may be designed and implemented to attain improvement.

Standard 2: Riparian-Wetland Sites

Riparian-wetland areas are in properly functioning condition.

Criteria for meeting Standard 2:

Stream channel morphology and functions are appropriate for proper functioning condition for existing climate, landform, and channel reach characteristics. Riparian-wetland areas are functioning properly when adequate vegetation, land form, or large woody debris is present to dissipate stream energy associated with high water flows.

Riparian-wetland functioning condition assessments are based on examination of hydrologic, vegetative, soil and erosion-deposition factors. BLM has developed a standard checklist to address these factors and make functional assessments. Riparian-wetland areas are functioning properly as indicated by the results of the application of the appropriate checklist.

The checklist for riparian areas is in Technical Reference 1737-9 "Process for Assessing Proper Functioning Condition." The checklist for wetlands is in Technical Reference 1737-11 "Process for Assessing Proper Functioning Condition for Lentic Riparian-Wetland Areas."

As indicated by such factors as:

Gradient
Width/depth ratio
Channel roughness and sinuosity of stream channel
Bank stabilization
Reduced erosion
Captured sediment
Ground-water recharge
Dissipation of energy by vegetation

Exceptions and exemptions (where applicable):

Dirt tanks, wells, and other water facilities constructed or placed at a location for the purpose of providing water for livestock and/or wildlife and which have not been determined through local planning efforts to provide for riparian or wetland habitat are exempt.

Water impoundments permitted for construction, mining, or other similar activities are exempt.

Guidelines:

2-1. Management practices maintain or promote sufficient vegetation to maintain, improve or restore riparian-wetland functions of energy dissipation, sediment capture, groundwater recharge and stream bank stability, thus promoting stream channel morphology (e.g., gradient, width/depth ratio, channel roughness and sinuosity) and functions appropriate to climate and landform.
2-2. New facilities are located away from riparian-wetland areas if they conflict with achieving or maintaining riparian-wetland function. Existing facilities are used in a way that does not conflict with riparian-wetland functions or are relocated or modified when incompatible with riparian-wetland functions.

2-3. The development of springs and seeps or other projects affecting water and associated resources shall be designed to protect ecological functions and processes.

Standard 3: Desired Resource Conditions

Productive and diverse upland and riparian-wetland plant communities of native species exist and are maintained.

Criteria for meeting Standard 3:

Upland and riparian-wetland plant communities meet desired plant community objectives. Plant community objectives are determined with consideration for all multiple uses. Objectives also address native species, and the requirements of the Taylor Grazing Act, Federal Land Policy and Management Act, Endangered Species Act, Clean Water Act, and appropriate laws, regulations, and policies.

Desired plant community objectives will be developed to assure that soil conditions and ecosystem function described in Standards 1 and 2 are met. They detail a site-specific plant community, which when obtained, will assure rangeland health, State water quality standards, and habitat for endangered, threatened, and sensitive species. Thus, desired plant community objectives will be used as an indicator of ecosystem function and rangeland health.

As indicated by such factors as:

Composition
Structure
Distribution

Exceptions and exemptions (where applicable):

Ecological sites or stream reaches on which a change in existing vegetation is physically, biologically, or economically impractical.

Guidelines:

3-1. The use and perpetuation of native species will be emphasized. However, when restoring or rehabilitating disturbed or degraded rangelands, non-intrusive, non-native plant species are appropriate for use where native species (a) are not available, (b) are not economically feasible, (c) cannot achieve ecological objectives as well as non-native species, and/or (d) cannot compete with already established non-native species.

3-2. Conservation of Federal threatened or endangered, proposed, candidate, and other special status species is promoted by the maintenance or restoration of their habitats.

3-3. Management practices maintain, restore, or enhance water quality in conformance with State or Federal standards.

3-4. Intensity, season and frequency of use, and distribution of grazing use should provide for growth and reproduction of those plant species needed to reach desired plant community objectives.

3-5. Grazing on designated ephemeral (annual and perennial) rangeland may be authorized if the following conditions are met:

ephemeral vegetation is present in draws, washes, and under shrubs and has grown to useable levels at the time grazing begins;

sufficient surface and subsurface soil moisture exists for continued plant growth;

serviceable waters are capable of providing for proper grazing distribution;

sufficient annual vegetation will remain on site to satisfy other resource concerns, (i.e., watershed, wildlife, wild horses and burros); and

monitoring is conducted during grazing to determine if objectives are being met.

3-6. Management practices will target those populations of noxious weeds which can be controlled or eliminated by approved methods.

3-7. Management practices to achieve desired plant communities will consider protection and conservation of known cultural resources, including historical sites, and prehistoric sites and plants of significance to Native American peoples.

