



United States
Department of the
Interior

Draft Coordinated Resource Management Plan

Horseshoe Allotment

Bureau of Land
Management

Phoenix District

Agua Fria National Monument

Arizona



Copper Creek Allotment



Cave Creek Ranger District

Tonto National Forest

Arizona

United States
Department of
Agriculture

Forest Service



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HORSESHOE AND COPPER CREEK CRMP PARTICIPANTS AND SIGNATORIES

COORDINATED PLAN PARTICIPANTS	SIGNATORIES
<ul style="list-style-type: none"> • Arizona Antelope Foundation • Archeology Southwest • Arizona State University • Audubon - Sonoran • AZ Zoological Society • AZ Game and Fish Department • Black Canyon City residents • BLM-Agua Fria National Monument • BLM-Tucson Field Office • Friends of the Agua Fria National Monument • Friends of the Tonto • Grand Canyon Trust • JH –Grass Fed Beef • Northern Arizona University • Residents and other interested citizens • Sierra Club • Southwest Decision Resources • The Nature Conservancy • Upper Agua Fria Watershed Partnership • USFS - Tonto National Forest • Western Watershed Project • Yavapai County 	<ul style="list-style-type: none"> • Bureau of Land Management • Tonto National Forest • JH Cattle • Arizona Game and Fish Department • Natural Resources Conservation Service

1 Introduction

A. Authority-The Federal Land Policy Management Act (FLPMA), as amended by the Public Rangelands Improvement Act (PRIA) allows for Allotment Management Plans (AMPs) to be included in grazing permits at the discretion of the Secretary of Agriculture (43 U.S.C. 1752(d), as amended by 92 Stat. 1803 (1978)). The Secretary has elected to exercise this discretion, and has delegated his authority to issue regulations in this area to the Chief of the Forest Service (36 CFR 222.1 et.seq.).

B. Definition - An Allotment Management Plan is defined in FLPMA as a document prepared in consultation with lessees or permittees applying to livestock operations on the public lands prescribing: 1) the manner in and extent to which livestock operations would be conducted in order to meet multiple use, sustained-yield economic and other needs and objectives, 2) range improvements to be installed and maintained, such other provisions relating to livestock grazing and other objectives found by the Secretary to be consistent with the provisions of FLPMA (43 USC 1702(k), 36 CFR 222.1 (b) (2), and FSM 1023).

C. The CRMP would serve as the Allotment Management Plan and would integrate actions needed to manage rangeland resources for livestock grazing. The CRMP would integrate resource goals, objectives, standards, guidelines, and management requirements for the management of rangeland resources including soil, water, wildlife, fisheries, and vegetation for a wide array of resources uses with livestock grazing. A Landscape Assessment Team (LAT) comprised of interagency resource specialists, grazing permittee, and interested publics/stakeholders may assist in the collection and interpretation of resource data. The purpose of the LAT is to provide technical expertise, conduct resource monitoring and assessments and help interpret results for the adaptive management decision making process. The LAT is also charged with organizing educational and partnership field opportunities with CRMP stakeholders to increase awareness and share knowledge about the Horseshoe-Copper Creek allotments and their natural and cultural resources.

2 Description of Allotments and Locations

2.1 Horseshoe Allotment

The Horseshoe allotment consists of approximately 32,000 acres in southeast Yavapai County, 50 miles north of Phoenix, Arizona. It is located within the Agua Fria National Monument, managed by the Bureau of Land Management (BLM). Horseshoe consists of 11 pastures; North and South River, Boone and Double Tank, Indian, New Mill, Joe's Hill, and Lousy Pasture. Riparian areas are located within major drainages of the Horseshoe Allotment. These include the Agua Fria River, Silver Creek, Indian Creek, and Bishop Creek. There are approximately 17 miles of riparian habitat within the allotment. Many portions of the Agua Fria River and tributaries are intermittent and do not support vigorous riparian vegetation. Frequent high flow events during winter storms and monsoons often scour out vegetation in portions of the active channel. Elevations range from 3300 feet to over 4600 feet and annual precipitation is about 14 inches.

2.2 Copper Creek Allotment

Copper Creek allotment consists of approximately 35,000 acres in southeast Yavapai County, 50 miles north of Phoenix, Arizona. It is located at the northwest end of the Cave Creek Ranger District of the Tonto National Forest (TNF). Copper Creek consists primarily of five pastures: Bobcat, Brooklyn, Cornstalk, Granite-Mesa Butte, and Perry Mesa. Vegetation on the allotment is dominated by a tobosa grassland on Perry Mesa and semi desert grassland and desert scrub in the higher elevations. Riparian vegetation occurs in some drainages. Topographical features range from nearly level mesa tops in the southwest to rolling hills in the north and steep mountains in the west. Elevations range from 3,000 to 5,800 feet. Mean annual precipitation is about 14 inches (USDI, BLM 2014).

3 Grazing and Resource Management

3.1 Stocking Level and Period of Use

The 2018 NEPA analysis for the Horseshoe allotment may authorize up to 4,572 Animal Unit Months (AUMs) which is equivalent to 381 cow/calf, from March 1 until February 28 annually. The class of livestock authorized to graze on the allotment includes mature cows (with or without un-weaned calves), replacement heifers, weaned or yearling steers, and bulls.

The 2018 NEPA analysis for the Copper Creek allotment may authorizes 2400 to 6000 AUM's which is equivalent to 200 to 500 cow/calf, from March 1 until February 28 annually. The class of livestock authorized to graze on the allotment includes mature cows (with or without un-weaned calves), replacement heifers, weaned or yearling steers, and bulls.

Calculation of AUMs is as follows: ($\#$ of cows multiplied by conversion rate for cow with calf of 1)($\#$ of days divided by 30.417) = Animal Unit Month.

Table 1: Proposed permitted number of livestock for the Horseshoe and Copper Creek Allotments.

Land Management Agency	Allotment	Permitted Livestock	Begin Date	End Date	Public Land %	Animal Unit Months (AUMs)
BLM	Horseshoe	381 adult cattle	1-Mar	28-Feb	100	4572
Tonto NF	Copper Creek	200 to 500 adult cattle	1-Mar	28-Feb	100	2400 to 6000
Tonto NF	Copper Creek	Annual natural increase [†]	1-Jan	15-May	100	Up to 2700

[†] Annual natural increases are the progeny of permitted cattle on the allotment (yearlings).

3.2. Grazing System:

Livestock management on the allotments would continue under a flexible livestock rotation with a selective rest-rotation strategy. A selective rest-rotation strategy is comprised of two components. The

selective component utilizes current climatic and on the ground monitoring data along with utilization triggers to prompt livestock rotations. The rest component defers a period of no grazing within a pasture to allow the physiological needs of plant recovery and reproduction post grazing disturbance. Annual authorized livestock numbers may be adjusted from initial stocking levels. A stock and monitor approach, consistent with regional Forest Service direction *R3 Supplement to FSH 2209.13 chapter 90*, would be used to establish grazing capacity over the long term (five to ten years). Actual permitted levels of grazing would be determined annually by the BLM Field Manager and Cave Creek District Ranger with the permittee based on the results of monitoring and successful implementation of management practices. Additionally annual authorized use would vary annually based on current range conditions, including forage availability and resource monitoring that may be collected by the LAT. Scheduling of pasture use would vary year to year as detailed in the Horseshoe annual grazing application and Copper Creek annual operating instructions (AOI). Pasture rotation schedules provide the basis for scheduled use, rest, and recovery periods after scheduled grazing to maintain or improve range watershed conditions. When schedules are determined for the upcoming grazing year, the permittee would be required to follow the prescribed pasture rotation or develop alternative plans with the BLM and Forest Service if resource or livestock management concerns arise.

The LAT may provide input to the BLM and Forest Service and help review monitoring data to provide recommendations for proposed actions that are consistent with the goals and objectives of the CRMP. The LAT team could evaluate short and/or long-term climatic data (e.g. precipitation), previous year's utilization, biological monitoring or other relevant resource data before considering recommendations to grazing management. The BLM Field Manager and Cave Creek District Ranger would make any necessary administrative decisions related to the grazing program after review of existing data and recommendations.

Actions: The LAT would generally meet twice a year (typically spring and fall) to evaluate rangeland and resource data including:

- Precipitation
- Rangeland ecological site condition
- Riparian and aquatic condition
- Parker 3-Step
- Assessment Inventory and Monitoring (AIM)
- Vegetation trends
- Soil cover
- Rangeland Health
- Livestock use records
- Wildlife surveys
- Habitat assessments

Evaluations of proposed grazing actions are made in light of the objectives in this CRMP and current resource conditions or concerns. Recommendations may be, but are not limited to; adjustments to current annual grazing management practices, grazing utilization levels and/or other strategies identified by the LAT (Appendix B).

3.3 Intensity:

Herbaceous forage utilization would be set at a conservative utilization level, approximately 30-40% of current year's growth on key perennial species. Utilization on browse is set at no more than 50%

(on current year's leaders) in upland areas. Riparian utilization would be limited to less than 40% on terminal leaders of obligate riparian woody species and less than 50% use on riparian herbaceous species. Use on emergent species would be managed to maintain a stubble height of 6-8 inches during the grazing period. Allowing for the physiological requirements of vegetative growth and reproduction, and to ensure progress towards meeting land health standards and objectives identified in the CRMP.

The CRMP calls for the use of soft and hard triggers, such as utilization thresholds which are intended to help proactively guide when livestock should be moved to other areas, before permitted use levels are exceeded. This plan gives the BLM, Forest Service and permittee the flexibility needed to properly manage livestock use within the allotments and to adapt to current environmental conditions. The following key forage species are examples but do not limit what may be used to evaluate grazing intensity:

Perennial Grasses:

Sideoats Grama (BOCU)
Vine Mesquite (PAOB)
Black Grama (BOER4)
Green Spangletop (LEDU)
Bush Muhly (MUPO2)
Tobosa Grass (PHMU)
Squirreltail (ELEL)
Deergrass (MURI)

Emergent Species:

Rushes (JUNCUS)
Sedges (SCPU)
Cattails (TYPHA)
Horsetails (JUNCUS)

Shrubs:

Globemallow (SPAM)
Shrubby Buckwheat (ERWR)

Riparian Woody Species:

Willow (*Salix* spp)
Cottonwood (*Populus* spp)
Ash (*Fraxinus*)

3.4 Cattle Allotment Management Practices

Livestock management, including herding and salting, is critical to distribute livestock across the allotments and control cattle in the appropriate unit. The permittee would furnish sufficient riders or herders for proper distribution, resource protection, and management of cattle on the allotments. The Agua Fria Resource Management Plan (RMP) and Tonto National Forest Plan Standards and Guidelines applicable to livestock grazing will be followed on the allotments in addition to the following:

- Cattle should be drifted instead of trailed wherever possible.
- Grazed units should have all livestock removed from them within 10 days of a scheduled move. Do not allow cattle to graze areas previously grazed until adequate rest has been provided.
- Time spent in each unit may vary depending on weather conditions and grazing intensity. It is the permittees' responsibility to monitor utilization and move cattle before standards are exceeded.
- Permittee would make sure enough time is allowed to remove livestock to meet the scheduled off date and avoid unauthorized and excess use.

- Permittee would provide the BLM and Forest Service with an Actual Use Record, an Improvement Maintenance Record, and any monitoring data they collect at the end of each grazing season.
- Use of salt, protein and other nutritional supplements are encouraged for livestock health and to improve livestock distribution. All supplements would be placed greater than ¼ mile from water, and away from natural concentration areas such as drainage bottoms, saddles, roads and trails. Supplement locations would be rotated periodically. No hay or bulk feed may be fed on BLM and Forest Lands.
- Salt would be removed from units when cattle have left an area. Salt should not be placed in a unit until the cattle are placed there.
- Place supplements where forage is abundant and current grazing use levels are low. Supplements should not be placed at any location more than once during the grazing season to prevent the concentration of livestock.
- Water may be turned off temporarily to discourage livestock use in a portion of a pasture, but may be made available again once livestock leave the pasture. This practice would continue to provide water for wildlife.
- New water developments would be constructed in uplands where possible to encourage livestock use away from riparian areas and facilitate livestock distribution.
- Dead livestock within 300 feet of any campsite, live stream, spring, roadway, or trail would be promptly removed and properly disposed of.

3.5 Frequency and Timing

Management systems would be designed to incorporate at least one growing season of rest or deferment in order to provide grazed plant recovery. Timing of pasture moves would be determined by forage utilization monitoring and resource management objectives specified in this CRMP, Horseshoe annual grazing application and the Copper Creek AOI with the following design criteria.

Livestock would be managed using adaptive management. This includes using monitoring results to continually modify management in order to achieve desired conditions. This would provide the flexibility to adapt management to current conditions. Such changes may include annual administrative decisions to adjust the number of livestock, dates for grazing (season of use), class of animal, or pasture rotation. These changes would not exceed the limits for timing, intensity, duration, and frequency as defined in the term grazing permit. Additional adaptive management guidelines can be found in the allotments' monitoring plan and outlined in Appendix E.

Actual rotation of cattle would be determined each grazing year through the Horseshoe annual grazing application and Copper Creek AOI. Modifications to these documents may be implemented at any time throughout the grazing season in response to unforeseen environmental or management concerns. Such changes may be in response to resource conditions including but not limited to: water availability, forage conditions, drought, fire, and management objectives.

3.6 Planned Grazing Rotation

Livestock management on the allotments would continue under a flexible livestock rotation through a selective rest-rotation strategy. Annual authorized use may vary annually based on current range conditions, including forage availability and biological monitoring from the LAT. Scheduling of pasture use would vary year to year as detailed in the Horseshoe annual grazing application and Copper Creek annual operating instructions (AOI). Pasture rotation schedules provide the basis to provide scheduled use and rest and recovery periods after scheduled grazing to maintain or improve range watershed conditions. When schedules are determined for the upcoming grazing year, the permittee would be required to follow the prescribed pasture rotation to the maximum extent possible.

4.0 Range Improvements

The permittee is responsible for the maintenance of all range improvements established on the Horseshoe and Copper Creek allotments throughout the course of their usable life. The permittee would be required to sign cooperative agreements for all range improvements on the Horseshoe allotment. Maintenance responsibilities for improvements on Copper Creek are outlined in part 3 of the Copper Creek grazing permit.

In addition to the current existing improvements, a need for additional improvements has been identified by the CRMP planning team. If implemented, future improvements on the Horseshoe allotment would have cooperative agreements signed and those on Copper Creek added to the part 3 of the Copper Creek grazing permit. The CRMP planning team identified several improvements that are no longer necessary to meet the long-term goals and objectives of the CRMP. These improvements would be removed. The existing and proposed range improvements can be found in the Appendix D. Maintenance standards for existing and proposed range improvements are described below. Improvements would be maintained before livestock are authorized on the allotments each year.

