United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Phoenix District
Agua Fria National Monument
21605 North 7th Avenue
Phoenix, Arizona 85027
www.blm.gov/az/

October 1, 2018

In Reply Refer To:
6840 (P030)

Memorandum

To: Jeff Humphrey, Field Supervisor, U.S. Fish and Wildlife Service, Phoenix, AZ
(Attn: Greg Beatty and Nichole Englemann)

Through: Rem Hawes, Field Office Manager, Hassayampa Field Office, Bureau of Land Management

From: Ron Tipton, Monument Manager, Agua Fria National Monument, Bureau of Land Management

Subject: Request for Informal Consultation Pursuant to Section 7 of the Endangered Species Act and 50 CFR 402.13 for the Horseshoe Allotment Grazing Authorization Renewal (DOI-BLM-AZ-P030-2018-0002-EA)

In accordance with the Section 7(a)2 of the Endangered Species Act (ESA)of 1973, as amended, and 50 CFR 402.13, the Bureau of Land Management (BLM), requests concurrence with our determination that the Horseshoe Allotment Grazing Authorization Renewal "may affect, but is not likely to adversely affect" the yellow-billed cuckoo (*Coccyzus americanus*), and its proposed critical habitat, the Gila chub (*Gila intermedia*), and its designated critical habitat, the Gila topminnow (*Poeciliopsis occidentalis*), the northern Mexican gartersnake (*Thamnophis eques megalops*), and its proposed critical habitat.

Please review the attached Biological Assessment which analyzed the effect of livestock grazing, proposed range improvement facilities and species translocations, to the aforementioned species and habitats. If you have any questions or need additional information, please contact Paul Sitzmann, Wildlife Biologist, at 623.580.5695 or psitzman@blm.gov or Ron Tipton, Monument Manager, Agua Fria National Monument at 623.580.5568 or rtiption@blm.gov. Your prompt attention to this request is be greatly appreciated.

4 Attachments
1. Biological Assessment for the Horseshoe Allotment Grazing Authorization Renewal
2. Horseshoe Land Health Evaluation
3. Horseshoe Allotment Grazing Authorization Renewal Environmental Analysis
4. Draft Horseshoe Copper Creek Coordinated Resource Management Plan

Cc: Arizona State Office (932)

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U.S. Department of the Interior
Bureau of Land Management

Biological Assessment Horseshoe Allotment Grazing Authorization Renewal

Date

October 2018

BLM

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Conclusions Summary- Effects Determination Table

Species occurrence records, office files and personnel knowledge, and the U.S. Fish and Wildlife Service (USFWS) Information, Planning, and Conservation (IPaC) decision support system were used in identifying listed species which may occur or have suitable habitat within the action area (IPaC Consultation Code: 02EAAZ00-2016-SLI-0366). This species lists was reviewed to determine if any of these special status species have the potential to occur in the action area. Table 1 lists the species that are analyzed in detail within this document. Special status species included on the USFWS list, but excluded from further evaluation due to geographic isolation, are addressed in Table 2.

Table 1. Effects determinations for T&E and proposed critical habitat for Horseshoe Allotment Grazing Lease based on IPAC list updated on October 1, 2018.

Species	**Status**	**Effects Determination for Species**	**Effects Determination for Critical Habitat or Proposed Critical Habitat**
Yellow-Billed Cuckoo (*Coccyzus americanus*)	Threatened. Proposed Critical Habitat	May affect - not likely to adversely affect	May affect - not likely to adversely modify proposed critical habitat
Gila chub (*Gila intermedia*)	Endangered. Designated Critical Habitat	May affect - not likely to adversely affect	May affect - not likely to modify designated critical habitat
Gila topminnow (*Poeciliopsis occidentalis*)	Endangered.	May affect - not likely to adversely affect	N/A
Northern Mexican gartersnake (*Thamnophis eques megalops*)	Threatened. Proposed Critical Habitat	May affect - not likely to adversely affect	May affect - not likely to adversely modify the proposed critical habitat

Table 2. Threatened and Endangered Species excluded from detailed analysis with rational for exclusion based on IPAC list updated on October 1, 2018.