Appendix B

TEAM MEMBERSHIP

Interdisciplinary Assessment Team[12]

Linda Price	Project Coordinator (BLM) – Transferred
Whit Bunting	Vegetation and Rangeland Management Team Lead
Michael Herder	Wildlife Biologist (BLM) – Transferred
Diana Hawks	Recreation, Wilderness, and Cultural Resources Team Lead (BLM)
Lee E Hughes	Vegetation/Grazing Administration (BLM) – Retired
Robert Smith	Soil Scientist/Watershed Management (BLM)
Luke Thompson	Wildlife Manager (Arizona Game and Fish Department)
Kyle Spencer	Soils and Vegetation (Natural Resource Conservation Service)
Rob Grumbles	Vegetation and Social Economics (Mohave County Extension Service)

Rangeland Resource Team

Commodity Interests

Bill Gubler,
Grazing
Rancher, St. George, UT

Bill Howes
Off Road Vehicle Use
Wizards Motorcycle Club

Kent McComb,
Grazing
Retired, St. George, UT

Non-Commodity Interests

Scott Hansen,
Environmental Conservation
Retired, St. George, UT

Spence Esplin,
Historical
Retired, St. George, UT

Phil Squire,
Dispersed Recreation/Wildlife
Retired, St. George, UT

Local Area Interests

Frank Malan,
Public-at-Large
Retired, St. George, UT

Roger McPeek
Public-at-Large
Retired, St. George, UT

Dennis Becenti
Native American Interests
Hopi and Navajo Tribes, AZ

Alternates

Maggie Sacher,
Commercial Recreation/Tourism
Owner: Lee's Ferry Lodge,
Marble Canyon, AZ

Paul Weaver
Non-Commodity
St. George, UT

[12] Several members of the IAT have either retired or transferred since the scoping and field meetings were conducted. These individuals participated in the early phases of this evaluation assessment, but not in the actual writing of this report.

Appendix C:

PRECIPITATION DATA

Precipitation data from the Cottonwood Wash rain gauge:

Field Office **130** **Rain Gauge Name:** **Cottonwood Wash Ex Rain Gauge** **04**

	Seasonal Precipitation					Annual Average					Percent of Normal				
Year	Fall	Winter	Spring	Summer	Annual	Fall	Winter	Spring	Summer	Annual	Fall	Winter	Spring	Summer	Annual
1978	1.14	15.41	2.91	2.66	22.12	1.81	4.82	1.99	3.23	11.84	60%	334%	142%	76%	184%
1979	3.88	5.14	4.00	2.25	15.27	1.81	4.82	1.99	3.23	11.84	204%	112%	196%	64%	127%
1980	0.50	0.90	1.09	3.04	5.53	1.81	4.82	1.99	3.23	11.84	26%	20%	53%	87%	46%
1981	1.59	2.00	3.00	2.90	9.49	1.81	4.82	1.99	3.23	11.84	84%	43%	147%	83%	79%
1982	0.98	2.75	2.40	5.63	11.76	1.81	4.82	1.99	3.23	11.84	52%	60%	117%	161%	98%
1983	3.95	5.75	2.86	4.16	16.72	1.81	4.82	1.99	3.23	11.84	208%	125%	140%	119%	139%
1984	2.38	0.98	0.55	7.28	11.19	1.81	4.82	1.99	3.23	11.84	125%	21%	27%	208%	93%
1985	1.93	6.50	0.75	2.15	11.33	1.81	4.82	1.99	3.23	11.84	102%	141%	37%	61%	94%
1986	3.25	2.10	3.70	3.33	12.38	1.81	4.82	1.99	3.23	11.84	171%	46%	181%	95%	103%
1987	1.19	4.38	1.80	3.19	10.56	1.81	4.82	1.99	3.23	11.84	63%	95%	88%	91%	88%
1988	3.94	3.12	3.07	4.12	14.25	1.81	4.82	1.99	3.23	11.84	208%	68%	150%	118%	118%
1989	0.60	4.14	0.64	3.52	8.90	1.81	4.82	1.99	3.23	11.84	32%	90%	31%	101%	74%
1990	0.43	2.60	2.17	3.90	9.10	1.81	4.82	1.99	3.23	11.84	23%	56%	106%	111%	76%
1991	1.32	3.36	1.91	4.62	11.21	1.81	4.82	1.99	3.23	11.84	70%	73%	93%	132%	93%
1992	1.17	5.50	5.16	1.45	13.28	1.81	4.82	1.99	3.23	11.84	62%	119%	253%	41%	110%
1993	3.20	12.30	1.88	1.24	18.62	1.81	4.82	1.99	3.23	11.84	169%	267%	92%	35%	155%
1994	2.00	2.40	1.36	7.75	13.51	1.81	4.82	1.99	3.23	11.84	105%	52%	67%	221%	112%
1995	1.54	9.46	1.50	2.50	15.00	1.81	4.82	1.99	3.23	11.84	81%	205%	73%	71%	125%
1996	1.12	2.88	0.63	2.37	7.00	1.81	4.82	1.99	3.23	11.84	59%	63%	31%	68%	58%
1997	2.25	4.85	1.15	5.50	13.75	1.81	4.82	1.99	3.23	11.84	119%	105%	56%	157%	114%
1998	1.00	5.52	2.40	5.33	14.25	1.81	4.82	1.99	3.23	11.84	53%	120%	117%	152%	118%
1999	2.80	1.45	2.25	4.00	10.50	1.81	4.82	1.99	3.23	11.84	148%	31%	110%	114%	87%
2000	0.00	3.87	0.26	3.10	7.23	1.81	4.82	1.99	3.23	11.84	0%	84%	13%	89%	60%
2001	3.45	8.45	4.10	5.50	21.50	1.81	4.82	1.99	3.23	11.84	182%	183%	201%	157%	178%
2002	0.50	0.88	0.63	1.74	3.75	1.81	4.82	1.99	3.23	11.84	26%	19%	31%	50%	31%
2003	1.13	3.37	2.50	1.00	8.00	1.81	4.82	1.99	3.23	11.84	60%	73%	122%	29%	66%
2004	0.70	4.42	1.01	0.87	7.00	1.81	4.82	1.99	3.23	11.84	37%	96%	49%	25%	58%
2005	6.50	12.25	2.75	2.75	24.25	1.81	4.82	1.99	3.23	11.84	342%	266%	135%	79%	201%
2006	1.25	0.50	2.50	4.25	8.50	1.81	4.82	1.99	3.23	11.84	66%	11%	122%	121%	71%
2007	1.25	1.00	0.38	2.88	5.50	1.81	4.82	1.99	3.23	11.84	66%	22%	18%	82%	46%
2008	0.00	6.5	.25	1.88	8.63	1.81	4.82	1.99	3.23	11.84	0%	139%	13%	54%	72%
2009	1.38	4.12	.50	.50	6.50	1.85	4.82	1.99	3.23	11.84	76%	89%	26%	15%	55%
2010	0.25	7.63	4.37	0.58	12.83	1.81	4.82	1.99	3.23	11.84	14%	158%	220%	18%	108%
2011	2.68	9.08	1.25	1.80	14.80	1.81	4.82	1.99	3.23	11.84	148%	188%	63%	56%	125%
2012	2.00	3.00	1.50	5.00	11.50	1.81	4.82	1.99	3.23	11.84	111%	62%	77%	153%	98%
2013	2.00	2.38	0.63			1.81	4.82	1.99	3.23	11.84	110%	50%	32%		