4.1 Stock water Development Standards: Troughs, Water Systems, and Stock Ponds

- All spring source facilities should be adequately protected or fenced and fences maintained to prevent livestock from getting into the source box. Once fenced, water would be piped to a trough located outside the enclosure to provide livestock water.
- Head box lids or covers shall be in place to prevent dirt, rodents, or other refuse from getting into the head box and prevent wildlife entrapment.
- All outlet pipes and valves from head boxes should be functioning and any leaking should be kept to a very minimum.
- Water troughs should be kept at heights that make them useable to livestock. Troughs which become elevated from trampling livestock should be periodically backfilled to maintain a useable height.
- Troughs which become uneven due to settling should be reset and leveled.
- Bottoms of troughs should be kept clear of the ground with at least 2” to 4” of clearance under the bottom of the trough to prevent rusting or decomposition.
- Water should not be allowed to overflow the sides of the troughs. Overflow pipes must be kept clear. Overflow water would be piped away from troughs at least 50 feet. The end of the overflow

pipe must be protected from trampling by livestock. Water from overflow pipe must be directed away from the trough area and returned to its source.

- Inlet and outlet pipe shall be protected by anchoring to the trough with a single post next to the vertical pipe and a brace or pole supporting the horizontal pipe. Inlet and outlet pipeline would be buried as much as possible for their protection.
- All troughs would be equipped with a wildlife escape ramp from which birds and rodents can escape or drink from the trough.
- Troughs, storage tanks, and pipelines would be drained and cleaned periodically to prevent moss and debris buildup and damage from freezing.
- Poles, posts, and trough framing materials used in the construction of the water development would be maintained, repaired, or replaced as needed. Open pipe posts would be capped to prevent wildlife entrapment.
- All above ground pipeline supported structures would be maintained to keep the pipes at gradient and prevent sagging.
- Pipelines with air and drain valves would be covered with fine screen to prevent rodents and dirt from entering the pipe. Screens would be replaced as needed.
- Pipeline leaks would be repaired or the damaged section would be replaced with materials similar to the original construction materials.
- Pipelines with valve covers boxes would be kept covered and repaired when needed.
- Stock water ponds would be kept clear of debris, dead animals, etc. Spillways would be cleaned and maintained to prevent washing out or becoming plugged. Rodent damage and damaging vegetation on dams would be reported to the administrative agency.
- Stock water development components (e.g., rusted out troughs, broken sections of pipe, etc.) replaced during maintenance or reconstruction would be removed and properly disposed of.
- New spring developments would be constructed with the spring box designed so that residual flow is left at the spring head to prevent dewatering.

4.2 Fence and Corral Standards

- All broken fence wire would be spliced and repaired in such a manner that tension on a wire can be maintained. Wire splices would be made with 12 gauge size tie wire or type of wire used in initial construction.
- Broken or rotten posts, broken braces and missing staples would be replaced where and when needed to maintain the fence.
- Wires would be re-stretched where needed.
- Broken or missing stays would be replaced where needed.
- The top wire on all range fences should be kept under 42 inches in height.
- Staples should not be driven so deep into the post that they scar or create a weak spot in the wire.
- All gates should be closed before livestock enter the grazing units and opened and tied back in the fall after livestock leave the allotment.
- Wire gate tension should be sufficient to prevent the gate from sagging and still be easily opened and closed. Gate loops should be made from smooth wire, not barbed wire.

- Trees which fall on fences would be cut and removed when and where needed; wire if broken would be spliced and re-stretched; poles if broken would be replaced.
- Broken or rotten sections of log or pole fences and corrals would be replaced as needed.
- Corrals would be kept clean of litter, in good repair, and in useable condition.
- Metal components of range fences and corrals (e.g., wire, stays, t-posts, gates, etc.) replaced during maintenance or reconstruction would be removed from the Forest and properly disposed of.

5.0 Wildlife Management

The Horseshoe and Copper Creek Allotments are home to an abundance of both game and non-game wildlife species. Both allotments are located within Game Management Unit (GMU) 21. The rich diversity of wildlife found in the vicinity can be attributed to the topographic and vegetative diversity of the area. Vast semi-desert grasslands are intersected by steep canyons and ribbons of native riparian deciduous forests. Semi-desert grasslands provide fawning grounds and movement corridors for an isolated huntable population of pronghorn antelope. Riparian areas within the allotments, designated by the Arizona Audubon as the Agua Fria National Monument Riparian Corridors Important Bird Area, support an abundance of bird species including the threatened western yellow-billed cuckoo (*Coccyzus americanus*). Riparian areas also support native fish populations such as the endangered Gila chub (*Gila intermedia*) and Gila topminnow (*Poeciliopsis occidentalis*) as well as other native and non-native fish species, reptiles and amphibians.

Critical habitat has been designated for the Gila chub within portions of both allotments and critical habitat has been proposed for the western yellow-billed cuckoo and northern Mexican gartersnake within the Horseshoe Allotment. There are also several Species of Greatest Conservation Need (SGCN) that have historic, present or potential distributions within the Allotments (Table 2- the list excludes plants and insects). The SGCN are species that the State has identified as most in need of conservation actions in Arizona's State Wildlife Action Plan: 2012-2022 (SWAP), and those that are indicative of the diversity and health of the State's wildlife (AGFD 2012).

5.1 Focal or Key Species:

The goals, objectives, strategies and actions identified within the Horseshoe-Copper Creek CRMP were developed to ensure habitat is maintained and/or improved for all fish and wildlife species. However, specific wildlife species associated with specific habitat types (e.g. semi-desert grasslands and riparian deciduous forests) were used for planning purposes and influenced the development of multi-resource objectives, strategies and actions. It is presumed that by using these species for planning purposes, implementation level actions would maintain or improve habitat conditions for most wildlife species found within the allotment.

Pronghorn and grassland bird life history requirements for breeding and survival were used to develop species goals, objectives, and strategies and actions that promote population maintenance and growth for species dependent on grasslands. Habitat quality and annual fawn recruitment rates are key drivers for sustaining the resident pronghorn population. Management actions that focus on optimization of habitat conditions for fawn production and survival (e.g. A diverse composition of native herbaceous

vegetation with low structure and low tree, shrub and cacti density); would minimize the effects other mortality factors have on population trends, such as predation. The use of a pronghorn fawn hiding cover objective for Adaptive Management would benefit grassland bird species, many of which have similar habitat requirements, and ensure that minimum cover requirements are met. A second objective, to maintain the abundance and distribution of key forage species that research has shown are disproportionately important to pronghorn during seasons of low forage production, would help promote forage conditions that sustain other wildlife as well during periods of stress. Both of these wildlife objectives as well as other strategies and actions would serve to maintain or improve watershed function and upland plant communities, which would also avoid or minimize detrimental impacts such as erosion and sedimentation to riparian and aquatic habitat and the species dependent on them. Many objectives, strategies and actions that benefit pronghorn, grassland birds and other terrestrial wildlife species can be found in the upland and grazing goals, strategies, and objections section (Appendix A and B).

Riparian obligate species such as the western yellow-billed cuckoo, Gila chub and northern Mexican gartersnake were used to develop riparian and aquatic objectives, strategies and actions. The maintenance and/or improvement of habitat for these species would ensure the habitat for all riparian obligate and aquatic species are met. Western yellow-billed cuckoo breed and forage in native Riparian Deciduous Forests, such as the cottonwood-willow forests along the Agua Fria River and tributaries. This species selects for densely canopied native riparian vegetation that is diverse in age and in vertical and horizontal structure. It prefers areas closely associated with perennial water and where summer season insect productivity is high. It also forages in adjacent mesquite and mixed tree woodlands. A diverse understory and greenline of native herbaceous and aquatic emergent plants at the water's edge also provides cover and breeding habitat for amphibians and reptiles. A diverse and densely structure riparian overstory and greenline will support greater levels of insect productivity, a critical forage base for all fish and wildlife. Fish habitat quality can be maintained and improved through efficient water transport, reduced erosion/sedimentation, reduced stream temperatures; all of which are enhanced by the presence of dense native riparian plant communities. Riparian plant objectives for Adaptive Management are expected to maintain or increase the extent and/or structural diversity of native woody plant cover and herbaceous understories by managing livestock grazing levels, seasons of use, constructing riparian exclosures and eliminating the practice of diverting perennial stream flows into upland livestock water locations. These actions would benefit birds, native fish, amphibians, reptiles and mammals associated with these biologically diverse areas. Many objectives, strategies and actions that benefit riparian obligate wildlife species can be found in the riparian strategies portion (Appendix B).

In addition to management of habitat quality for the benefit of wildlife, wildlife population management objectives would be implemented to maintain diversity and species population trends. The action of reintroducing Gila topminnow and northern Mexican gartersnakes into suitable habitat within the allotments would assist with recovery efforts for these species. **This action has not yet been analyzed through NEPA and is currently not authorized.**

5.2 Overview of actions

In a collaborative process between federal and state agencies, the permittee, and stakeholders, many actions have been developed within this CRMP to benefit fish and wildlife and habitats upon which they depend. Many of these actions would be implemented by actively and adaptively managing grazing across the landscape (See Section 8.0) to ensure habitat requirements for wildlife are maintained and/or improved. Other actions include: building/removing range facilities and supplemental stockings of threatened and endangered species. An overview of specific actions that are intended to benefit fish and wildlife are bulleted below.

- Adjustments in timing, duration, frequency of livestock use to:
 - Maintain key forage for wildlife by actively managing livestock
 - Maintain adequate pronghorn fawn hiding cover in fawning areas
- Implement utilization thresholds in upland and riparian areas to maintain and improve habitat the vegetative community and the ecological services it provides
- Limit livestock use of riparian areas winter season (Nov. 1 to Mar. 1) to maintain riparian health
- Build riparian exclosures around Silver Creek, and many springs to protect sensitive areas and resources
- Maintaining existing water sources to improve water distribution for both wildlife and livestock
- Construct new water sources where appropriate to improve water availability to wildlife
- Build, maintain and relocate fences with wildlife friendly designs to reduce entrapment and/or injury, and improve permeability and access to water for wildlife
- Suspend surface water diversions of Indian Creek, Silver Creek and the Agua Fria River to improve surface water availability
- Build riparian exclosure around Silver Creek to improve riparian function and habitat quality for Gila chub
- Transplant northern Mexican gartersnake and Gila topminnow into Indian Creek, Silver Creek and Copper Creek to increase threatened and endangered species populations. **This action has not yet been analyzed through NEPA and is currently not authorized.**

See Appendix A and B for the Horseshoe-Copper Creek Coordinated Resource Management Plan: Goals, Objectives, and Strategies document for an exhaustive list of wildlife strategies that may be considered when implementing actions.

6.0 Adaptive Management and Drought Strategy

6.1 Adaptive Management

Adaptive management is a tool that uses documented results of management actions to continually modify management in order to achieve specific objectives. Management is designed to provide sufficient flexibility to adapt management to changing circumstances. Monitoring of forage availability and utilization, range readiness and resource conditions would be used to determine whether management is being properly implemented and whether actions are effective at achieving or

moving toward desired conditions. If monitoring indicates that desired conditions are not being achieved, an adaptive management decision would be used to modify management. Such changes may include administrative decisions such as the specific number of livestock authorized annually, specific dates for grazing, class of animal or modifications in pasture rotations, etc. However, such changes would not exceed limits for timing, intensity, duration and frequency defined in the term grazing permit. Adaptive management would be implemented through the AOI, which may adjust livestock numbers and the timing of grazing so that use is consistent with current productivity and is meeting management objectives. The AOI would also include mitigation measures and Best Management Practices to avoid or minimize effects to wildlife, soil, and water quality. Modifications to the AOI may be implemented at any time throughout grazing season in response to unforeseen environmental or management concerns.

Adaptive management also includes monitoring to determine whether identified structural improvements are necessary or need to be modified. Minor additions to existing infrastructure such as fencing or additional troughs along existing water developments to achieve resource objectives would be tiered to the Environmental Analysis. All new structures would have heritage and biological clearances prior to implementation and all Forest Plan Standards and Guidelines would be followed.

6.2 Drought Strategy

The Bureau of Land Management follows a drought policy that outlines an annual three-phased approach, organized using the annual seasonal cycle of livestock grazing use on public lands, to assessing drought-caused circumstances or resource conditions, and implementing responsive management actions (“assessment and response”): 1) Pre-Season; 2) Early to Mid-Season; and, 3) Late-Season to Post-Season. It is focused primarily on the grazing program and those programs that affect or are affected by the grazing program.

The Tonto National Forest follows Southwestern Regional drought guidelines found in Forest Service Handbook 2209.13. These guidelines consist of four elements: drought evaluation, management process, stocking during and after drought, and communication plan.

The Arizona Game and Fish Department operates under guidelines developed for drought in a more general sense monitoring for specific wildlife needs. The Department has identified critical waters in times of drought within the two allotments. Drought management may include monitoring and input to the LAT for adaptive management strategies to help minimize compounding impacts of drought, grazing, fire, invasive species, or changes in native plant communities, e.g. retaining minimum vegetation cover within key fawning areas may become more critical during drought.

A minimum of two rain gauges are planned to be placed in each pasture in the allotments. These may provide additional precipitation data that may be useful in monitoring current on-the-ground conditions and help prepare and monitor drought conditions.

The issuance of the yearly AOI provides sufficient flexibility to allow management to be adjusted in recognition of changing circumstances such as drought or seasonal fluctuations in forage production. If monitoring indicates desired conditions are not being achieved in a particular unit/pasture, management would be modified in cooperation with the permittee. Changes may include administrative decisions such as the specific number of livestock authorized annually, scheduled dates for grazing, class of animal (cow/calf pairs versus yearlings, steers or heifers, etc.), livestock herd movement, and/or non-use or pasture determent.

7.0 Monitoring Plan

7.1 Key Areas

Key areas are described in “Sampling Vegetation Attributes” (ITR, 1996) as indicator areas that are able to reflect what is happening on a larger area as a result of on-the-ground management actions. A key area should be an area representation of the range as a whole, an area where livestock use occurs, located within a single ecological site and plant community, and be a minimum of 100 yards from fence lines, enclosures, roads, and trails. A key area is representative example of the landscape selected because of its location, grazing or browsing value, or use. It serves as a monitoring and evaluation point for range condition, trend, or degree of grazing use. Annual monitoring in key areas is for short-term data collection. These key areas are properly selected to reflect overall acceptability of current grazing management over rangeland condition. Key areas may also be used to monitor other resources such as wildlife and heritage resources.

- Monitoring methods could include, but are not limited to utilization and stubble height monitoring, annual riparian monitoring, and photo point protocols.

Data would be used, along with supporting information to determine when livestock must be moved from one pasture to another and to make any necessary adjustments to livestock numbers and/or season of use (determined in AOI).

Final utilization and stubble height readings would be taken at end of pasture use, along with end of growing season use of each year. Annual monitoring would follow accepted BLM and Forest Service protocols set by monitoring handbooks.

Key areas include but are not limited to:

- Benchmark locations
- Additional locations that meet definition above

7.2 Benchmarks

Condition and long-term trend monitoring may be conducted in some key areas used for annual monitoring. Information would be used to determine if the area is meeting or moving towards desired conditions. Long-term trend data would be used to measure changes in plant community composition,

cover, structure, soil conditions, frequency, and management of grazing in a trend status. Annual adjustments may be conducted in order to meet long-term desired conditions. Periodic monitoring, on decade intervals, for vegetation trend would include cover and frequency, in which Parker 3 Step Clusters, or other similar procedures, would be used.

7.2.1 Indicators of downward trend for vegetation include:

- Key vegetation species decreasing in vigor.
- Lack of young plants from desirable and intermediate species.
- Invasion by undesirable species.
- Hedged and highlined shrubs. Dead branches, generally indicating that shrubs are dying back.