Species	**Status**	**Habitat Requirements**	**Exclusion Justification**
Desert pupfish (*Cyprinodon macularius*)	Endangered	Shallow springs, small streams, and marshes. Tolerates saline and warm water below 4,000 ft.	No effect to species due to geographic isolation.

1.0 Introduction

This Biological Assessment (BA) considers the effects of renewing a 10 year grazing permit and adopting the Horseshoe - Copper Creek Coordinated Resource Management Plan which includes to new terms and conditions for Horseshoe Allotment, to threatened or endangered species and to both proposed and designated critical habitat. The Horseshoe Allotment is run jointly with the Copper Creek Allotment which is managed by the Tonto National Forest but this effects analysis is limited to the Horseshoe Allotment.

The effects of many land uses in the planning area have been evaluated in several consultations or conferences and subsequent biological or conference opinions. Consultations and Conferences within the planning areas include:

[2-21-88-F-167]	The Phoenix Resource Management Plan and Environmental Impact Statement
[2-21-96-F-421]	Lower Gila North Management Framework Plan and Lower Gila North Final Grazing Environmental Impact Statement
[2-21-96-F-422]	Eastern Arizona Grazing EIS, Phoenix District portion
[2-21-03-F-210]	BLM Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management
[2-21-03-C-0409]	Biological Evaluation and Conference Opinion for the Existing Phoenix Resource Management Plan for the Agua Fria National Monument
[02-21-05-F-0785]	Agua Fria National Monument and Bradshaw-Harquahala Resource Management Plans
[2-21-99-F-031]	Reintroduction of Gila topminnow and desert pupfish into three tributaries of the Agua Fria River

1.1 Purpose of the Proposed Action

The purpose of this action is to consider livestock grazing opportunities on public lands where consistent with management objectives, including the BLM *Arizona Standards for Rangeland Health and Guidelines for Livestock Grazing Management* (Rangeland Health Standards) (BLM 1997).

1.2 Broad Description of the Acton Area

The Horseshoe Allotment is located approximately 50 miles north of Phoenix, Arizona (Map 1). The 32,427 acre Horseshoe Allotment is located within the Agua Fria National Monument (AFNM) and is managed by the BLM's Hassayampa Field Office. Arizona Game and Fish Department owns the 190 acre Horseshoe Ranch which is located in the central portion of the Horseshoe Allotment.

1.3 BLM Mission and Management Goals in the Planning Area

The need for this action is established by the Taylor Grazing Act, the Federal Land Policy and Management Act, Fundamentals of Range Health (43 CFR 4180), and the Agua Fria National Monument Resource Management Plan (RMP) (BLM 2010) to respond to an application for renewal of an expiring livestock grazing permit to graze livestock on public land. In detail, the analysis of the actions is needed because:

The Agua Fria National Monument RMP identifies resource management objectives and management actions that establish guidance for managing a broad spectrum of land uses and allocations for public lands in the AFNM. The RMP allocated public lands within the Horseshoe Allotment as available for

domestic livestock grazing. Where consistent with the goals and objectives of the RMP and Land Health Standards, the issuance of grazing permits or leases to qualified applicants are provided for by the Taylor Grazing Act and the Federal Land Policy and Management Act.

Pertinent to analysis in this BA, the following Management Decisions/Desired Future Conditions identified in the Agua Fria National Monument Record of Decision and Approved Resource Management Plan (2010) were developed to benefit threatened and endangered species:

- TE-4. All Biologically suitable perennial waters on public lands are occupied by thriving populations of Gila topminnow, Gila chub and desert pupfish.

- TE-8. Riparian areas that could physically support (due to floodplain width and gradient) yellow-billed cuckoo habitats will attain the vegetation structure, plant species diversity, density , and canopy cover to constitute suitable habitat. Livestock utilization will not substantially reduce the abundance, density or distribution of native riparian tree species though herbivory.

- TE-17. In cooperation with the Arizona Game and Fish Department and the U.S. Fish and Wildlife Service, BLM will re-establish Gila topminnow, Gila chub, and desert pupfish into suitable habitat sites throughout the planning area.