Appendix D:

Vegetation Data

Old Ecological Site Inventory

DPC objectives were developed during a 1992 evaluation process by an interdisciplinary team of resource specialists. These objectives focus on the ecological sites and their potentials, which reflect the vegetative diversity of the area. DPC objectives are expressed in figures of Composition by Weight (CBW). Composition data is collected using the Dry Weight Rank sampling method.

On May 27 1992, seven people met to come up with DPC objectives. The seven people were Mel Hughes (Rancher), Jay Reber (Rancher), Robert Price (Arizona Fish and Game), Robert Sandberg (Range Conservationist – BLM), Matt Safford (Outdoor Recreation Planner – BLM), Art Mean (Soil Scientist – BLM) and Lee E Hughes (Ecologist – BLM). The objectives are as follows:

Ecological Site	Current Composition	DPC	Acres
Cobbly Limy Upland			17,107
Cool Season P. Grass	3	0-6	
Warm Season Grass	3	5-10	
Forbs	1-2	2-5	
Browse	3-5	2-10	
Shrubs	87-96	80-90	
Riparian –Wet Zone			49
Native sedges/rushes	23	70-80	
Non-native invasives	71	15-30	
Forbs	1	1	
Tamarisk	6	1-15	
Riparian-Regeneration	See green line data in Riparian		10
Saltcedar /Arrowweed Seepwillow	82	40-60	
Willow/ Cottonwood	2	19-50	
Floodplain			432
Tamarisk	55	30-50	
Arrow weed	11	5-11	
Willow	7	5-15	
Others	0	1-5	