7.2.2 Indicators of downward trend in soil stability include:

- Rill marks, which are small but conspicuous water channels around vegetation.
- Active gullies are raw, actively downcutting, and may have headcuts. This type of gully may vary from a few inches to several feet deep.
- Alluvial deposits; soil material transported and laid down as small fans in headwater drainages.
- Soil remnants; original topsoil held in place by vegetation or roots.
- Active terraces; usually caused by hooves of animals; stair step in appearance on side-slopes
- Pedestalled plants; exposed plant crown or roots.
- Wind-scoured depressions between plants, or wind deposits of soil
- Soil buildup behind plants, logs, and trees on upslope side.

Long-term monitoring would follow accepted BLM and Forest Service protocols determined by the documents listed above.

7.3 Current Conditions

7.3.1 Horseshoe Allotment

All of the following information about long and short-term monitoring methods and data analysis can be found in its entirety in the 2014 BLM LHE. Long-term vegetation monitoring was conducted on the Horseshoe allotment using legacy and new methods. Legacy methods (dry-weight rank) consisted of collecting vegetation data at areas that had vegetation monitoring transects previously established; one on the inside of a fenced livestock enclosure and one outside. Legacy data was used to show vegetative trend between monitoring periods. Vegetative trend is the direction plant communities take over time. These data can be compared to subsequent readings to determine trend towards meeting land health objectives. The following tables outline trend between years 1994, 1996, and 2014:

Table 2: Comparison plot inside and outside Copper Trap Exclosure using the Dry weight rank method.

Copper Trap #1, T-2 Outside Exclosure							Copper Trap #1, T-2 Inside Exclosure								
	% frequency				% composition				% frequency				% composition		
	1994	1996	2014		1994	1996	2014		1994	1996	2014		1994	1996	2014
Cover category							Cover category								
Bare ground	19	60	34				Bare ground	34	60	25					
Gravel		5	3				Gravel		16	4					
Rock	7	10	6				Rock	14	8	9					
Litter	56	14	52				Litter	41	11	51					
Live basal	18	11	4				Live basal	11	5	11					
Shrub/succulent							Shrub/succulent								
mesquite	1						mesquite	1							
shrub buckwheat							shrub buckwheat	4	6	1	1		0		
snakeweed	13	2		7		0	snakeweed	15	4		5		0		
prickly pear							prickly pear	1		1					
Perennial grass							Perennial grass								
tobosa	87	92	56	14		37	tobosa	85	93	84	50		56		
vine mesquite		2					vine mesquite		0						
squirrletail	14			3		0	squirrletail	8			3		0		
Perennial forb							Perennial forb								
bundleflower							bundleflower			3					
ragweed		3	5	0		1	ragweed								
vetch / lotus							vetch / lotus		5						
Annual grasses	100	30	90	41		7	Annual grasses	99	45	100	32		13		
Annual forbs	41	85	100	4		21	Annual forbs	38	95	100	5		24		
ann goldeneye	1	0	82	0		35	ann goldeneye	4	0	77	0		13		

Due to the time between readings it is difficult to look at the data from T-2 and draw conclusions. It appears that basal cover of tobosa has declined significantly outside the exclosure and increased back to some more normal amount inside. Inside the exclosure, basal cover went from 11% in 1994 to 4% in 1996, just two years. The decade prior to 1994 was the wettest on record in Arizona's climate history and by 1994 levels of basal cover were high. 1996 was a severe drought year and in both transects basal cover declined. Basal cover declined outside the exclosure from 18% to 11% and inside from 11% to 4%. These transects are only 200 feet apart. This could mean that there are dynamics in tobosa basal cover that are not well understood. There has been very little grazing in Copper Trap #1 for the past 9 years. Without monitoring data and land use records throughout this period it is impossible to draw conclusions from the results.

Other methods included the newer Assessment, Inventory, and Monitoring (AIM) method that has been recently developed by the BLM. Thirty two AIM plot locations were randomly selected on the Horseshoe allotment and vegetative measurements were taken in 2012. Seventeen primary AIM plots were selected for repeat measurements on the allotment. Fifteen backup AIM plots can be used as needed to monitoring progress in meeting land health objectives. All AIM plots were visited in 2012 and soil cover / vegetation measurements including, ground cover, foliar cover, basal and canopy gap and shrub density were made. All primary AIM plots were assessed for Rangeland Health in 2012 or 13. Four primary AIM plots were re-assessed and four backup AIM plots were assessed for Rangeland Health during field studies in 2014.

The following tables outline AIM vegetation cover data for the Clayey Upland and Volcanic Hills, Clayey 12-16” precipitation zone Ecological Site Descriptions and how it was compared against NRCS ESDs.

Table 3: Foliar cover by plant functional group for the Clayey Upland 12-16 p.z. AIM sites.

Summary Category	2012 Average Percent	2018 Average Percent	NRCS ESD
Foliar Cover All	36.3	33.2	45-119%
Foliar Tobosa	6.9	17.2	5-20%
Bare Ground	20.9	27.9	15-25%
Basal Cover	1.7	1.0	12-31%
Total Litter	50.0	38.7	35-55%
Gravel/Rock	4.3	4.4	0-25%

Table 4: Foliar cover by plant functional group for the Volcanic Hills, Clayey 12-16 p.z. AIM Sites.

Functional Group	2012 Percent Cover	2018 Percent Cover	NRCS ESD
Grass	14.1	23.2	22-45%
Forb	2.4	1.2	1-7%
Shrub/Vines	26.5	19.6	12-32%
Tree	6.6	8.5	0-15%
Red Brome	15.0	0.0	0.0
Wild Oats	0.2	0.0	0.0

Short-term monitoring was also conducted on the Horseshoe Allotment. Upland Range Health Assessments done at 19 locations on the Horseshoe allotment from 2012 to 2014 show that the vast majority of the allotment meets Rangeland Standard Number 1, Upland soils exhibit infiltration, permeability and erosion rates that are appropriate to soil type, climate and landform (Ecological site).

One range health assessment on Volcanic Upland on the Horseshoe allotment did not meet standard 1. This site appears to be a former cultivated field associated with one of numerous archaeological sites on Perry Mesa. Gullies and rills on the site are thought to be associated with past cultivation.

Table 5: Horseshoe Allotment Summary of Upland Rangeland Health Assessment for all AIM plots.

Horseshoe Allotment Summary of Upland Rangeland Health Assessment							
Plot	Pasture	Eco. Site	Soil & Site Stability	Hydrologic Function	Biotic Integrity	Range Health Assessment	Notes
Not AIM	Copper Trap	Clayey	Stable	Functioning	Intact	Meet Standard 1	
Not AIM	Boone	Clayey	Stable	Functioning	Intact	Meet Standard 1	
Not AIM	Bull	Clayey	Stable	Functioning	Intact	Meet Standard 1	
VU-11	Joe's Hill	Volcanic Upland/Clayey Upland	Stable	Functioning	Intact	Meet Standard 1	
CU-12	Joe's Hill	Clayey	Stable	Functioning	At Risk	Meet Standard 1	Fire-drought invasive annuals
VU-3	Joe's Hill	Volcanic Upland/Clayey Upland	Stable	Functioning	Intact	Meet Standard 1	
VU-7	Lousy	Volcanic Upland/Clayey Upland	Stable	At Risk	At Risk	Meet Standard 1	Arch Site/Cultivated Area
GH-2	North River	Granitic Hills	Stable	Functioning	Intact	Meet Standard 1	Lehmann's lovegrass
GH-2B	South River	Granitic Hills	Stable	Functioning	Intact	Meet Standard 1	Lehmann's lovegrass
VH-5	Boone	Volcanic Upland	Stable	Functioning	Intact	Meet Standard 1	Agave toumeyana site
CU-4B	Joe's Hill	Volcanic Upland	Stable	Functioning	At Risk	Meet Standard 1	Fire-drought invasive annuals
CU-12	Joe's Hill	Volcanic Upland	Stable	Functioning	At Risk	Meet Standard 1	Fire-drought invasive annuals
VU-2	Joe's Hill	Volcanic Upland	Stable	Functioning	At Risk	Meet Standard 1	Fire-drought invasive annuals
VU-4	Joe's Hill	Volcanic Upland	Stable	Functioning	Intact	Meet Standard 1	
VU-5	Lousy	Volcanic Upland	Stable	Functioning	Intact	Meet Standard 1	
VH-12	Boone	Volcanic Hills, Clay	Stable	Functioning	Intact	Meet Standard 1	
VH-8	Double Tank	Volcanic Hills, Clay	Stable	Functioning	Intact	Meet Standard 1	
VH-11	Joe's Hill	Volcanic Hills, Clay	Stable	Functioning	Intact	Meet Standard 1	
VU-6	Joe's Hill	Volcanic Hills, Clay	Stable	Functioning	Intact	Meet Standard 1	
VH-9	Lousy	Volcanic Hills, Clay	Stable	Functioning	Intact	Meet Standard 1	

Forage utilization transects were also conducted within the allotments at various “Key Area” and AIM plot locations throughout the allotment. Utilization transects were completed in areas that had been grazed by livestock during the summer of 2014. The methodology used is called “Grazed-class”. 100 plants were sampled in a pace-transect format. Height-weight relationships for forage species were developed from un-grazed plants in the field. The cow herd (150) was in the Double Tanks pasture during April to July. The herd was moved onto the Forest allotment the end of July when utilization measurements were made. Utilization was judged on forage species within 0.25 miles of water at three locations, Copper Corrals, Bishop Well and Copper Tank in the Copper Trap #1. Table 6 shows the results of these measurements.

Table 6: Horseshoe Allotment utilization.

Horseshoe Allotment, end of season grazing utilization			
	Grazing utilization expressed as percent by weight		
Key Forage Species	Double Tanks, Bishop well	Double Tanks, AIM CS 1	Copper Trap 1, T-2 (outside exc)
Tobosa	5	0	5
Sideoats grama	10	25	
Black grama	20	31	
Curly mesquite	18		
Red threeawn	21	29	
Sand dropseed	34	50	
Rough tridens		34	
Squirrletail	20		
Shrub buckwheat	15	10	3
Globemallow	50	49	0
Ecological Site	Clayloam upland	Clayey slopes	Clayey upland

Results show light to moderate level of grazing use at three locations, close to livestock water supplies, throughout the four month grazing season. Grazed plants will be able to recover as these pastures will not be grazed again for 12-18 months.

Overall, short and long-term data indicated plant communities found on the various ecological sites within the Horseshoe Allotment to be in good ecological condition when compared to similar NRCS ESD's. However, some areas of the allotment have wild oats and red brome, and other non-native invasive plants within the upland plant communities. This is a common occurrence within most plant communities across Arizona.

7.3.2 Copper Creek Allotment

The Forest Service established Parker Three-Step monitoring (Parker Clusters) pace transects sites in key areas on the allotment in the mid-1950s and early 1960's. These sites provide historical data and are designed to measure long term vegetation condition, vegetation trend, soil stability, and soil trend. Vegetation trend usually refers to vegetative conditions based on available forage for livestock. Data at these sites has been collected at various intervals between 1956 and 2014.

Additionally the Common Non-Forested Vegetation Sampling Procedures monitoring protocol (CNVSP) was implemented on the Copper Creek allotment in 2013. The intent of this protocol is to collect additional rangeland data to better describe key areas. CNVSP protocol combines several monitoring methods from the "Sampling Vegetation Attributes" and "Guide to Rangeland Monitoring and Assessment" to capture information on a variety of attributes including ground cover and vegetative species index/frequency list (ITT 1996a and Smith et al. 2012). CNVSP has been implemented at key areas so legacy data from historic Parker Clusters could be assessed at the same locations.

Table 7: Parker 3 Step Cluster Current Condition and Trend.

Pasture	Cluster Number	Vegetation Rating	Vegetation Trend	Soil Stability	Soil Trend
Bobcat	C1	Poor	Upward	Very Poor	Downward
Cornstalk	C2	Good	Stable	Fair	Upward
Cornstalk	C3	Fair	Upward	Poor	Upward
Cornstalk	C4	Fair	Upward	Poor	Stable
Granite Mesa-Butte	C5	Good	Upward	Fair	Upward
Perry Mesa	C6	Fair	Downward	Fair	Downward
Perry Mesa	C7	Fair	Upward	Poor	Downward
Brooklyn	C8	Good	Stable	Fair	Stable
Granite Mesa-Butte	C9	Poor	Downward	Poor	Downward

Trend data collected from 2013-2014

Table 8: CNVSP Initial Ground Cover Data Results (2013-2014).

Pasture	Location	Basal Cover	Litter	Rock	Gravel	Total Ground Cover	Bare Soil
Bobcat	C-1	4	6	20	20	37	64
Cornstalk	C-2	18	19	2	0	38	62
Cornstalk	C-3	8	8	2	2.5	21	79
Cornstalk	C-4	7	26	1	0	34	66
Granite Mesa-Butte	C-5	6	7	19	1	32	68
Perry Mesa	C-6	9	30	8	0	47	53
Perry Mesa	C-7	9	20	3	2	33	67
Brooklyn	C-8	7	8	5	2	23	78
Granite Mesa-Butte	C-9	6	31	19	12	68	33

8.0 Monitoring Description

The BLM and Forest Service operate under different laws, regulations, and guidelines of the Federal Government. For that reason, monitoring protocols may vary among the two allotments and the corresponding administrative land management agency. Methods would be similar in nature but may vary in protocol. Monitoring would be conducted to determine if the terms of the grazing permits, this CRMP, annual grazing application and current AOI are being followed (implementation or short term monitoring). Monitoring may also be conducted to determine if the resource conditions on the allotments are meeting or moving towards the goals and objective of this CRMP, and the broader goals and objects identified in the Agua Fria RMP and Tonto Forest Plan (effectiveness or long term Monitoring). Should monitoring indicate a need for improved compliance or change in management, appropriate adjustments would be initiated. Participation from the permittee, CRMP stakeholders, and the CRMP Landscape Assessment Team (LAT) would be highly encouraged. The primary monitoring techniques used are described below but other may also be used in the future. Monitoring intensity

may be affected by current staffing, funding, and administrative agency priorities. A detailed monitoring plan for the allotments can be found in Appendix E.

8.1 Uplands

8.1.1 Horseshoe Allotment

Implementation monitoring: This type of monitoring typically occurs annually and may include such things as inspection reports, forage utilization measurements, livestock counts (actual use) and improvement inspections. Utilization measurements are made following procedures found in the Interagency Technical Reference and with consideration of the Principles of Obtaining and Interpreting Utilization Data on Southwest Rangelands.

Effectiveness Monitoring: Includes measurements to track condition and trend of upland and riparian vegetation, soil, and watersheds. Monitoring would be done following procedures described in the Interagency Technical Reference. These data would be interpreted to determine whether management is achieving desired resource conditions, whether changes in resource condition are related to management, and to determine whether modifications in management are necessary. Effectiveness monitoring may occur at a minimum of five-year intervals, or more frequently if considered necessary. Examples of effectiveness monitoring may include, but is not limited to Assessment Inventory and Monitoring (AIM), dry weight rank, and repeat photography. Rangeland health evaluations may be conducted every three to five years. Watershed and riparian evaluations may include Proper Functioning Condition (PFC), Multiple Indicator Monitoring (MIM), as well as soil and watershed condition assessments.