- TE-19. Domestic livestock utilization of native riparian trees seedlings along streams occupied by Gila chub, Gila topminnow, and desert pupfish will be limited to 30 percent of the apical stems per growing season.

- TE-23. Conservation of Federal threatened or endangered, proposed, candidate, and other special status species is promoted by maintaining or restoring their habitats.

BLM Arizona adopted the Arizona Rangeland Health Standards (Land Health Standards) and Guidelines for Livestock Grazing Management (Arizona S&Gs) in all Land Use Plans in 1997. The Land Health Standards and Guidelines for Grazing Administration were also incorporated into the RMP. The Land Health Standards for Rangeland should be achieving or making significant progress toward achieving standards. Guidelines direct the selection of grazing management practices and, where appropriate, livestock facilities to promote significant progress toward, or the attainment and maintenance of, the standards.

The Rangeland Health Evaluation completed in 2014 and updated in 2018 for the Horseshoe Allotment determined that Standards 1 (Upland Health) and 3 (Desired Resource Condition) are being achieved on upland sites and riparian sites. Standard 2 (Proper Functioning Condition) is not currently big met due to drought and the effects of the Cave Creek Complex Fire (Appendix 1).

1.4 Summary of the Objectives of the Biological Assessment

This BA evaluates the effects of the proposed action to listed species and their proposed or designated critical habitat in the Horseshoe Allotment. Following environmental analysis of listed species and proposed or designated critical habitat, this document documents effects determinations for the species and habitats effected. This BA is prepared in accordance with legal requirements set forth under Section

7 of the Endangered Species Act (ESA)(16 U.S.C. 1536), and its regulations 50 CFR 402, and follows the standards established in BLM Manual 6840 – specials Status Species Management.

1.5 Species and Critical Habitat Addressed in this Biological Assessment

Multiple T&E species can be found at various locations within the Horseshoe Allotment (02EAAZ00-2016-SLI-0366) (Table 3). The endangered Gila chub (*Gila intermedia*) occupy portions of Silver Creek and Larry Creek tributary. Gila topminnow (*Poeciliopsis occidentalis*), also endangered, occupies Larry Creek tributary. Larry Creek tributary was also stocked with the endangered desert pupfish (*Cyprinodon macularius*) in 2003 but desert pupfish have not been documented in the past six years of fish survey efforts. The threatened Yellow-billed cuckoo (*Coccyzus americanus*) (cuckoo) is known to breed during the summer months in riparian areas surrounding the Agua Fria River, Indian Creek and Silver Creek (Wise-Gervais and Magill 2003, 2004, Wise and Prager 2010, Prager and Wise 2011, Prager and Wise 2012, Prager and Wise 2013, Prager and Wise 2014). The threatened northern Mexican gartersnake (*Thamnophis eques megalops*) occupies the Agua Fria drainage; the last known sighting in 1993.

Critical Habitat has been designated and proposed for multiple species within the allotment (Map 1). Portions of Silver Creek and Larry Creek Tributary have been designated as critical habitat for Gila chub. Riparian portions of the Agua Fria River, Indian Creek and portions of Silver Creek within the allotment have been proposed as critical habitat for the cuckoo. Critical habitat has also been proposed for the northern Mexican gartersnake in the Agua Fria River. Critical habitat was not proposed or designated within the allotment for either the Gila topminnow or the desert pupfish. Gila chub, Gila topminnow, and desert pupfish currently occupy or were stocked and may be present within Larry Creek Tributary. The proposed action would have **no effect** to these individuals/species in Larry Creek Tributary due to the geographic isolation of this area (Map 6). Consequently, desert pupfish have been removed from further analysis.

Table 3. IPaC list (updated on October 1, 2018) of Endangered Species Act listed species, critical habitat designations, and current conditions of listed species known to occur in or in close proximity to the Horseshoe Allotment.