Ecological Site	Current Composition	DPC	Acres
Limy Upland 7-10	Burned and Unburned		3568
Perennial Grass	0	3-12	
Forbs	2	1-7	
Browse	2	5-15	
Shrubs	88	66-80	
Granitic Hills 7-10			7940
Cool P.Grass	5	2-5	
Warm P. Grass	1	3-10	
Forbs	6-24	1-6	
Browse	6-30	8-24	
Shrubs	30-86	45-80	
Shallow Upland 8-12	Burned /Unburned		2545
Cool P.Grass	1	5-10	
Warm P. Grass	0	3-5	
Forbs	1	2-7	
Browse	3	1-10	
Shrubs	95	68-90	
Limestone Hills-16-20	Unburned		3929
Cool P.Grass	53	25-35	
Warm P Grass	14	25-30	
Forbs	3	5-10	
Browse	12	20-25	
Shrubs	18	6-15	
Breaks 10-14	Burned		2211
P. Grass	6	6-30	
Forbs	2	5-20	
Browse	5	2-18	
Shrubs	85	32-80	
Limestone Hills 16-20	Burned		3274
Cool P.Grass	2	5-15	
Forbs	0	1-10	
Browse	3	5-10	
Shrubs	95	65-90	

Ecological Site	Current Composition	DPC	Acres
Limestone Hills 16-20	Unburned		12645
Cool P. Grass	2	5-15	
Forbs	0	1-10	
Browse	3	5-10	
Shrubs	95	65-90	
Breaks 10-14	Unburned		2464
Cool P. Grass	0	2--10	
Forbs	0	5-20	
Browse	20	2-20	
Trees	80	50-80	
Basalt Breaks/Clay upland 16-20			2635
Cool P. Grass	1	1-5	
Forbs	0	1-5	
Browse	10-30	12-35	
Trees/Shrubs	67-86	55-80	
Limy Upland Deep 7-10			3435
Cool P. Grass	5	2-10	
Warm P. Grass	1-9	0-4	
Forbs	5	2-9	
Browse	0	0-5	
Shrubs	90	72-91	

Site Class: BLM || Arizona State Office || Arizona Strip District || Arizona Strip Field Office || Littlefield Community Allotment || Summer Pasture **Site ID:** 3

% Ground Cover								Quadrat Size:
Species	**Transect**							
	01/26/82	**01/31/85**	**12/03/88**	**09/21/92**	**04/11/97**	**10/22/01**	**11/28/07**	**03/21/12**
Bare Ground	56	47	25	6	5	10	63	25
Cryptogam								
Litter							21	53
Litter - Non-Persistent	19	31	62	67	70	59		
Litter - Persistent	1			1		1		
Live Basal Veg.	3	2	1	1	10	7	2	2
Rock >= 1/2"	22	20	13	25	16	25	15	21

% Frequency								Quadrat Size: 40x40 cm
Species	**Transect**							
	01/26/82	**01/31/85**	**12/03/88**	**09/21/92**	**04/11/97**	**10/22/01**	**11/28/07**	**03/21/12**
Acamptopappus		1	1			1	1	1
Amaranthus palmeri							1	
Ambrosia dumosa	1	1		4	1	1	2	1
Aristida longiseta	3	3	16	19	3	1		
Bouteloua barbata			92					
Bromus			87					
Bromus rubens					78			84
Cryptantha					8			
Ephedra nevadensis		1	1	2		1		1
Erodium cicutarium			73		79			22
Euphorbia			1					
Evolvulus							3	
Festuca octoflora			94					
Gutierrezia sarothrae	25	28	38	17	4	1	4	10
Hilaria rigida		2	1	7	1	1	1	8
Krameria parvifolia	2	3	3	3	2	3	2	4
Larrea tridentata	9	6	9	10	7	10	8	6
Lupinus sparsiflorus								1
Lycium torreyi					1			
Muhlenbergia porteri	1	1	3	2				
Opuntia erinacea							1	
Plantago			15					6
Sphaeralcea			8					
Sporobolus cryptandrus			1					
Thamnosma montana	10	9	13	17	7	11	9	10



Site Class: BLM || Arizona State Office || Arizona Strip District || Arizona Strip Field Office || Littlefield Community Allotment || Summer Pasture **Site ID:** 4

% Ground Cover						Quadrat Size:
Species	Transect					
	01/26/82	01/31/85	12/03/88	09/15/92	10/22/01	05/12/10
Bare Ground	29	46	50	34	42	37
Cryptogam						2
Litter						28
Litter - Non-Persistent	17	18	35	35	28	
Litter - Persistent	1			4	2	
Live Basal Veg.	2		3	4	8	4
Rock >= 1/2"	52	37	12	23	22	29

Site Class: BLM || Arizona State Office || Arizona Strip District || Arizona Strip Field Office || Littlefield Community Allotment || Summer Pasture **Site ID:** 4

% Frequency						Quadrat Size: 40x40 cm
Species	Transect					
	01/26/82	01/31/85	12/03/88	09/15/92	10/22/01	05/12/10
Acamptopappus		1	2			
Acamptopappus sphaerocephalus					2	1
Ambrosia dumosa	32	27	38	43	30	34
Annual forb(s)						1
Bromus			100			
Bromus rubens						1
Cryptantha			1			
Echinocereus engelmannii						1
Ephedra torreyana					1	
Ephedra viridis		2	1			
Erodium cicutarium			6			40
Ferocactus cylindraceus					1	
Krameria parvifolia	2	1	1	3	2	3
Larrea tridentata	9	11	18	18	11	15
Lepidium			17			
Lepidium montanum						4
Lupinus						7
Opuntia		1	2	2		1
Opuntia arbuscula					1	5
Plantago			12			
Plantago patagonica						26
Thamnosma montana					1	
Tridens pulchellus		2	14		1	