8.1.2 Copper Creek Allotment

Implementation monitoring: This type of monitoring typically occurs annually and may include such things as inspection reports, forage utilization measurements in key areas, livestock counts and facilities inspections. Utilization measurements are made following procedures found in the Interagency Technical Reference and with consideration of the Principles of Obtaining and Interpreting Utilization Data on Southwest Rangelands.

Effectiveness Monitoring: Includes measurements to track condition and trend of upland and riparian vegetation, soil, and watersheds. Monitoring would be done following procedures described in the Interagency Technical Reference and the Region 3 Rangeland Analysis and Training Guide. These data would be interpreted to determine whether management is achieving desired resource conditions, whether changes in resource condition are related to management, and to determine whether modifications in management are necessary. Effectiveness monitoring may occur at a minimum of five-year intervals, or more frequently if considered necessary. Examples of effectiveness monitoring include, but are not limited to pace transects, pace quadrat frequency, dry weight rank, ground cover, Parker 3-step clusters, and repeat photography. Watershed and riparian evaluations may include Proper Functioning Condition (PFC), Multiple Indicator Monitoring (MIM), as well as soil and watershed condition assessments.

8.1.3 Utilization & Stubble Height Standards (Short-Term Monitoring)

Grazing would be managed to achieve long-term goals in pasture key areas. It is the responsibility of permittee to ensure livestock grazing does not exceed vegetative use thresholds. If seasonal vegetative use of available forage approaches these thresholds, an allotment inspection may be scheduled.

Table 9: Allowable Use the Horseshoe and Copper Creek Allotments.

Vegetation	Use Threshold
Upland Herbaceous Use	30-40% of current year's growth
Upland Browse Species	50% of current year's growth
Tobosa grass in Key Pronghorn Fawning areas [†]	Maintain a minimum of 8" average stubble height on Tobosa grass during Pronghorn fawning season: late March through June.
Riparian Herbaceous Use	Limited to 50% of plant species biomass and maintain 6-8 inches of stubble height for emergent species such as rushes, sedges, cattails, and horsetails; measured during grazing season.
Riparian Woody Species	Limited to 40% of leaders browsed on upper 1/3 plants up to 6 feet tall

[†]Map of pronghorn fawning areas in Appendix D

8.1.4 Allotment Inspections/Compliance Monitoring

Compliance monitoring ensures livestock are distributed in correct pastures and areas authorized for grazing. It also includes but is not limited to: improvement maintenance inspections, forage utilization and livestock counts. These inspections would occur throughout the grazing season.

Utilization measurements are followed by procedures found in the Sampling Vegetation Attributes (1999), Utilization Studies and Residual Measurements (1999). These data collections could include browse utilization measurements, perennial grass stubble height measurements, photo points, and or height/weight relationships for certain perennial grass species. Utilization would be monitored on key forage species, which are native perennial grasses along with native perennial shrubs that are palatable to livestock. At a minimum, monitoring would include use in key areas and locations selected outside of key areas. Data collection procedures and interpretation would consider guidance contained in Principles of Obtaining and Interpreting Utilization Data on Southwest Rangelands (Smith et al. 2005) publication.

8.2 Riparian monitoring

Utilization measurements in riparian areas are also followed and conducted by Sampling Vegetation Attributes (1996), Utilization Studies and Residual Measurements (1996), Cowley and Burton (2005), and/or current acceptable methods/protocols that gather information in the Interagency Technical Reference manual (ITR, 1996). Utilization of critical riparian areas would be measured seasonally, while livestock are in pasture. If utilization reaches limits of recommended allowable use, livestock would be moved from critical area or pasture considering time of year and extent of area involved.

Changes in riparian vegetation and stream channel geomorphology condition and trend would be measured, preferably by riparian specialists.

8.3 Noxious Weed monitoring

Noxious weeds located in these allotments would be treated as necessary. Permittee and Forest Service would coordinate weed inventory and treatment. Noxious weed monitoring would be carried out at the same time allotment inspections are conducted. As noxious weed populations are found they are mapped, monitored, and treated. Treatment of invasive species would be carried out in accordance with practices established in the Draft Horseshoe/Copper Creek Environmental Assessment (BLM 2015) and Environmental Assessment of Integrated Treatment of Noxious or Invasive Weeds as detailed in the decision notice and finding of no significant impact, pages three and four (USFS 2012).

8.4 Wildlife and Habitat monitoring

Wildlife and habitat monitoring are critical components needed to apply adaptive management for the Horseshoe-Copper Creek CRMP. Monitoring both wildlife and their respective habitats would be conducted to determine if wildlife goals and objectives are being met. If wildlife goals and objectives are not met and/or not making progress towards being met, adaptive management steps and additional studies would be implemented to determine causal factors and provide insight for management responses. Data and results of wildlife and habitat monitoring would be shared and used in collaborative planning efforts.

Populations of wildlife would be monitored to determine status and trend which would inform adaptive management for the Horseshoe and Copper Creek Allotments. Focal species associated with upland, riparian and aquatic habitat types would be used to inform adaptive management. The maintenance or improvement in these species populations would generally reflect good and/or improving habitat conditions. It is presumed that when focal species populations are being maintained or improved, other wildlife species dependent upon a similar habitat type would also be maintained or improve. Focal species identified in the planning process are the western yellow-billed cuckoo, northern Mexican gartersnake, Gila chub, Gila topminnow, pronghorn, and grassland birds. Currently, periodic wildlife survey efforts attempt to track all of these species trends or presence.

Wildlife habitat would be monitored in association with upland, riparian and aquatic monitoring efforts. These data would be interpreted to assess habitat values for individual focal species. Specific habitat requirements/values for the respective focal species are summarized below:

Table 10: Habitat Requirements for Focal Species.

Species	Habitat Requirements
Pronghorn	Stubble height, hiding cover, utilization, DPC objectives, bare ground, canopy gap
Grassland birds	Stubble height, hiding cover, utilization, DPC objectives, bare ground, canopy gap
Western yellow-billed cuckoo	Greenline composition, woody species height class, woody species age class, woody riparian patch size, vegetative structure
Gila chub and Gila topminnow	Greenline composition, woody species height class, streambank stability and cover, woody species age class, Greenline-to greenline width, substrate, residual pool depth and pool frequency, aquatic physical and chemical properties
Northern Mexican Gartersnake	Greenline composition, woody species height class, woody species age class, woody riparian patch size, vegetative structure, residual pool depth and pool frequency

See Appendix E for the Horseshoe-Copper Creek Monitoring Plan for an exhaustive list of wildlife and habitat monitoring that may be considered when implementing actions.

8.5 Heritage Resource monitoring

8.5.1 Key Areas

Sites would be selected for monitoring based on several criteria: 1) known history of human or natural disturbance or impact; 2) risk of new human or natural impact due to location or other information; and 3) other concerns identified by a qualified agency archaeologist. A minimum of 10 sites would be selected in each allotment (BLM and FS), for a minimum total of 20 study sites. Where possible, sites already selected for other monitoring programs (e.g. Site Stewards) would be integrated into this monitoring plan so that information gained from site visits can be maximized. A representative sample of historic and prehistoric sites would be selected, spanning the range of occupation for the allotments. A variety of site types including, habitation sites with architecture, rock art sites, open air sites, etc. would be selected by a qualified agency archaeologist. Sites may be added to the program over time. The following may be considered in site selection:

- Include sites that are already monitored by site stewards
- Sites eligible for the register or monument objects
- Site selection: location (spatial distribution, landforms, access roads), sites previously monitored/studied, public knowledge, public use allocation, preservation/current condition, proximity to roads, locations relative to grazing use areas/range improvements
- Sites that are eroding (specifically burials)
- Long/short term management considerations

8.5.2 Benchmarks

A baseline condition assessment would be completed for each study site by a qualified agency archaeologist. Volunteers may assist, but a qualified archaeologist approved by either agency must be present. Baseline condition assessments would have two stages:

Literature and records search – many sites are already well documented and several previous monitoring and vandalism studies have been conducted on the allotments. This previous work can provide essential information about site conditions in the past that can help identify the extent of ongoing impacts to cultural sites, and to identify cases in which recovery has occurred (i.e. regrowth of vegetation).

On-site assessment – a standardized, on-site assessment form is essential to collect baseline site condition data that is informative and useful but does not create excess documentation which can hinder effective monitoring and data management. The form would include essential elements of the site description and characteristics, the creation of a site datum, detailed and accurate site mapping, GPS mapping and photography of current impacts to the site or features that are at risk.

8.5.3 Guidelines for on-site assessment:

Monitoring sites would record the following: site dimensions, how the site was located, depth of deposits (surface or subsurface), topographic and environmental setting, current condition and relative level of disturbance, accurate site map, establish or locate existing site datum, site walkover, GPS record of disturbances, photographs of at-risk features, photographs from fixed points around the site that are recorded on the map

8.5.4 Monitoring Description

Once baseline assessments are completed, a schedule for ongoing monitoring would be established by a qualified agency archaeologist. Monitoring schedules would take into account current site impacts, the potential for future site impacts, site type, location, physical setting, and other characteristics. Follow up monitoring can be completed by partner organizations and volunteers; however, all results would be verified by the agency archaeologists.

Guidelines for site monitoring:

- Volunteers and partner organizations would be trained by a qualified archaeologist prior to conducting monitoring. Sufficient training and documentation would be essential to ensure that results are consistent, accurate, and usable
- Documentation from baseline assessment and previous follow-up monitoring visits would be used during the site visits to effectively assess changes to the site condition
 - New photos would only be taken if there is a change in site condition with the exception of designated photo points to avoid excessive documentation
- Monitoring would include observations of indicators for human, natural, and animal disturbances

- Frequency of site evaluation would be determined on a case by case basis. Sites would be visited at least once every six months.

8.5.5 Data Management

Data management may require partnerships with other organizations to ensure that archaeological site data are stored in a secure manner and accessible only to permitted and authorized people. A long term data management plan would need to be developed. Key elements are:

- Field data collection: all data collection in the field would utilize standardized paper forms
- All site photographs would be logged on a photo form. Photos would be stored in both hard copy and digital form.
- All data would be entered and stored into a secure digital database to be identified in the future.

9.0 Standards and Guidelines

Standards and guidelines found in the Agua Fria RMP and Forest Plan are included in the CRMP Goals and Objectives, found in Appendix A.

9.1 Agua Fria RMP

Guidelines for Standard One

GM-17 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. The ground cover should maintain soil organisms, 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.

Guidelines for Standard Two

GM-19 Management practices maintain or promote sufficient vegetation to maintain, improve or restore riparian-wetland functions of energy dissipation, sediment capture, groundwater recharge, stream bank stability, thus promoting stream channel morphology (e.g. gradient, width/depth ratio, channel roughness, and sinuosity), and functions suitable to climate and landform.

Guidelines for Standard Three

GM-23 Intensity, season and frequency of use, and distribution of grazing use will be managed to provide for growth and reproduction of plant species needed to reach DPC (Desired Plant Community) objectives.

GM-26 DPC objectives will be quantified for each allotment through the rangeland monitoring and evaluation process. Ecological site descriptions available through the Natural Resources Conservation Service and other data will be used as a guide for addressing site capabilities and potentials for change over time. These DPC objectives are vegetation values that BLM is managing over the long term. Once established, DPC objectives will be updated and monitored by the use of indicators for Land Health Standard Three.

9.2 Tonto Forest Plan

The Tonto Land and Resource Management Plan (Forest Plan) defines the long-term direction for managing public lands. The purpose of the Forest Plan is to provide for multiple use and sustained yield of goods and services from Forest in a way that maximizes long-term net public benefits in an environmentally sound manner [36 Code of Federal Regulations (CFR) 219.1(a)].

10.0 Travel Management

The permittee would continue to access the allotment on existing roads and trails as designated by Forest maps to avoid the creation of illegal off-highway vehicle (OHV) trails. Tonto National Forest is currently finalizing the Travel Management Analysis with a projected decision in mid-2016. The objective is to designate a sustainable road system and reduce non-essential roads for watershed and resource protection. The following would apply:

- Travel Management Decision would be followed by the permittee.
- If access is needed to enter a motor vehicle restricted area, the permittee must have special authorization through a special use Permit or special authorization through the AOI.
- Road maintenance that is required to access range improvements or livestock management must receive a road use permit for any road work. In the event of significant future deviations from “current access needs” for motorized use as authorized by a Term Grazing Permit, there may be the requirement for additional environmental analysis on a site-specific basis, to comply with NEPA. The AOI authorizing each year’s grazing activity will include a brief discussion of the use of vehicles and OHVs within the designated road system, any single purpose use roads or trails, and a description of the annually anticipated level of cross-country travel and access consistent with Part 3 of the term grazing permit and/or AMP.

The administration and operation of this allotment may involve the use of motorized access to some portions of the allotment and the associated infrastructure on either a one-time or a recurring basis. This need for access may be for maintenance of existing improvements or for the construction of new improvements, as well as other logistical needs. Access is usually provided on existing system roads. If access is required beyond that available on existing system roads, it may be authorized on a case by case basis by the Agua Fria Monument Manager or Cave Creek District Ranger.

11.0 Revisions:

This plan is intended to be flexible and may be revised if the objectives and goals are not being met or management changes are necessary to meet required changes in policy, regulations or laws. Any revision of this CRMP would be carried out in close cooperation with the permittee.

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Appendix A: Resource Goals and Objectives

The following are Goals and Objectives that have been identified and developed by the LAT to help desired conditions on the Horseshoe and Copper Creek Allotments. These Goals and Objectives would help inform the management decision making and planning process.

Uplands

Uplands Goal 1: Restore or maintain native plant communities and vegetation types (semi-desert grassland, chaparral, Sonoran desert scrub and juniper woodland).

- a. Maintain each vegetation community towards its ecological site potential for ground cover, plant composition, diversity, structure and function influenced by natural and prescribed disturbance regimes.
- b. Maintain ecological processes to support healthy biotic populations and communities.