Birds	Status	Critical Habitat	Condition(s)
Yellow-Billed Cuckoo (*Coccyzus americanus*) Population Western U.S. DPS	Threatened	Proposed	Species present within allotment. Species and proposed critical habitat may be affected. See Section 5.1
Fishes			
Desert pupfish (*Cyprinodon macularius*) Population: Wherever found	Endangered	Final	Species may be present within allotment. No critical habitat within allotment. Species not affected because it is geographically isolated from impacts associated with the proposed action.
Gila chub (*Gila intermedia*) Population: Wherever found	Endangered	Final	Species present within allotment. Species and critical habitat may be affected. See Section 5.2
Gila topminnow (*Poeciliopsis occidentalis*) Population: Wherever found	Endangered	NA	Species present within allotment. No critical habitat within allotment. Species and may be affected. See Section 5.3
Reptiles			
Northern Mexican gartersnake (*Thamnophis eques megalops*) Population: Wherever found	Threatened	Proposed	Species may be present within allotment. Proposed critical habitat within allotment. Species and proposed critical habitat may be affected. See Section 5.4

The BLM has determined that the following endangered, threatened, or proposed species may be affected by the Proposed Action: Gila chub, Gila topminnow, yellow-billed cuckoo, northern Mexican gartersnake. This BA addresses all aforementioned species as well as designated or proposed critical habitat where relevant within the Horseshoe Allotment.

2.0 Proposed Action

2.1 Horseshoe Allotment Proposed Action

Horseshoe Allotment Proposed Action

The Coordinated Resource Management Plan (CRMP) for the Horseshoe-Copper Creek Allotments is a multifaceted plan with many goals, objectives, strategies, and actions to help facilitate better management of resources in the allotments while balancing multiple uses. Specific goals and objectives, which represent the desired future conditions for the project area, have been developed and are listed in Appendix A of the CRMP. Many of the resource objectives and actions are interrelated and are mentioned multiple times in this proposed action. The following proposed action consists of six sections as derived from the CRMP: (1) wildlife management, (2) heritage resources management, (3) livestock grazing management, (4) range improvement infrastructure projects, (5) rangeland research projects, and (6) natural and heritage resources monitoring.

2.1.1 Wildlife Management

Wildlife management is a cornerstone of the CRMP. A multitude of biological goals and objectives have been developed in the CRMP for both long and short-term timeframes to improve wildlife habitat for both terrestrial and aquatic wildlife. Many of the goals and objectives that have been developed have been based upon the guiding principles of using adaptive management in the allotment.

Focal Species: The goals, objectives, strategies, and actions identified within the 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 (Table 4). 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.

Table 4. CRMP wildlife focal species for riparian and upland (terrestrial) ecosystems.

Riparian Obligate Species	Terrestrial Grassland Species
Western Yellow-billed Cuckoo	Pronghorn Antelope (fawning)
Northern Mexican Garter Snake	Various Grassland Bird Species
Gila Chub, Gila Topminnow	

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 as listed below:

- Build riparian exclosures around Silver Creek, and many springs to protect sensitive areas and resources, including Gila Chub.
- Maintain existing water sources to improve water distribution for both wildlife and livestock
- Suspend surface water diversions of Indian Creek, Silver Creek and the Agua Fria River to improve surface water availability
- Conduct annual habitat and population monitoring to determine trends
- Transplant northern Mexican gartersnake into areas where appropriate

Adaptive Management: Many actions have been developed in the 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 Proposed Action Sections 3 and 4) to ensure habitat requirements for wildlife are maintained and/or improved. Other actions include: building/removing range infrastructure projects (See Proposed Action Section 4), constructing exclosures and supplemental stockings of threatened and endangered species (Proposed Action Section 4). The specific actions that are intended to benefit fish and wildlife that may be implemented based on monitoring are listed 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

- 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
    - Stock and Gila topminnow into Silver Creek and Copper Creek to increase threatened and endangered species populations

For more information about trigger and responses developed in the CRMP, please refer to the CRMP for more information.

2.1.2 Heritage Resources Management

Heritage resources management is also a cornerstone of the CRMP. The Horseshoe allotment falls within one of the richest cultural landscapes in the American southwest, the Perry Mesa National Registered Archaeological District, the nation's largest Archaeological District.

Information concerning modern human impacts to archaeological sites and features is well documented; however, information about impacts from livestock grazing to archaeological sites and features is limited. Therefore, goals and objectives have been developed within Appendix A of the CRMP for to better manage heritage resources, especially in relationship to livestock grazing. The CRMP calls for an intensive cultural resources monitoring program (See Proposed Action Section 6).