Site Class: BLM || Arizona State Office || Arizona Strip District || Arizona Strip Field Office || Littlefield Community Allotment || Summer Pasture **Site ID:** 5

% Ground Cover						Quadrat Size:
Species	Transect					
	01/25/82	01/31/85	09/15/92	12/31/01	12/31/08	02/12/13
Bare Ground	60	66	27	52	50	34
Cryptogam						7
Litter					39	33
Litter - Non-Persistent	8	19	50	27		
Litter - Persistent	2	1	4			
Live Basal Veg.		1	2	5		2
Rock >= 1/2"	30	14	18	17	11	24

Site Class: BLM || Arizona State Office || Arizona Strip District || Arizona Strip Field Office || Littlefield Community Allotment || Summer Pasture **Site ID:** 5

% Frequency						Quadrat Size: 40x40 cm
Species	Transect					
	01/25/82	01/31/85	09/15/92	12/31/01	12/31/08	02/12/13
Ambrosia dumosa	14	22	26	13	8	9
Aristida longiseta				1		
Bromus rubens						72
Erodium cicutarium						17
Hilaria rigida					1	
Krameria parvifolia		1	1	1	1	
Larrea tridentata	11	16	26	19	16	25
Mammillaria				1		
Opuntia	4	2	5			
Opuntia acanthocarpa				1	1	3
Opuntia echinocarpa				2	1	1
Plantago insularis					73	89
Schismus barbatus						16

Site Class: BLM || Arizona State Office || Arizona Strip District || Arizona Strip Field Office || Littlefield Community Allotment || Cottonwood Pasture **Site ID:** 6A

% Ground Cover	Quadrat Size:	
Species	**Transect**	
	03/13/07	**10/06/09**
Bare Ground	17	53
Cryptogam		
Litter	76	39
Litter - Non-Persistent		
Litter - Persistent		
Live Basal Veg.	1	3
Rock >= 1/2"	5	6

Site Class: BLM || Arizona State Office || Arizona Strip District || Arizona Strip Field Office || Littlefield Community Allotment || Cottonwood Pasture **Site ID:** 6A

% Frequency	Quadrat Size: 40x40 cm	
Species	Transect	
	03/13/07	10/06/09
Aristida longiseta		1
Baileya multiradiata	1	
Bromus rubens	8	
Coleogyne ramosissima	4	4
Cowania mexicana	17	16
Ephedra fasciculata	5	4
Erodium cicutarium	19	
Fallugia paradoxa		1
Gutierrezia sarothrae	26	14
Oryzopsis hymenoides		1
Perennial forb(s)		10
Prunus fasciculata	3	1
Sitanion hystrix		1
Sphaeralcea parvifolia	3	
Thamnosma montana		10
Yucca baccata	3	5

Site Class: BLM || Arizona State Office || Arizona Strip District || Arizona Strip Field Office || Littlefield Community Allotment || Cottonwood Pasture **Site ID:** 6B

% Ground Cover	Quadrat Size:	
Species	Transect	
	03/13/07	10/06/09
Bare Ground	66	69
Cryptogam		
Litter	31	30
Litter - Non-Persistent		
Litter - Persistent		
Live Basal Veg.	1	1
Rock >= 1/2"	3	1

Site Class: BLM || Arizona State Office || Arizona Strip District || Arizona Strip Field Office || Littlefield Community Allotment || Cottonwood Pasture **Site ID:** 6B

% Frequency	Quadrat Size: 40x40 cm	
Species	Transect	
	03/13/07	10/06/09
Bouteloua curtipendula		1
Bromus rubens	40	
Coleogyne ramosissima	1	2
Cowania mexicana		1
Ephedra fasciculata	1	2
Erodium cicutarium	57	
Gutierrezia sarothrae	6	9
Linanthus lemmonii		1
Sitanion hystrix		1
Sphaeralcea parvifolia	14	14
Thamnosma montana	3	5
Yucca baccata	1	3

Site Class: BLM || Arizona State Office || Arizona Strip District || Arizona Strip Field Office || Littlefield Community Allotment || Mountain Pasture **Site ID:** 1-7

% Ground Cover					Quadrat Size:
Species	**Transect**				
	04/22/83	**05/15/86**	**04/11/97**	**10/24/01**	**11/03/09**
Bare Ground	43	72	40	43	82
Cryptogam					
Litter					17
Litter - Non-Persistent	22	21	34	25	
Litter - Persistent	1			2	
Live Basal Veg.	1	4	25	22	
Rock >= 1/2"	33	4		8	1