Objectives:

1. Maintain desirable upland plant communities and wildlife forage and hiding cover.
2. Each vegetation community is maintained within its natural range of variability and plant composition/structure/function (BLM RMP) on the Horseshoe allotment and maintains or improves the diversity of key upland plant species on Copper Creek.
3. Manage wildland (natural and prescribed) fire to maintain desired plant communities in the watershed consistent with upland plant community objectives on the Horseshoe allotment (BLM RMP).
4. Manage for a heterogeneous landscape in the watershed with mixed fire regime classes and seral states on the Horseshoe allotment.
5. Reduce accelerated runoff, erosion, and sedimentation within the watershed to minimize impacts to Aquatic habitats on the Horseshoe allotment.
6. Fuel loads are maintained below levels that are considered hazardous.
7. Horseshoe allotment Clayey Upland study sites:
 - a. Maintain foliar cover of tobosa between 15-45% OR increase foliar cover of tobosa by 5% of Land Health Evaluation (LHE) conditions within 3 years re-examine at data and consider basal cover objective
 - b. Maintain bare ground between 15-30%
 - c. Maintain basal cover of perennial plants between 4-10%
 - d. Maintain litter between 25-45%
8. Horseshoe allotment Volcanic Uplands study sites:
 - a. Maintain foliar cover of perennial grasses and subshrubs between 15-30% OR improve foliar cover by 5% of LHE conditions within 3 years
 - b. Maintain bare ground between 5-55%
 - c. Maintain basal cover of perennial vegetation between 2-5%
 - d. Maintain litter between 10-40%
 - e. Decrease mean foliar cover of non-native invasive species
9. Horseshoe allotment Volcanic Hills, Clayey:
 - a. Maintain foliar cover of perennial grasses and subshrubs between 20-30%
 - b. Maintain bare ground between 5-20%
 - c. Maintain basal cover of perennial vegetation between 2-5%
 - d. Maintain litter between 10-45%
 - e. Reduce Snakeweed by 5-10%
 - f. Decrease mean foliar cover of non-native invasive species
10. Horseshoe allotment Granitic Hills:

- a. Maintain foliar cover of perennial grasses and sub-shrubs between 10-30%
 - b. Maintain bare ground between 10-50%
 - c. Maintain basal cover of perennial species between 1-5% OR Increase basal cover of perennial species by 1% within 3 years
 - d. Maintain litter between 20-50%
11. Horseshoe allotment Clayey slopes:
- a. Maintain foliar cover of perennial grasses and sub-shrubs between 15-30%
 - b. Maintain bare ground between 3-35%
 - c. Maintain basal cover of perennial species between 3-8%
 - d. Maintain litter between 15-65%
 - e. Reduce large shrub component of plant community by 5%
12. Plant composition, diversity, structure, and function would be assessed by appropriate monitoring (long and short term) at selected study sites (paired plot or other study design) annually. Data would be evaluated to identify potential causal factors (fire, herbivory, livestock use, drought, etc.) and to inform adaptive management.
13. Maintain or improve upland indicators such as ground cover, foliar cover, diversity, and frequency on Copper Creek.

Uplands Goal 2: Maintain or improve ground cover and soil conditions within the natural range of variability.

- a. Efficiently retain water where appropriate
- b. Reduce erosion, runoff rates and sediment loading, and increase soil/ground and vegetative cover

Objectives: All objectives for Upland Goal 1 also address Upland Goal 2.

- 1. Ground cover and erosion rates are appropriate to soil type, climate, landform and ecological site and Terrestrial Ecological Unit Inventory (TEUI) data.
- 2. Following major disturbance (e.g. fire, drought), live vegetation cover (basal or canopy) would be increased to within 50% of desired plant community and/or when fire recovery goals (plants per M²) are met.
- 3. Following major disturbance (e.g. fire, drought), basal cover would be maintained or improved for ecological recovery over a long-term time frame (5-10 years).
- 4. Maintain desired plant community objectives during drought conditions
- 5. Reduce number of active erosional features, and impacts from them

Uplands Goal 3: Manage the aquifer and associated watershed to increase aquifer volume, in stream flow, and recharge rates

Objective All objectives for Upland Goal 1 and Riparian Goal 2 also address Upland Goal 3.

Riparian and Aquatic

Riparian Goal 1: Protect, restore and enhance native riparian habitats towards their natural potential.

- a. High species diversity and native plant composition
- b. Diverse structural composition that enhances stream channel resiliency to disturbance and climate change
- c. Increased connectivity between habitat patches

Objectives:

1. Maintain or improve the vegetative community structure and function.
2. Maintain or improve Agua Fria River Proper Functioning Condition (PFC) rating from Functional at Risk (FAR) to a FAR with upward trend or PFC on the Horseshoe allotment.
3. Maintain Proper Functioning Condition (PFC) condition of Bishop Creek. FS -Maintain or improve riparian conditions in Bishop Creek on the Copper Creek allotment.
4. Improve PFC in Indian Creek from FAR to FAR upward trend on the Horseshoe allotment.
5. Improve PFC in Silver Creek from FAR downward trend to upward trend on the Horseshoe allotment and maintain or improve riparian conditions in Silver Creek on Copper Creek allotment.
6. Maintain or increase stream bank cover at 50% in the Agua Fria River by 2025.
7. Maintain or increase overstory cover of native woody species to 20% in Silver Creek by 2025 on the Horseshoe allotment.
8. Maintain overstory cover of native woody species at Indian Creek of 75% OR increase percent mature trees relative to other age classes by 5% by 2025 on the Horseshoe allotment.
9. Maintain green line composition in Indian Creek and Agua Fria River with a native perennial herbaceous cover of >20% on the Horseshoe allotment.
10. Maintain green line composition in Silver Creek with a native perennial herbaceous cover of >70% on the Horseshoe allotment and maintain or improve green line composition where potential exists in Silver Creek on Copper Creek allotment.
11. Maintain a diverse array of riparian obligate woody species age classes (15:15:15 Seedling, mid-size, and large size) on the Horseshoe allotment.
12. Maintain long term trend (attributes such as green line composition, diversity, cover, structure) on the Horseshoe allotment.
13. Maintain or improve current native species composition (90-95%), respective to each stream and monitoring area.
14. Achieve 80% of potential canopy cover in Copper Creek where possible on Copper Creek allotment.

Riparian Goal 2: Protect and improve water quality and quantity

Objectives:

1. Manage soil and plant conditions to support infiltration, storage, and release of water that are in balance with climate and landform.
2. Protect and enhance stream and spring base flows, where feasible to support native fish, wildlife, invertebrates and riparian plant communities.
3. Strive to meet or maintain water quality standards (ADEQ).
4. Maintain in-stream flows as quantified by median monthly flow.
5. Maintain vegetative cover to slow runoff, increase infiltration, and decrease soil erosion.

Invasive and Non-native Flora and Fauna

Invasive and Non-native Flora and Fauna Goal 1: Restrict, reduce or eradicate non-native and/or invasive flora and fauna

Objectives:

1. Native woody-invasive species cover and composition is consistent with the ecological site potential.
2. Native flora and fauna species remain dominant over non-native species in most areas.

Wildlife

Wildlife Goal 1: Manage for habitat conditions that sustain viable populations of native wildlife species

- a. Protect, restore and enhance native wildlife habitats and connectivity.
- b. Ensure that sufficient food, water, cover and space are available.

Objectives: Upland and Riparian goals, objectives and strategies also address Wildlife Goal 1

1. Distribution and cover of woody species meet the habitat requirements of key wildlife species (e.g., mule deer, white-tailed deer, grassland birds, and pronghorn) considering site potential. Strive for a mix of successional stages/mosaic.
2. Reduce pronghorn population fragmentation as a result of tree and shrub encroachment and other habitat modifications.
3. Maintain or improve water use, distribution and availability for wildlife and livestock.
4. Ensure available water within 1 mile of key antelope fawning areas.
5. Pronghorn neonate fawn hiding cover: Maintain a minimum tobosa grass stubble height 8 inches high during the fawning season from the late March through June each year in key fawning areas to minimize predation loss; and commensurate with ecological site potential.
6. Attain the vegetation structure, plant species diversity, density, and canopy cover to constitute suitable habitat, where appropriate, for grassland bird species through active and passive management.

Wildlife Goal 2: Conserve and restore historic and extant native wildlife populations including the conservation of sensitive, threatened, endangered, and candidate species, species of greatest conservation need, and the ecosystems upon which they depend.

Objectives:

1. Increase endangered species (Gila chub, Northern Mexican gartersnake, Gila topminnow, Western yellow-billed cuckoo) population levels to support species recovery plans towards delisting.
2. Increase special status species population levels to prevent listing
3. Attain the vegetation structure, plant species diversity, density, and canopy cover to constitute suitable habitat where appropriate for Western yellow-billed cuckoos through active and passive management (See also riparian goals and objectives).
4. Conserve and restore native fish and other aquatic species populations and habitats, including designated and proposed critical habitat (see also riparian and upland objectives).
5. Maintain or improve grassland obligate wildlife species diversity and populations
6. Maintain or improve riparian obligate wildlife species diversity and populations

Wildlife Goal 3: Identify and reduce direct and indirect stressors on wildlife and their habitats where desirable and reasonable.

Objectives:

1. Maintain wildlife population dynamics as directed by AGFD wildlife strategic action plans.
2. Reduce recreation impacts to pronghorn fawning activities.
3. Modify actions and objectives based on models of climate change.

Heritage Resources

Heritage Resource Goal 1: Develop and implement a management strategy for heritage resources of the Perry Mesa National Historic Register District (NHRD) to avoid damage to cultural heritage sites.

Objectives:

1. Develop and implement a monitoring plan specific to the contributing elements of the Perry Mesa NHRD.
2. Apply protective measures whenever potential or existing impacts to cultural resources are discovered and confirmed by a qualified agency archaeologist
3. Obtain complete records of all documented cultural resources for the Perry Mesa NHRD
4. Complete an ethnohistory of the Perry Mesa NHRD in coordination with affiliated communities
5. Stakeholders, volunteers and partners, including citizen scientists and youth, have clear opportunities to contribute to progress implementing on-the-ground projects including completion of 100% survey of cultural resources in the Perry Mesa NHRD
6. Encourage scientific research in the Perry Mesa NHRD

Heritage Resource Goal 2: Reduce vandalism including looting

Objectives:

1. Deter vandalism and looting of cultural resources and end vandalism that repeatedly targets the same cultural resources

Heritage Resource Goal 3: Encourage responsible and educational enjoyment of the cultural resources in the Perry Mesa NHRD

Livestock Grazing

Livestock Grazing Goal 1: Maintain or improve an ecologically and economically sustainable ranching operation

Objectives:

1. Manage allotments and facilities for the mutual benefit of both wildlife and livestock.
2. Implement a grazing system which provides rest periods in each pasture to allow plants to regrow, regain vigor, produce seed and establish new plants when climatic conditions are favorable
3. Provide better distributed, permanent, reliable and wildlife-friendly water so that the ability to move cattle in response to ecological conditions is not limited by availability of water.
4. Reduce time spent chasing stray cattle (due to infrastructure failure).
5. Strive for a 90% survival rate of calves
6. Strive for calving in the months of February, March, and April.
7. Develop and maintain a grazing management plan informed by adaptive management and that allows for rest, rotation and flexibility
8. Humanely manage livestock using low stress handling techniques.

Collaborative Adaptive Management

Collaboration Goal 1: Provide opportunities and build capacity for collaborative, adaptive management to develop and implement management decisions.

Objectives:

1. Use landscape level data and results to better understand the long-term trends and uncover causal factors as possible.
2. Develop and foster partnerships within each of the key resource areas for the purposes of sharing data and information addressing the CRMP goals and objectives.

Recreation and Education

Recreation and Education Goal 1: Promote sustainable wildlife and outdoor-related recreation, education, and outreach.

Objectives:

1. Motorized uses comply with existing laws and regulations.
2. Increase educational programming associated with Watchable Wildlife and responsible recreational use.
3. Provide for sustainable consumptive use of wildlife by people (hunting) and non-consumptive (observing wildlife).
4. Provide an undeveloped, primitive, self-directed visitor experience and a landscape setting including areas without provisions for motorized and mechanical access (AFNM RMP/ROD).

Recreation and Education Goal 2: Provide multi-level visitor experience of heritage resources while maintaining semi primitive recreation throughout most of the planning area, and respecting American Indian traditional and contemporary uses

Objectives:

1. Provide opportunities for visitors to experience archeological sites through a variety of sustainable and responsible activities while maintaining the integrity of the sites.

Appendix B: Management Strategies:

The following are Strategies that have been developed by the LAT to help achieve the desired Goals and Objectives of the CRMP.

Uplands

1. Build water developments in uplands to improve water distribution
2. Use assessment monitoring to map site conditions
3. Base management on areas of concern
4. Implement grassland restoration
5. Implement erosion control projects (i.e. native grass wattles, water bars, hay bales, removing dams and other water control features, seeding, rock structures including gabions, re-contouring, etc.)
6. Improve and maintain fences, cattleguards and gates (range improvements)
7. Reseed with desired, native species when feasible
8. Develop flexible grazing plans to shift with forage
9. Keep stocking rates appropriate to environmental conditions, in order to minimize impacts from climatic conditions (drought, fire, etc.)
10. Coordinate grazing management with fire management
11. Use riparian exclosures to allow more flexible upland pasture use
12. Rehabilitate and/or stabilize head cuts caused by roads
13. Clarify specific resource objectives for fire: develop pre and post fire monitoring, short and long term, including exclosures.
14. Assess upland plant community responses and ecological trends in response to fire
15. Plan alternate methods for restoration projects when prescribed fires are not appropriate
16. Work with CRMP partners, OHV clubs and users for education, engineering and enforcement
17. Use appropriate fire intensity and return intervals to maintain grasslands

Riparian

1. Adjust grazing season of use, intensity, duration based on current conditions
2. Identify stream reaches where restoration and/or management practices can increase the density, vertical and horizontal canopy cover of woody riparian tree species. Implement restoration activities such as pole planting of native species at strategic locations
3. Treat invasive with herbicide and/or mechanical (other alternative means)
4. Develop collaborative control and restoration program
5. Inventory invasive weeds
6. Develop and share guidebook of invasive of HS/CC allotment
7. Educate partners, landowners and staff about identifying and reporting invasive plants and animals
8. Maintain and install OHV barriers (if needed)
9. Build new water developments that do not rely on surface flows
10. Quantify livestock water demand (spatially explicit)
11. Repair existing dirt tanks
12. Avoid wells near streams
13. Avoid surface water diversions

14. Monitor utilization on woody and herbaceous species
15. Fence spring source if developed
16. Redevelop springs to return to source
17. Monitor woody species for age class distribution and composition (BLM RMP specific)
18. Exercise water rights during high flows or wet periods to maintain water right and limit impact to riparian resources
19. Avoid wells that use shallow alluvium
20. Limit or exclude livestock grazing in sensitive areas (e.g., Silver Creek, upper Agua Fria)
21. Use livestock attractants to encourage livestock use away from riparian areas (i.e. salt, shade structure, fence, water, etc.)

Invasive and Non-native

1. Control woody invasive species including Cat Claw, Juniper, Mesquite, Prickly Pear, Scrub Oak that are encroaching native grasslands, and Tamarisk that is invading riparian areas.
2. Utilize a full suite of management tools such as livestock grazing, fire, etc.
3. Removal of none native fish and crayfish may occur within Silver Creek, Bishop Creek, Agua Fria River, Indian Creek pending consultation with FWS for T&E species and critical habitat impacts.
Early detection and prevention of invasive plants and animals that have not yet become established, such as Buffelgrass, Black Mustard, Johnson's Grass, Dalmatian Toad Flax, Tree of heaven, and Malta Star Thistle, crayfish, feral pigs, bull frogs, mosquito fish, among others modify actions and objectives

Wildlife

1. Construct waters away from canyon edges
2. Reduce shrubs and fence barriers around waters
3. Avoid fence, wire, markers, metal bars across waters for wildlife that drink in flight (i.e. bats)
4. Cover water storage tanks to prevent entrapment and reduce evaporation
5. Remove unnecessary livestock infrastructure
6. Install escape ramps in water troughs
7. Evaluate water availability and access for wildlife and develop improvement plan
8. Construct new fences to wildlife standards
9. Modify fences to wildlife standards
10. Reduce fence densities; avoid new
11. Manage for a range of tree density, structure, pattern, (for specific ecological sites) to assure habitat needs are met for a suite of species (pronghorn, grassland birds, etc.) using a variety of methods (prescribed fire, mechanical, herbicides, etc.)
12. Monitor stubble heights, canopy gap and percent ground cover to assess pronghorn and grassland bird habitat quality
13. Require certified "weed free" feed and seed
14. Habitat maintenance and restoration for important forage plants (shrubby buckwheat, globe mallow). Set utilization standards of these important forage species
15. Install and maintain signs at gates- "Please close gates"
16. Reduce predator abundance - to increase pronghorn/mule deer (coyote, mountain lion)
17. Develop a year-round predator control strategy

18. Inventory and map wildlife movement barriers (fences, roads, vegetation)
19. Develop specific waters for wildlife
20. Use upland, riparian, wildlife, and livestock monitoring data to set pasture scale objectives for areas that need improvement
21. Monitor wildlife habitat quality at the appropriate scale (i.e. pasture, allotment, watershed) to inform adaptive management
22. Use vegetation monitoring sites for bird surveys & wildlife habitat assessments
23. Use bird diversity indices respective to the habitat type (e.g. Riparian, grassland etc.) as indicators of ecosystem health and population dynamics
24. Develop allotment rotations that take into account seasonal wildlife habitat requirements and plant growing season where practical
25. Time livestock pasture use to consider impacts of livestock presence during pronghorn fawning periods in key fawning areas
26. Enhance dirt tanks to improve aquatic habitat quality
27. Consider introducing native aquatic species in dirt tanks where appropriate
28. Inventory dirt tanks for aquatic invasive species (i.e. Bullfrogs) and eliminate
29. Add Gila chub to pools as they clear from sedimentation and perennial water exists
30. Incorporate climate change models, partnering with NAU
31. Maintain shrubby buckwheat and globe mallow at or above baseline densities from AIM and FS data.
32. Introduce Northern Mexican Gartersnakes to the Agua Fria River
33. T&E species, sensitive species and Species of Greatest Conservation Need habitat/population actions take precedent over other species
34. Introduce Gila topminnow to Silver Creek and Copper Spring. **This action has not yet been analyzed through NEPA and is currently not authorized.**

Heritage

1. Programmatic agreement SHPO-USFS-BLM-AGFD (To facilitate compliance with federal law and regulation within the context of the specific cultural values of the Perry Mesa NHRD)
2. Engage with stakeholders, non-profit partner groups and volunteers to conduct monitoring, archaeological surveys, educational outreach, and citizen science activities.
3. Assess the current conditions in all areas with proposed or existing grazing improvements to determine whether the current conditions match the desired conditions for cultural resource preservation.
4. Agency archaeologists would prioritize monitoring using risk and condition assessments
5. Use a simple monitoring worksheet for volunteer monitoring of sites
6. Complete an assessment of current conditions for sites and locations to be included in the monitoring plan including site setting as defined the National Register standards
7. Build fences or other appropriate barriers to protect cultural sites from human and grazing impacts where appropriate
8. BLM and FS archaeologists would work closely with tribes to provide information about potential impacts to cultural sites so that livestock grazing strategies can be implemented to mitigate or avoid these impacts.

9. BLM and FS archaeologists would work closely with other members of the interdisciplinary team, tribes, stakeholders, and public to provide information about potential impacts to cultural sites so that livestock grazing strategies can be implemented to mitigate or avoid these impacts.
10. Use educational and outreach materials to mitigate human impacts such as vandalism
11. Add cultural expert visits to Assessment Inventory and Monitoring (AIM) sampling locations, to assist in interpreting vegetation and soil results in light of cultural influences these sites have experienced.
12. Develop an integrated database of cultural resources sites in the Perry Mesa NHRD and make these data accessible to permitted archaeological researchers
13. Identify sites at highest risk for vandalism based on location, history of vandalism, and public use allocations. Develop specific plans for those areas based on the nature of the risks and the cultural resource.
14. Use remote monitoring such as game cameras to deter vandalism and identify offenders in conjunction with law enforcement
15. Develop an integrated interpretive plan for the Perry Mesa NHRD emphasizing the cultural landscapes of the district
16. Develop or identify available public outreach materials to post at entrance kiosks and at heavily used or targeted areas
17. Stabilize and repair cultural sites that have been subject to adverse effects of vandalism, looting, and natural, animal, and environmental causes as appropriate
18. Provide and facilitate educational opportunities and training for stakeholders, partners, and volunteers for archaeological survey, monitoring, and documentation
19. Encourage educational and research opportunities for the public, volunteers, stakeholders, youth, and academic institutions
20. Develop and foster relationships with tribes and Native American communities
21. Consult with agency biologist and wildlife staff in cases where animal impacts, such as burrowing, are identified as potential or existing impacts to cultural resources.

Livestock Grazing

1. Locate and develop wildlife friendly waters where possible; considering the other resources in the area (cultural, wildlife, etc.).
2. Maintain and improve wildlife access to water and reduce entrapment.
3. Develop and/or maintain waters through a variety of methods that promote water conservation.
4. Install swinging gates and signs to encourage public to shut gates and/or install cattle guards
5. Pregnancy check cows; check bulls for Trichomoniasis; limit movement of cattle during calving; maintain cows body condition; keep minerals available; and use vaccination program for cows
6. Slowly shorten time bulls are with the cows until only April-July

Recreation and Education

1. Provide educational wildlife watching opportunities (in partnership with BLM when "event" group size is an issue - see RMP).
2. Align CRMP and Horseshoe Ranch recreation, education and outreach strategies to ensure mutual support.

3. Encourage participation in education and information programs supporting safe and responsible use of OHV's and recreational vehicles.
4. Develop integrated FS/BLM interpretive plan for the area.
5. Prohibit Special Recreation Permit activity during pronghorn fawning seasons and within key fawning grounds between March 1 and June 1
6. Prohibit Special Recreation Permit activity during yellow-billed cuckoo breeding season in proposed Critical Habitat.
7. Utilize visitor's surveys to ensure that visitor experience meets desired standards

Collaboration Strategies

1. Review annually or biannually monitoring and other relevant data/results to inform adaptive management and share as appropriate amongst agencies and stakeholders
2. Create monitoring plans that inform at multiple scales (pasture, allotment, and watershed).
3. Participate in interagency team meetings, conduct biological planning days with stakeholders to discuss data and assessment results
4. Understand the influences of factors such as: development, habitat fragmentation, increased recreation, climate change, ground water depletion, etc. in the planning area
5. Key actions are implemented with a design that promotes learning and sharing of knowledge

Appendix C: Proposed Range Improvements

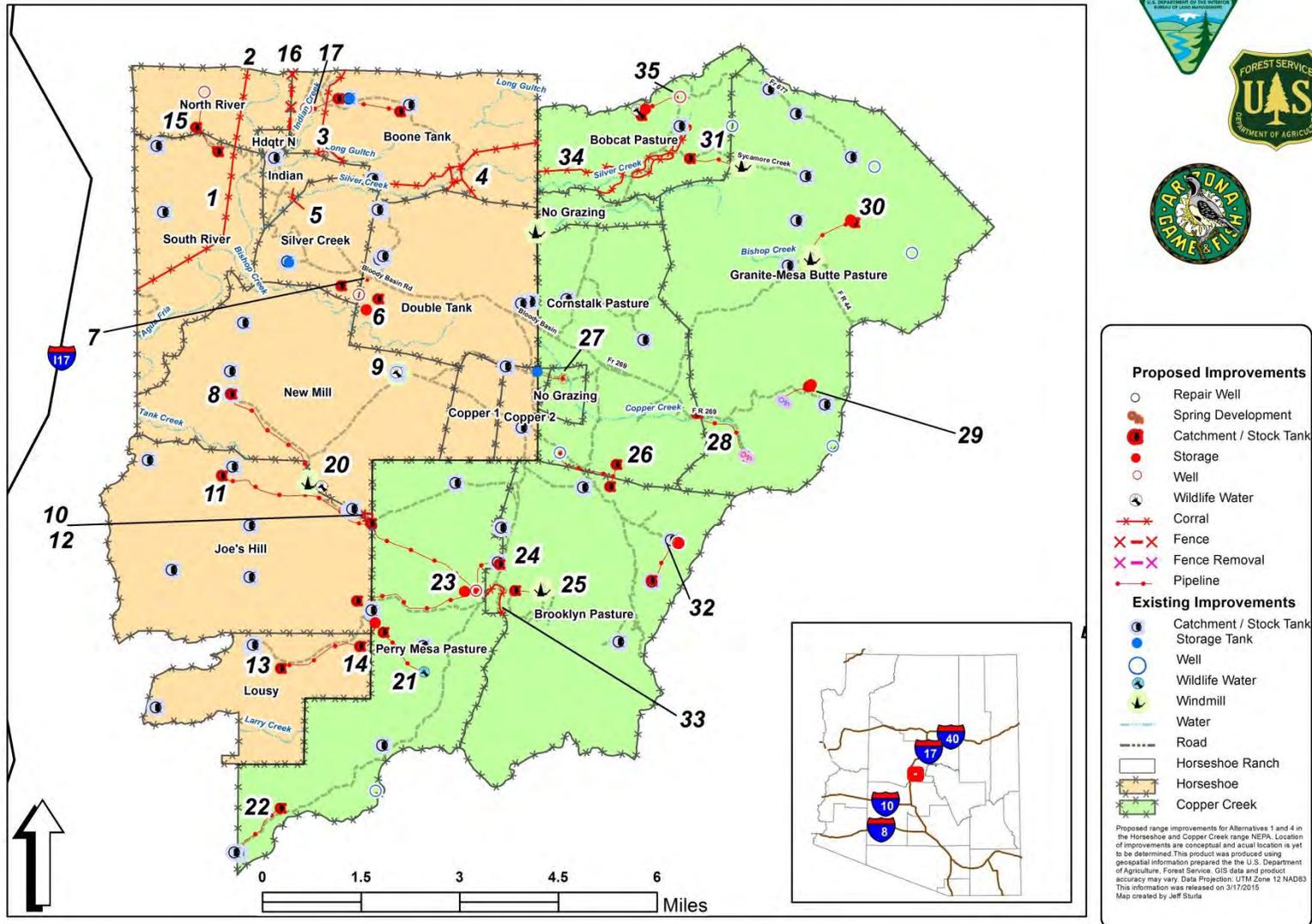
Table 11: Proposed Range Improvements.

Project #	Allotment	Pasture	Description
1	Horseshoe	South River	Fence off Agua Fria River Westside of River
2	Horseshoe	North River	Fence off Westside of Agua Fria River
3	Horseshoe	Boone Tank	Fence off Long gulch Spring
4	Horseshoe	Boone Tank	Fence off Silver Creek
5	Horseshoe	Indian Pasture	Drift fence on the mesa (Excludes Silver Creek)
6	Horseshoe	Silver Creek, Double Tank	New Well, drinker and storage
7	Horseshoe	Double Tank	Rebuild and expand Corrals
8	Horseshoe	New Mill	Drinker on West end of pasture
9	Horseshoe	New Mill	Wildlife Drinker New Mill windmill
10	Horseshoe	Joe's Hill	Rebuild Corrals
11	Horseshoe	Joe's Hill	Drinker northwest end of Pasture
12	Horseshoe	Joe's Hill	Drinker and Storage Perry Tank
13	Horseshoe	Lousy	Drinker center of Pasture
14	Horseshoe	Lousy	Drinker near East end of Pasture
15	Horseshoe	North River	Well, Pipeline, Drinker. Remove old instream pipeline
16	Horseshoe	North River	Remove Cross fence between Boone Tank
17	Horseshoe	Boone Tank	Well, Pipeline, Drinker. Remove old instream pipeline
18	Horseshoe	Joe's Hill	Drinker Southeast side of pasture
19	Horseshoe	Multiple	Recover abandoned Pipeline and Storage tanks, Indian Creek, Silver Creek, Joe's Hill and Agua Fria
20	Horseshoe	New Mill	Add wildlife drinker outside of corral

14	Copper Creek Perry	Drinker and Storage West end near Lousy
21	Copper Creek Perry	Repair Trick tank storage and run pipeline
22	Copper Creek Perry	Drinker run from Point Extreme windmill/ Solar Well
23	Copper Creek Perry	New Well, Storage
24	Copper Creek Perry	Drinker South Campbell Tank
25	Copper Creek Brooklyn	Drinker and Pipeline from old well
26	Copper Creek Brooklyn	Drinker from Cornstalk solar well
27	Copper Creek Cornstalk	Fix Admin Well and run pipeline to corrals
28	Copper Creek Granite Mesa	Develop Copper Spring, Well, Drinker, and Storage
29	Copper Creek Granite Mesa	Small Trap and Drinker
30	Copper Creek Granite Mesa	Water Distribution from Rugged Windmill drinker and storage
31	Copper Creek Bobcat	Drinker from Old mine Windmill
32	Copper Creek Brooklyn	Develop Rosalie Spring, Drinker and Storage
33	Copper Creek Brooklyn	Install fence end of FR 14 to protect heritage resources.
34	Copper Creek Bobcat	Fence out Silver Creek
35	Copper Creek Bobcat	Well, drinker, and storage

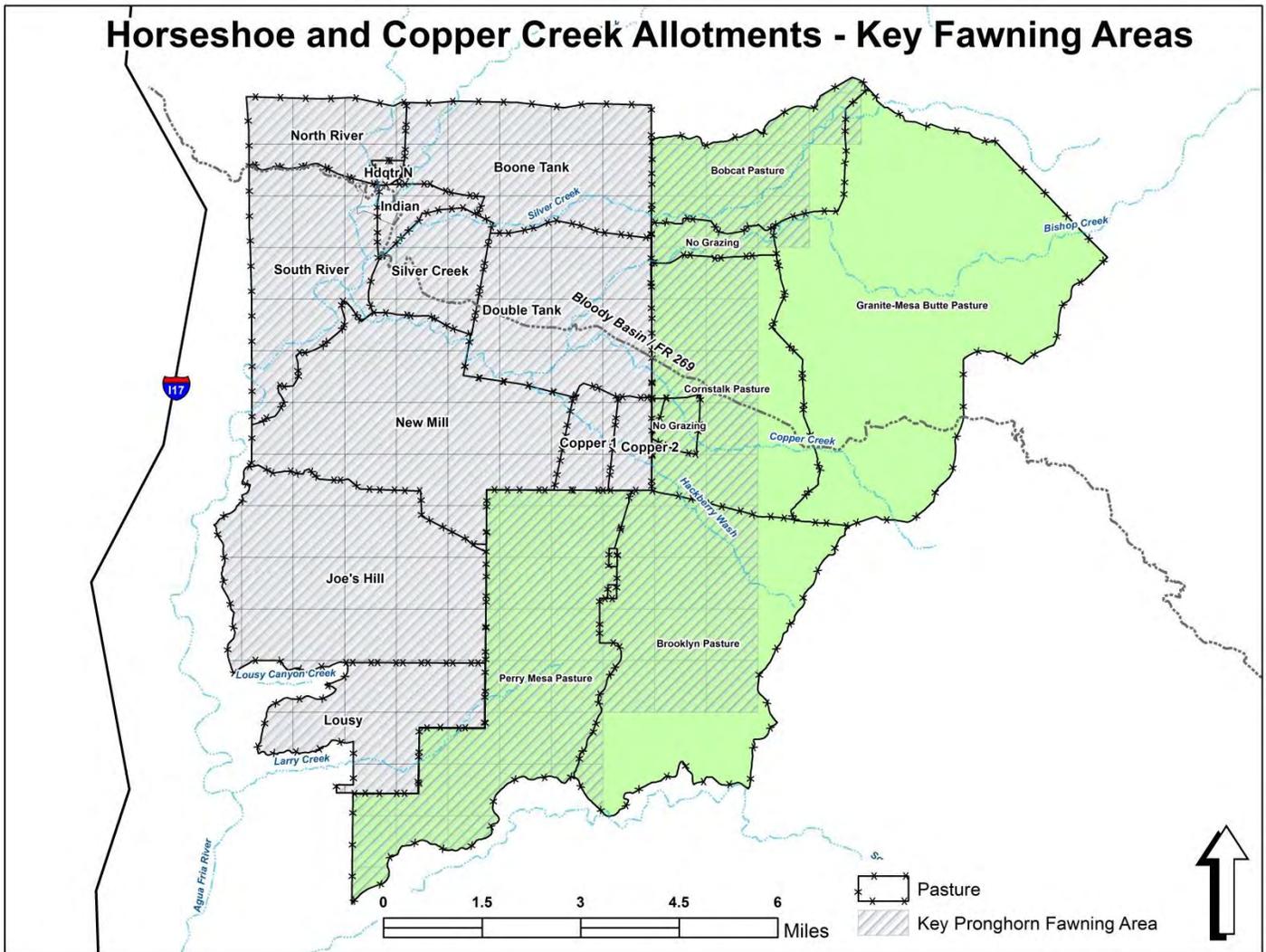
Figure 1: Conceptual proposed range improvements - Horseshoe / Copper Creek.