Site Class: BLM || Arizona State Office || Arizona Strip District || Arizona Strip Field Office || Littlefield Community Allotment || Mountain Pasture **Site ID:** 1-7

% Frequency					Quadrat Size: 40x40 cm
Species	Transect				
	04/22/83	05/15/86	04/11/97	10/24/01	11/03/09
Abronia				2	
Annual forb(s)					2
Aristida	12	6			
Artemisia tridentata	13	2	6	16	1
Baileya multiradiata			1	1	
Berberis fremontii			2		
Bromus rubens			75		
Ceanothus	1	7			
Coleogyne ramosissima	5	6	4	8	1
Cowania mexicana	3	4	2	4	
Cryptantha			1		
Cylindropuntia acanthocarpa var. acanthocarpa					7
Eriogonum - shrub #1	5	2			
Erodium cicutarium			1		
Euphorbia			1		
Gaura coccinea			9		
Gutierrezia sarothrae	60	76	18	20	6
Haplopappus	1	2	1		
Juniperus osteosperma				3	1
Lycium pallidum				1	
Opuntia	5	3	5	10	
Opuntia phaeacantha				2	
Opuntia polyacantha				1	
Oryzopsis hymenoides	1	1			
Penstemon	2	4			

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Phlox			1		
Pinus edulis		1			
Pinus monophylla	1				
Prunus fasciculata	4	2	13	9	3
Rhus trilobata			1	2	1
Sphaeralcea	12	13	1		
Sphaeralcea parvifolia					1
Thamnosma montana	20	10	12	29	4
Tridens pulchellus	1	1			

Vegetation/GIS DataSystem - University of Arizona

Site Class: BLM || Arizona State Office || Arizona Strip District || Arizona Strip Field Office || Littlefield Community Allotment || Mountain Pasture **Site ID:** 1-13

% Ground Cover				Quadrat Size:
Species	**Transect**			
	04/20/83	**05/15/86**	**10/24/01**	**08/04/09**
Bare Ground	19	16	19	30
Cryptogam				
Litter				58
Litter - Non-Persistent	29	41	23	
Litter - Persistent	3	4	10	
Live Basal Veg.	2	6	30	1
Rock >= 1/2"	47	32	19	11

Site Class: BLM || Arizona State Office || Arizona Strip District || Arizona Strip Field Office || Littlefield Community Allotment || Mountain Pasture **Site ID:** 1-13

% Frequency				Quadrat Size: 40x40 cm
Species	Transect			
	04/20/83	05/15/86	10/24/01	08/04/09
Amelanchier alnifolia	6	6		
Amelanchier utahensis			19	11
Arctostaphylos	7			26
Arctostaphylos pringlei			3	
Arctostaphylos pungens		14	13	
Artemisia tridentata	34	34	36	17
Ceanothus greggii	6	3	2	4
Cercocarpus montanus	1	2	1	
Fendlera rupicola			1	
Garrya	31			
Garrya flavescens			12	10
Garrya wrightii		31		
Juniperus osteosperma				1
Opuntia	1	1		
Penstemon				1
Petrophyton caespitosum	1	3		
Pinus edulis		1		3
Pinus monophylla			4	
Poa fendleriana	48	54	27	16
Quercus gambelii			3	1
Quercus turbinella		1		1
Sitanion hystrix			1	
Symphoricarpos				1
Symphoricarpos oreophilus			7	

Site Class: BLM || Arizona State Office || Arizona Strip District || Arizona Strip Field Office || Littlefield Community Allotment || Summer Pasture **Site ID:** 1

% Ground Cover							Quadrat Size:
Species	Transect						
	01/26/82	01/31/85	09/21/92	01/11/94	04/11/97	10/23/01	05/06/10
Bare Ground	77	65	30	22	56	44	29
Litter							43
Litter - Non-Persistent	4	18	62	51	24	45	
Litter - Persistent		1				2	
Live Basal Veg.		1	1	2	9	3	2
Rock >= 1/2"	19	16	8	24	11	7	27

Site Class: BLM || Arizona State Office || Arizona Strip District || Arizona Strip Field Office || Littlefield Community Allotment || Summer Pasture **Site ID:** 1

% Frequency							Quadrat Size: 40x40 cm
Species	Transect						
	01/26/82	01/31/85	09/21/92	01/11/94	04/11/97	10/23/01	05/06/10
Annual forb(s)							19
Baileya multiradiata							1
Bromus rubens				65	18		4
Cryptantha				1	5		
Eriastrum				1			
Eriogonum - annual forb #1				4			
Erodium cicutarium				88	69		79
Hymenoclea salsola				1	1		
Krameria parvifolia		1					
Larrea tridentata	15	26	31	22	21	29	29
Opuntia	2	1	2	1	2	1	
Opuntia							1
Perennial forb(s)					1		
Phacelia				15			
Plantago				1			
Schismus barbatus				37			8