Horseshoe and Copper Creek Allotments - Proposed Range Improvements



Appendix D: Key Pronghorn Fawning Area

Figure 2: Horseshoe and Copper Creek key Pronghorn Fawning areas.



Horseshoe-Copper Creek Coordinated Resource Management Plan
DRAFT Resources Monitoring Plans

Resource: Uplands

Monitoring Uplands

Table 12: Monitoring Plan for Upland Resources.

Monitoring	Item to monitor	Methods/ parameters	Site/ location	Soft Trigger	ST Mgmt Action	Hard Trigger	Ht Mgmt Action	Frequency	Reporting	Responsibility
Effectiveness: Soil Condition	Soil description, canopy cover, surface components, and soil condition rating checklist.	Protocols per Soil Management Handbook, R3 Supplement, FSH 2509.18-99-1	Key area locations plus additional sites to achieve a comprehensive assessment	30% utilization on key browse or forage species.	Move cattle to areas showing less utilization within the same pasture or reduce pasture stocking rate.	40% utilization on key browse or forage species.	Determine causal factor, make changes to management.	5-10 year interval	Summary of data and evaluation, data located in allotment file	Forest Soil Scientist
Effectiveness: Aquifer and associated watershed	Aquifer volume (BLM) and instream flow (BLM & FS)	Aquifer volume (BLM) and instream flow protocols (BLM & FS)	Monitoring wells and key perennial stream reaches.	Active erosional features such as head cuts, gullies, rills are identified	Determine causal factor, make changes to management; and/or implement erosion control measures	Negative impacts to resources and/or moderate to extreme departure from reference state	Determine causal factor, make changes to management; OR implement erosion control measures	Annually	Summary of data and photographic record.	BLM-FS- Forest Hydrologist and Soil Scientist
Effectiveness: FS- Maintain ground cover and erosion rates appropriate to soil type, climate, landform and ecological site and TEUI (FS)	Ground cover and erosion	May include but not limited to pace transects, pace quadrat frequency, ground cover, Parker 3-step clusters, erosion hazard index and repeat photography	Key areas such as Parker Clusters monitoring plots	na	na	Downward trend in long-term data, two out of three readings	Identify causal factor and implement corrective measures as appropriate	10 year interval	Summary of data and evaluation, data located in allotment file	Rangeland Management Specialist
Effectiveness: trends of upland and riparian vegetation, soil, and watersheds	Vegetation diversity including density, vigor, and distribution of plants.	May include but not limited to pace transects, pace quadrat frequency, dry weight rank, ground cover, Parker 3-step clusters, and repeat photography	Key areas such as Parker Clusters or AIM monitoring plots	30% utilization on key browse or forage species.	Move cattle to areas showing less utilization within the same pasture or reduce pasture stocking rate.	40% utilization on key browse or forage species. Downward trend in long-term data	Determine causal factor, make changes to management.	5-10 year interval	Summary of data, brief evaluation of trend and photographic record.	Rangeland Management Specialist
Effectiveness: Maintain desirable upland plant communities and wildlife forage and hiding cover.	Vegetation diversity including density, vigor, distribution of plants, utilization and stubble heights.	May include but not limited to pace transects, pace quadrat frequency, dry weight rank, ground cover, Parker 3-step clusters, AIM monitoring plots and repeat photography	Key areas such as Parker Clusters or AIM monitoring plots	30% utilization on key browse or forage species.	Move to areas showing less utilization within the same pasture by considering some or all of the following: - Turning off waters - Remove/redistribute salt. -Day herding cattle, Remove livestock access to water (close gates around waters) Reduce pasture stocking rate	40% utilization on key browse or forage species	Adjust grazing season of use (AOI)/ grazing management plan adaptively (duration of use, season of use, pasture rotations, and AUM adjustments).	Annually	Summary of data and photographic record.	BLM Natural Resource Specialist and Rangeland Management Specialist

Monitoring	Item to monitor	Methods/ parameters	Site/ location	Soft Trigger	ST Mgmt Action	Hard Trigger	Ht Mgmt Action	Frequency	Reporting	Responsibility
					(Actual days to meet utilization level/days expected to meet utilization level*AUMS=adjusted number of cattle)					
Effectiveness: Clayey uplands study sites Maintain foliar cover of tobosa between 15-45% OR increase foliar cover of tobosa by 5% of LHE conditions within 3 years. Maintain bare ground between 15-30%. Maintain basal cover of perennial plants between 4-10%. Maintain litter between 25-45%	Vegetation diversity including density, vigor, distribution of plants and cover.	May include but not limited to pace transects, pace quadrat frequency, dry weight rank, ground cover, Parker 3-step clusters, AIM monitoring plots and repeat photography	Key areas such as Parker Clusters or AIM monitoring plots	30% utilization on key browse or forage species.	Move to areas showing less utilization within the same pasture by considering some or all of the following: - Turning off waters - Remove/redistribute salt. -Day herding cattle, Remove livestock access to water (close gates around waters) Reduce pasture stocking rate (Actual days to meet Utilization level/days expected to meet utilization level* AUMS= adjusted number of cattle)	40% utilization on key browse or forage species. Downward trend in long-term data	Determine causal factor, make changes to management; OR implement vegetation treatments; OR both.	5-10 year interval	Summary of data and evaluation, data located in allotment file	BLM Natural Resource Specialist
Effectiveness: BLM Volcanic Upland study sites: Maintain foliar cover of perennial grasses and sub shrubs between 15-30% OR Improve foliar of cover by 5% of LHE conditions within 3 years. Maintain bare ground between 5-55%. Maintain basal cover of perennial species between 2-5%. Maintain litter between 10-40% Decrease mean foliar cover of non-native invasive	Vegetation diversity including density, vigor, distribution of plants and cover.	May include but not limited to pace transects, pace quadrat frequency, dry weight rank, ground cover, Aim monitoring plots and repeat photography	Key areas such as AIM monitoring plots	30% utilization on key browse or forage species.	Move to areas showing less utilization within the same pasture by considering some or all of the following: - Turning off waters - Remove/redistribute salt. -Day herding cattle, Remove livestock access to water (close gates around waters) Reduce pasture stocking rate (Actual days to meet Utilization level/days expected to meet utilization level*AUMS=adjusted number of cattle)	40% utilization on key browse or forage species. Downward trend in long-term data	Determine causal factor, make changes to management; OR implement vegetation treatments; OR both.	5-10 year interval	Summary of data and evaluation, data located in allotment file	BLM Natural Resource Specialist

Monitoring	Item to monitor	Methods/ parameters	Site/ location	Soft Trigger	ST Mgmt Action	Hard Trigger	Ht Mgmt Action	Frequency	Reporting	Responsibility
Effectiveness: BLM Volcanic Hills, Clayey: Increase foliar cover of perennial grasses and subshrubs between 20-30% Maintain bare ground between 5-20%. Maintain basal cover of perennial vegetation between 2-5%. Maintain litter between 10-45% Reduce Snakeweed by 5-10%. Decrease mean foliar cover of non-native invasive (Red brome and Wild oats)	Vegetation diversity including density, vigor, distribution of plants and cover.	May include but not limited to pace transects, pace quadrat frequency, dry weight rank, ground cover, AIM monitoring plots and repeat photography	Key areas such as AIM monitoring plots	30% utilization on key browse or forage species.	Move to areas showing less utilization within the same pasture by considering some or all of the following: - Turning off waters - Remove/redistribute salt. -Day herding cattle, Remove livestock access to water (close gates around waters) Reduce pasture stocking rate (Actual days to meet Utilization level/days expected to meet utilization level*AUMS=adjusted number of cattle)	40% utilization on key browse or forage species. Downward trend in long-term data	Determine causal factor, make changes to management; OR implement vegetation treatments; OR both.	5-10 year interval	Summary of data and evaluation, data located in allotment file	BLM Natural Resource Specialist
Effectiveness: BLM Granitic Hills: Maintain foliar cover of perennial grasses and subshrubs between 10-30% Maintain bare ground between 10-50%. Maintain basal cover of perennial species between 1-5% OR Increase basal cover of perennial species by 1% within 3 years Maintain litter between 20-50%	Vegetation diversity including density, vigor, distribution of plants and cover.	May include but not limited to pace transects, pace quadrat frequency, dry weight rank, ground cover, Aim monitoring plots and repeat photography	Key areas such as AIM monitoring plots	30% utilization on key browse or forage species.	Move to areas showing less utilization within the same pasture by considering some or all of the following: - Turning off waters - Remove/redistribute salt. -Day herding cattle, Remove livestock access to water (close gates around waters) Reduce pasture stocking rate (Actual days to meet Utilization level/days expected to meet utilization level*AUMS=adjusted number of cattle)	40% utilization on key browse or forage species. Downward trend in long-term data	Determine causal factor, make changes to management; OR implement vegetation treatments; OR both.	5-10 year interval	Summary of data and evaluation, data located in allotment file	BLM Natural Resource Specialist

Monitoring	Item to monitor	Methods/ parameters	Site/ location	Soft Trigger	ST Mgmt Action	Hard Trigger	Ht Mgmt Action	Frequency	Reporting	Responsibility
Effectiveness: BLM Clayey slopes: Maintain foliar cover of perennial grasses and sub-shrubs between 15-30% Maintain bare ground between 3-35% Maintain basal cover of perennial species between 3-8% Maintain litter between 15-65% Reduce large shrub component by 5%	Vegetation diversity including density, vigor, distribution of plants and cover.	May include but not limited to pace transects, pace quadrat frequency, dry weight rank, ground cover, Aim monitoring plots and repeat photography	Key areas such as AIM monitoring plots	30% utilization on key browse or forage species.	Move to areas showing less utilization within the same pasture by considering some or all of the following: - Turning off waters - Remove/redistribute salt. -Day herding cattle, Remove livestock access to water (close gates around waters) Reduce pasture stocking rate (Actual days to meet Utilization level/days expected to meet utilization level*AUMS=adjusted number of cattle)	40% utilization on key browse or forage species. Downward trend in long-term data	Determine causal factor, make changes to management; OR implement vegetation treatments; OR both.	5-10 year interval	Summary of data and evaluation, data located in allotment file	BLM Natural Resource Specialist
Effectiveness: FS-Maintain or improve upland indicators such as ground cover, foliar cover, diversity, and frequency	Ground and foliar cover, plant diversity and vegetative frequency	May include but not limited to pace transects, pace quadrat frequency, dry weight rank, ground cover, Parker 3-step clusters and repeat photography	Key areas such as Parker Clusters monitoring plots	na	na	Downward trend in long-term data, two out of three readings	Identify causal factor and implement corrective measures as appropriate	10 year interval	Summary of data and evaluation, data located in allotment file	Rangeland Management Specialist
Implementation: Following major disturbance (e.g. fire, drought), live vegetation cover will be recovered to within 50% of desired plant community and/or fire recovery goals (plants per meter ²) are met.	Cover and plants per meter ²	May include but not limited to pace transects, pace quadrat frequency, dry weight rank, ground cover, Parker 3-step clusters, Aim monitoring plots and repeat photography	Key areas such as Parker Clusters or AIM monitoring plots	BLM-Drought index is approaching being between D1-D4; FS- SPI approaching -0.7 or less	If objective not met then consider timeframe as appropriate for management actions such as grazing or other restoration practices	Downward trend at key areas over 2 of 3 readings	Identify causal factor and implement corrective measures as appropriate	Up to three key areas annually	Summary of data and evaluation, data located in allotment file	Rangeland Management Specialist
Effectiveness: Following major disturbance (e.g. fire, drought), basal cover will be maintained or improved for ecological recovery over a long term time frame (5-10 years).	Basal cover	May include but not limited to pace transects, pace quadrat frequency, dry weight rank, ground cover, Parker 3-step clusters, Aim monitoring plots and repeat photography	Key areas such as Parker Clusters or AIM monitoring plots	na	na	Downward trend at key areas over 2 of 3 readings	Identify causal factor and implement corrective measures as appropriate such as rest or implement another appropriate actions.	10 year interval	Summary of data and evaluation, data located in allotment file	

Monitoring	Item to monitor	Methods/ parameters	Site/ location	Soft Trigger	ST Mgmt Action	Hard Trigger	Ht Mgmt Action	Frequency	Reporting	Responsibility
Effectiveness: Maintain desired plant community objectives during drought conditions	Vegetation diversity including density, vigor, distribution of plants, and utilization	May include but not limited to pace transects, pace quadrat frequency, dry weight rank, ground cover, Parker 3-step clusters, AIM monitoring plots, and repeat photography	Key areas such as Parker Clusters or AIM monitoring plots	BLM- Drought index is approaching being between D1-D4; FS- SPI approaching -0.7 or less	Monitor Precipitation at rain gauges and track patterns	BLM- Drought index is between D1-D4 FS- SPI of -0.7 or less	BLM- Acceptable utilization levels may be adjusted to reflect current resource conditions. FS- Drought team will assess grazing and determine appropriate grazing strategy	Annually	Drought and Standard Precipitation Index	BLM-Natural Resource Specialist FS- Forest Hydrologist

Riparian

Table 8: Monitoring Plan for Riparian Resources

Monitoring	Item to monitor	Methods/ parameters	Site/ location	Soft Trigger	ST Mgmt Action	Hard Trigger	Ht Mgmt Action	Frequency	Reporting	Responsibility
Effectiveness: Riparian Condition: Agua Fria, Indian Creek, Bishop Creek, & Silver Creek, on BLM	Qualitative and quantitative assessment of indicators in hydrology, vegetation, and soil stability	May use protocols per A User Guide to Assessing Proper Functioning Condition, Multiple Indicator Monitoring and the Supporting Science for Lotic Areas. Technical Reference 1737-15, USDI-BLM, 1998	Representative sites representing stratified stream reaches	Declining trend	Evaluate causal factors and determine if management action is needed	na	na	5-10 year interval for satisfactory sites; For sites less than satisfactory, 1-2 years after management change	Summary of data and evaluation, data located in allotment file	ID team consisting of soils, hydrology, vegetation, and wildlife specialties
Effectiveness: Riparian Condition Maintain or improve riparian conditions in Silver Creek on FS	Qualitative and quantitative assessment of indicators in hydrology, vegetation, and soil stability	May use protocols per A User Guide to Assessing Proper Functioning Condition, Multiple Indicator Monitoring and the Supporting Science for Lotic Areas. Technical Reference 1737-15, USDI-BLM, 1998	Representative sites representing stratified stream reaches	Declining trend	Evaluate causal factors and determine if management action is needed	na	na	5-10 year interval for satisfactory sites; For sites less than satisfactory, 1-2 years after management change	Summary of data and evaluation, data located in allotment file	ID team consisting of soils, hydrology, vegetation, and wildlife specialties
Effectiveness: Riparian Condition	Stream reaches with existing permanent photo points	Photo Point Interpretation	At existing permanent photo point sites	Declining trend	Determine causal factors. Modify grazing management for rest if canopy cover is <50%. Identify stream reaches where restoration and/or management practices can increase the density, vertical and horizontal canopy cover of woody riparian tree species. Implement restoration	Declining trend between 5-10 years or <80%, lack of seedling recruitment, Invasive species establish and increase	Remove livestock. Implement Veg treatment Identify stream reaches where restoration and/or management practices can increase the density, vertical and horizontal canopy cover of woody riparian tree species. Implement restoration	3-5 year interval	Summary of data and evaluation, data located in allotment file and on Friends of Tonto website	Soils, Hydrology, Range, Wildlife personnel

Monitoring	Item to monitor	Methods/ parameters	Site/ location	Soft Trigger	ST Mgmt Action	Hard Trigger	Ht Mgmt Action	Frequency	Reporting	Responsibility
					activities such as pole planting of native species at strategic locations		activities such as pole planting of native species at strategic locations			
Effectiveness: Riparian Condition: Maintain or increase overstory cover of native woody species to 50% in Agua Fria River by 2025 (BLM)	Woody Species cover	Multiple Indicator Monitoring	DMA's on Agua Fria River	Woody Species Browse at 40%.	Schedule additional monitoring and Determine causal factors. Modify grazing management for rest if canopy cover is <50%. Identify stream reaches where restoration and/or management practices can increase the density, vertical and horizontal canopy cover of woody riparian tree species. Implement restoration activities such as pole planting of native species at strategic locations	Lack of seedling recruitment, Invasive species establish and increase. Woody species Declining trend between 5-10 years or <50%.	Remove livestock. Identify stream reaches where restoration and/or management practices can increase the density, vertical and horizontal canopy cover of woody riparian tree species. Implement restoration activities such as pole planting of native species at strategic locations	5 year interval	Summary of data and evaluation, data located in allotment file	BLM Natural Resource Specialist
Effectiveness: Riparian Condition: Maintain or increase overstory cover of native woody species to 20% in Silver Creek by 2025 (BLM).	Woody Species cover	Multiple Indicator Monitoring	DMA's on Silver Creek	Declining trend	Determine causal factors. Modify grazing management for rest if canopy cover is <50%. Identify stream reaches where restoration and/or management practices can increase the density, vertical and horizontal canopy cover of woody riparian tree species. Implement restoration activities such as pole planting of native species at strategic locations	Declining trend between 5-10 years or <80%, lack of seedling recruitment, Invasive species establish and increase	Remove livestock. Implement Veg treatment Identify stream reaches where restoration and/or management practices can increase the density, vertical and horizontal canopy cover of woody riparian tree species. Implement restoration activities such as pole planting of native species at strategic locations	5 year interval	Summary of data and evaluation, data located in allotment file	BLM Natural Resource Specialist
Effectiveness: Riparian Condition: Maintain over story cover of native woody species at Indian Creek of 75% OR increase percent mature trees relative to other age classes by 5% by 2025.	Woody Species cover	Multiple Indicator Monitoring	DMA's on Silver Creek	Declining trend	Determine causal factors. Modify grazing management for rest if canopy cover is <50%. Identify stream reaches where restoration and/or management practices can increase the density, vertical and horizontal canopy cover of woody riparian tree species. Implement restoration activities such as pole	Declining trend between 5-10 years or <80%, lack of seedling recruitment, Invasive species establish and increase	Remove livestock. Implement Veg treatment Identify stream reaches where restoration and/or management practices can increase the density, vertical and horizontal canopy cover of woody riparian tree species. Implement restoration activities such as pole	5 year interval	Summary of data and evaluation, data located in allotment file	BLM Natural Resource Specialist

Monitoring	Item to monitor	Methods/ parameters	Site/ location	Soft Trigger	ST Mgmt Action	Hard Trigger	Ht Mgmt Action	Frequency	Reporting	Responsibility
					planting of native species at strategic locations		planting of native species at strategic locations			
Effectiveness: Riparian Condition: Maintain green line vegetation composition in Indian Creek and Agua Fria with a native perennial herbaceous cover of >20%.	Riparian vegetation (herbaceous and aquatic emergent key species)	May use protocols per A User Guide to Assessing Proper Functioning Condition, Multiple Indicator Monitoring and the Supporting Science for Lotic Areas. Technical Reference 1737-15, USDI-BLM, 1998	Key Riparian Areas	na	na	Declining trend	Determine causal factors and adjust management accordingly (grazing rotation, Adjust grazing plan (adjust rest periods, utilization levels, periods of use)	5 year interval	Summary of data and evaluation, data located in allotment file	BLM Natural Resource Specialist
Effectiveness: Riparian Condition: Maintain green line vegetation composition in Silver Creek with a native perennial herbaceous >70% (BLM). Maintain or improve green line composition where potential exists in Silver Creek (FS)	Riparian vegetation (herbaceous and aquatic emergent key species)	May use protocols per A User Guide to Assessing Proper Functioning Condition, Multiple Indicator Monitoring and the Supporting Science for Lotic Areas. Technical Reference 1737-15, USDI-BLM, 1998 and photopoints	Key Riparian Areas	Trend decreasing	Monitor more closely and determine causal factors.	Downward trend at key areas over 2 of 3 readings	If condition degrades implement vegetation treatments such as mechanical, herbicide, biological. May require additional NEPA	5 year interval	Summary of data and evaluation, data located in allotment file	BLM Natural Resource Specialist and Forest Hydrologist
Effectiveness: Riparian Condition: Maintain a diverse array of age classes (15:15:15 Seedling, mid-size, and large size) where potential exists	Riparian woody species-composition and structure	Multiple Indicator Monitoring	Key Riparian Areas	Greater than 10% Deviation from current.	Convene managers and stakeholders to discuss next steps which may include increased monitoring, and possible management actions. Monitor for structural elements. Assessment of primary resource needs (seedling establishment, northern Mex gartersnake, etc.) and make management decisions accordingly	Downward trend at key areas over 2 of 3 readings	If it can be determined that livestock grazing is having a direct impact on species composition, consider grazing management strategies (e.g. rest, rotation, season of use)	3 year interval	Summary of data and evaluation, data located in allotment file	BLM Natural Resource Specialist and Forest Hydrologist
Effectiveness: Riparian Condition: Maintain long-term trend	Green line composition, diversity, cover, structure	May use protocols per A User Guide to Assessing Proper Functioning Condition, Multiple Indicator Monitoring and	Key Riparian Areas	Trend decreasing	Convene managers /stakeholders to discuss next steps which may include increased monitoring, and possible management	Downward trend at key areas over 2 of 3 readings	If it can be determined that livestock grazing is having a direct impact on species composition, consider grazing	1 to 5 years	Summary of data and evaluation, data located in allotment file	BLM Natural Resource Specialist and Forest Hydrologist

Monitoring	Item to monitor	Methods/ parameters	Site/ location	Soft Trigger	ST Mgmt Action	Hard Trigger	Ht Mgmt Action	Frequency	Reporting	Responsibility
		the Supporting Science for Lotic Areas. Technical Reference 1737-15, USDI-BLM, 1998 and photopoints			actions. Determine causal factors and adjust management accordingly (grazing rotation, Adjust grazing plan (adjust rest periods, utilization levels, periods of use)		management strategies (e.g. rest, rotation, season of use)			
Effectiveness: Riparian Condition: Maintain or improve current native species composition (90-95%), respective to each stream and monitoring area	Qualitative and quantitative assessments of composition	May use protocols per A User Guide to Assessing Proper Functioning Condition, Multiple Indicator Monitoring and the Supporting Science for Lotic Areas. Technical Reference 1737-15, USDI-BLM, 1998 and photopoints	Key Riparian Areas	Native composition equal to or less than 80-85% native spp.	Convene managers/stakeholders to discuss next steps which may include increased monitoring, and possible management actions.	Native composition equal to or less than 50% native spp	If it can be determined that livestock grazing is having a direct impact on species composition, consider grazing management strategies (e.g. rest, rotation, season of use)	5 year interval	Summary of data and evaluation, data located in allotment file	BLM Natural Resource Specialist and Forest Hydrologist
Riparian Implementation:	Level of utilization on riparian vegetation (woody, herbaceous and aquatic emergent key species)	Follow established utilization measurement protocols such as dry weight rank and Cole browse,	Key riparian areas	50% (BLM) and 30%(FS) herbaceous and 10-12 inches of stubble height aquatic emergents, and 40% current years terminal leader growth on woody species,	Annual utilization to decide soft trigger management. Contact team to discuss, day herding, salt, remove cattle (pasture specific)	50% (BLM) and 40% (FS) herbaceous and 6-8 inches of stubble height aquatic emergents, and 40% current years terminal leader growth on woody species	Measure utilization yearly, but make decisions about hard triggers (3 years) Fencing, exclosure, change season of use to winter (FS).	Annually	Summary of data and evaluation, data located in allotment file	Range and Hydrology personnel

Invasive

Table 9: Monitoring Plan for Invasive Species

Monitoring	Item to monitor	Methods/ parameters	Site/ location	Soft Trigger	ST Mgmt Action	Hard Trigger	Ht Mgmt Action	Frequency	Reporting	Responsibility
Effectiveness: Native woody-invasive species cover and composition is consistent with the ecological site potential.	Cover and vegetation diversity	May use protocols per A User Guide to Assessing Proper Functioning Condition, Multiple Indicator Monitoring and the Supporting Science for Lotic Areas. Technical Reference 1737-15, USDI-BLM, 1998	Key Riparian areas		Develop tamarisk fire plans before beetle kill Removal of Tamarisk and pole planting of cottonwoods, willow, etc.	Excessive cover on woody and/or invasive species Presence of Tamarisk beetle	Removal of invasive. Develop tamarisk fire plans before beetle kill Pole planting of cottonwoods, willow, etc. Evaluate causal factors (natural fire, grazing management, roads, etc.). Inventory presence of invasive plants and animals, Use DEMAs as baseline data (BLM). Use stakeholder involvement to do treatment.	5 year interval	Summary of data and evaluation, data located in allotment file	Wildlife and range specialist
Effectiveness: Native flora and fauna species remain dominant over non-native species in most areas.	Flora and fauna diversity	May use protocols per A User Guide to Assessing Proper Functioning Condition, Multiple Indicator Monitoring and the Supporting Science for Lotic Areas. Technical Reference 1737-15, USDI-BLM, 1998	Key Riparian areas			Monitoring data indicates excessive cover of invasive species.	Determine causal factor, make changes to management; OR implement vegetation treatments; OR both	5 year interval	Summary of data and evaluation, data located in allotment file	Wildlife and range specialist

Wildlife

Table 10: Monitoring Plan for Wildlife

Monitoring	Item to monitor	Methods/ parameters	Site/ location	Soft Trigger	ST Mgmt Action	Hard Trigger	Ht Mgmt Action	Frequency	Reporting	Responsibility
Wildlife Implementation: Distribution and abundance of key forage plant species for pronghorn, deer and other wildlife	Density trends for key forage species including but not limited to: Shrubby Buckwheat and Globe Mallow spp.	AIM data (belt transects for woody species)- BLM; CNVSP (frequency) monitoring- TNF; Annual Utilization monitoring – BLM/TNF	AIM plots – BLM; Upland Monitoring sites – TNF; Key fawning areas for pronghorn	Trend declining from baseline conditions; upland utilization > 30%	Convene managers /stakeholders to discuss next steps which may include increased monitoring, and possible grazing management actions	Trend declining from baseline conditions; upland utilization > 40%	Adjust grazing season of use (AOI)/ grazing management plan adaptively (duration of use, season of use, pasture rotations, or AUM adjustments).	Annually	Summary of data and evaluation, data located in allotment file; LAT meetings with agencies	Range and Wildlife personnel; LAT team and volunteers or research partners
Wildlife Implementation: Pronghorn neonate fawn hiding cover	Hiding cover or residual stubble height for herbaceous and shrubs - maximum foliar height; and/or foliar height within 10cm increments up to 50cm classified by functional group shrubs	Modified line-point intercept or visibility board (Bristow and Ockenfels 2002) for foliar height classification within functional groups; and Pace transects for residual stubble height;	Key areas within key pronghorn fawning areas (defined by historic and future AGFD aerial survey - data hotspot	<12” average stubble height on tobosa grass	Set livestock rotation, timing, utilization, to meet residual stubble height in pastures with key fawning areas (Top pastures: New Mill, Perry, parts of Joe's Hill).; Move to areas showing less utilization within the same pasture by	<8” average stubble height on tobosa grass	Livestock are moved from fawning grounds; If objectives are not being met despite attempts to use pre-fawning stubble height triggers, reconsider livestock timing, duration and intensity;	Annually; before and/or during fawning period March-early June	Summary of data and evaluation, data located in allotment file; LAT meetings with agencies	Range and Wildlife personnel; LAT team and volunteers or research partners

	and herbaceous (grass, forb);	Key areas within key fawning areas (could include some AIMS plots for reference); could include paired plots inside/outside exclosures	analysis); Over time, overlay stubble height measures on utilization/prod activity maps to identify if there are areas of ongoing conflict or synergy		considering some or all of the following: - Turning off waters - Remove/redistribute salt. -Day herding cattle, Remove livestock access to water (close gates around waters) Reduce pasture stocking rate (Actual days to meet Utilization level/days expected to meet utilization level* AUMS= adjusted number of cattle); Rotate rest in key pastures, no use in successive years in key pastures during fawning. Add waters for distribution, less disturbance.		look for other possible causal factors and fixes; 1b. Over time, overlay stubble height measures on utilization/productivity maps to identify if there are areas of ongoing conflict or synergy.			
Wildlife Implementation: grassland bird thermal, nesting, foraging cover	Same as pronghorn fawning habitat			Same as pronghorn fawning habitat		Same as pronghorn fawning habitat				
Wildlife Effectiveness: Suitable habitat for Western yellow-billed cuckoo	Length of native riparian vegetation in Agua Fria River-vegetation structure, diversity, density and canopy cover	Aerial imagery, woody belt transects, GPS extent, photopoints; MIMs; Determine appropriate suite of protocols to coincide with what is already going on with Audubon and AGFD. Integrate monitoring results with adaptive management for riparian pastures	Yellow-billed cuckoo occupied and Critical Habitat reaches of the Agua Fria River and Silver Creek tributary							
Wildlife Effectiveness: Suitable habitat for Gila chub										