Appendix E:

Monitoring Data Sheets

(Standard 1 Determination Worksheets

and

Riparian Standard Worksheet)

Standards for Rangeland Health
Indicators of Standard #1
Documentation Worksheet

Arizona Bureau of Land Management
Arizona Strip Field Office
Mngmnt Unit: AZ010 AZ100 AZ300
(circle one)

Date: 1/13/09 Location: KA #1
Littlefield comm

Legal T _____ , R _____ , Sec _____ , _____ 1/4, _____ 1/4

Observers:
Lee Hughes Diana Hawks _____
Robert Smith Brian Wooldridge _____
Lorraine Christian _____ _____

Standard #1: *Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate and landform (ecological site).*

Ecological Site: Cobbly Loamy upland 6-9

Indicators	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Ground Cover					
1. Litter					X
Comments					
2. Bare Ground (Live Veg Cover)					X
Comments					
3. Rock					X
Comments					
Signs of Erosion					
4. Flow Pattern					X
Comments					
5. Gullies					X
Comments					
6. Rills					X
Comments					
7. Plant Pedestalling					X
Comments					

(X) Meeting Standard #1 ( ) Making Progress towards Meeting Standard #1
( ) Not Meeting Standard #1

Standards for Rangeland Health
Indicators of Standard #1
Documentation Worksheet

Arizona Bureau of Land Management
Arizona Strip Field Office
Mngmnt Unit: AZ010 AZ100 AZ300
(circle one)

Date: 1/13/09 Location: Key Area #5
Littlefield Town Littlefield Com

Legal T _____, R _____, Sec _____, _____1/4, _____1/4

Observers:
Kit Jensen Dana Hawks _____
La Hughes Brian Woolridge _____
Bob Smith _____ _____

Standard #1: *Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate and landform (ecological site).*

Ecological Site: Limy Upland 6-9

Indicators	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Ground Cover					
1. Litter					X
Comments					
2. Bare Ground (Live Veg Cover)					X
Comments					
3. Rock					X
Comments					
Signs of Erosion					
4. Flow Pattern					X
Comments					
5. Gullies					X
Comments					
6. Rills					X
Comments					
7. Plant Pedestalling					X
Comments					

(X) Meeting Standard #1 ( ) Making Progress towards Meeting Standard #1
( ) Not Meeting Standard #1

Standards for Rangeland Health
Indicators of Standard #1
Documentation Worksheet

Arizona Bureau of Land Management
Arizona Strip Field Office
Mngmnt Unit: (AZ010) AZ100 AZ300
(circle one)

Date: Feb. 3, 2009 Location: Key Area 66 Littlefield Comm.

Legal T _____ , R _____ , Sec _____ , _____ 1/4, _____ 1/4

Observers:
Bob Smith, Luke Thompson, Lorraine Christian
Lee Hughes, Scott Hansen, Spencer Esplin, Kent McComb
Kitti Jensen, Collin Bowler, Linda Price

Standard #1: *Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate and landform (ecological site).*

Ecological Site: Shallow Sandy Loam Calcareous 10-14"

Indicators	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Ground Cover					
1. Litter					X
Comments					
2. Bare Ground (Live Veg Cover)					X
Comments					
3. Rock					X
Comments					
Signs of Erosion					
4. Flow Pattern					X
Comments					
5. Gullies					X
Comments					
6. Rills					X
Comments					
7. Plant Pedestalling					X
Comments					

(X) Meeting Standard #1 ( ) Making Progress towards Meeting Standard #1
( ) Not Meeting Standard #1

Standards for Rangeland Health
Indicators of Standard #1
Documentation Worksheet

Arizona Bureau of Land Management
Arizona Strip Field Office
Mngmnt Unit: AZ010 AZ100 AZ300
(circle one)

Date: Feb. 3, 2009 Location: Key Area 66 Littlefield Comm.

Legal T _____ , R _____ , Sec _____ , _____ 1/4, _____ 1/4

Observers:
Bob Smith, Luke Thompson, Lorraine Christian
Lee Hughes, Scott Hansen, Spence Esplin, Kent McComb
Kitti Jensen, Collin Bowler, Linda Price

Standard #1: *Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate and landform (ecological site).*

Ecological Site: Shallow Sandy Loam Calcareous 10-14"

Indicators	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Ground Cover					
1. Litter					X
Comments					
2. Bare Ground (Live Veg Cover)					X
Comments					
3. Rock					X
Comments					
Signs of Erosion					
4. Flow Pattern					X
Comments					
5. Gullies					X
Comments					
6. Rills					X
Comments					
7. Plant Pedestalling					X
Comments					

(X) Meeting Standard #1 ( ) Making Progress towards Meeting Standard #1
( ) Not Meeting Standard #1

Standard Checklist

Name of Riparian-Wetland Area: Virgin River

Date: 2/14/12 Segment/Reach ID: Segment 9

Miles: _____ Acres: _____

ID Team Observers: J. Roague, R. Reeve, S. Langston, K. Wright, L. Hughes

Yes	No	N/A	HYDROLOGY
X			1) Floodplain above bankfull is inundated in "relatively frequent" events
		X	2) Where beaver dams are present they are active and stable
X			3) Sinuosity, width/depth ratio, and gradient are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region)
X			4) Riparian-wetland area is widening or has achieved potential extent
X			5) Upland watershed is not contributing to riparian-wetland degradation

recent flood* caused temp widening

Yes	No	N/A	VEGETATION
X			6) There is diverse age-class distribution of riparian-wetland vegetation (recruitment for maintenance/recovery)
X			7) There is diverse composition of riparian-wetland vegetation (for maintenance/recovery)
X			8) Species present indicate maintenance of riparian-wetland soil moisture characteristics
X			9) Streambank vegetation is comprised of those plants or plant communities that have root masses capable of withstanding high streamflow events
X			10) Riparian-wetland plants exhibit high vigor
	X		11) Adequate riparian-wetland vegetative cover is present to protect banks and dissipate energy during high flows
		X	12) Plant communities are an adequate source of coarse and/or large woody material (for maintenance/recovery)

Cottonwoods don't occur in area

Yes	No	N/A	EROSION/DEPOSITION
	X		13) Floodplain and channel characteristics (i.e., rocks, overflow channels, coarse and/or large woody material) are adequate to dissipate energy
X			14) Point bars are revegetating with riparian-wetland vegetation
X			15) Lateral stream movement is associated with natural sinuosity
X			16) System is vertically stable
	X		17) Stream is in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition)

*Note

(Revised 1998)

Remarks

All Answers marked "NO" are a direct result of the Dec. 2010 flood. Regeneration of vegetation is slowly occuring. and historical flood events show that this area always bounces back, So we have no doubt this area will recover from the 2010 flood and soon be back in PFC.
This segment is overall vertically stable, However on the Southeast side is a cut bank. Lee Hughes states it is reletively stable and has not changed much over the past 30 yrs.

Summary Determination

Functional Rating:

Proper Functioning Condition	
Functional—At Risk	X
Nonfunctional	
Unknown	

Trend for Functional—At Risk:

Upward	X
Downward	
Not Apparent	

Are factors contributing to unacceptable conditions outside the control of the manager?

Yes	X
No	

If yes, what are those factors?

___ Flow regulations	___ Mining activities	___ Upstream channel conditions
___ Channelization	___ Road encroachment	___ Oil field water discharge
___ Augmented flows	X Other (specify) flood in 2010	

Appendix F:

Wildlife Data

Arizona Game & Fish Unit 13B Mule Deer Population Counts				
Year	**Number of Animals Surveyed**	**Bucks/100 Does**	**Fawns/100 Does**	**Population Estimate**
1985	108	30	50	1,000-1,500
1986	41	29	18	1,000-1,500
1987	63	31	44	1,163
1988	--	No Data	No Data	No Data
1989	112	71	31	900
1990	63	68	32	900
1991	85	27	37	900
1992	31	24	59	<1000
1993	117	126	52	800-1000
1994	143	69	52	No Estimate
1995	88	183	79	No Estimate
1996	154	87	33	No Estimate
1997	64	77	29	No Estimate
1998	156	43	45	No Estimate
1999	145	51	35	No Estimate
2000	155	49	36	No Estimate
2001	275	34	67	No Estimate
2002	118	46	20	1,000[13]
2003	84	29	46	1,000
2004	102	34	57	1,025
2005	128	65	72	1,100-1,200
2006	143	68	64	1,200
2007	152	79	41	1,050
2008	158	45	63	1,200
2009	150	28	42	1,100
2010	183	39	57	1,100
2011	176	58	83	1,300
2012	199	50	93	No Estimate

[13] Population estimate is based upon a population model provided by AGFD.

Arizona Game & Fish Unit 13B North Desert Bighorn Sheep Population Counts							
Year	**Total Rams**	**Ewes**	**Lambs**	**Yearling Male**	**Yearling Female**	**Unclassified**	**Total**
2003	Insufficient Data						
2004	Insufficient Data						
2005	35	58	19	3	6	0	121
2006	32	90	18	3	10	0	153
2007	36	93	17	6	8	0	160
2008	34	44	8	0	0	0	86
2009	No data (no counts done)						
2010	No data (no counts done)						
2011	26	66	14	3	4	0	113
2012	No data (no counts done)						