Adaptive Management: Cultural resource areas identified as being impacted by humans and/or livestock would be managed using the principles of adaptive management to assist in mitigating the situation. The specific actions that are intended to benefit heritage resources and Some Possible mitigation measures would be implemented based on monitoring are listed below:

- build fences around cultural sites
- Block closed or illegally built roads to cultural areas
- Use salt or mineral supplements to entice livestock away from cultural areas;
- Adjust livestock numbers/ class; or completely removing livestock from areas with high cultural significance

Monitoring is also an important part of adaptive management for cultural resources. For more information about the cultural resources monitoring plan, please refer to Section 6 of this proposed action.

2.1.3 Livestock Grazing Management

Livestock grazing management is the crux of the CRMP. Historical grazing management encompassed by wildfire has left some areas of the allotment in less than desirable condition (BLM 2014). The overall theme of the CRMP calls for conservative use of the forage and water resources in the Horseshoe Allotment to improve resource conditions. The Bureau of Land Management, Agua Fria National Monument, would renew the livestock grazing authorization (lease) for the Horseshoe Allotment for a period of 10 years under the following terms and conditions:

Livestock Numbers: Total permitted numbers would range from 0 to 381 cattle (0 to 4,572) Animal Unit Months (AUMs)) for up to 12 months annually. The proposed amount livestock use would be authorized on a yearly basis and would be based upon using adaptive management principles with help from the CRMP stakeholder group and the US Forest Service. It is expected that during normal precipitation and forage growth years, the lessee would likely use between 2,500-3,000 AUMs in the Allotment on an annual basis. The Silver Creek and Long Gulch Exclosures would reduce acres available to livestock grazing by approximately 884 acres (Table 5, Map 1, Map 3). However, AUMs would remain the same as the No Action Alternative because utilization thresholds are required to be met regardless of the upper limits of authorized AUMs.

Table 5. CRMP proposed pasture realignments and acreage adjustments.

Pasture	Current Acreage	CRMP Adjusted Acreage
North River	1,639	1,031
South River	3,586	2,104
Boone Tank	4,181	2,550
Double Tank	4,037	4,278
Silver Creek	1,573	1,413
Indian	528	0
New Mill	6,381	6,382
Copper 1	758	758
Copper 2	497	497
Joes Hill	6,459	6,459
Lousy	2,630	2,630
Upper Agua Fria†	-	1,468
Lower Agua Fria†	-	1,812
Silver Creek Exclosure	-	766
Long Gulch Exclosure	-	118
Total	**32,269**	**32,264**

†Denotes newly proposed riparian pastures. No livestock use would be authorized in the Agua Fria riparian pastures outside of the November 1 to March 1 use period (BLM 2010).

Grazing System: The proposed grazing system would use an adaptively managed, rest rotational grazing system to move livestock in single or multiple herds through pastures until scheduled use dates are met, or until forage utilization thresholds ("triggers") (Appendix X, BLM 2018) are met in upland and riparian areas. After livestock grazing disturbance, the lessee would rest a pasture for at least one cool and warm growing season before returning with livestock. There may be instances where the lessee would be prescribed to use livestock as a tool for vegetation treatments of invasive annual grasses (e.g. wild oats) by the BLM, which may decrease the amount of rest between grazing cycles.

It is expected that during normal precipitation and forage years, the lessee would likely use between 2,500-3,000 AUMs in the allotment on an annual basis. Annual authorized livestock numbers, stocking rates, and scheduled rotations would be identified through annual pre-grazing meetings, with consideration from the previous season's actual use, current production of palatable forage, availability of livestock water, current climatic and resource conditions, and recommendations from the CRMP stakeholder group. Within the allotment, no hot season grazing would be authorized in any riparian areas from March 1 to October 31 annually as directed by in the Agua Fria Record of Decision and Approved Resource Management Plan (BLM 2010).

Adaptive Management: The proposed action employs adaptive management which provides a suite of management options that may be used to adjust management actions to meet desired conditions. If monitoring indicates that desired resource conditions are not being achieved, adaptive management decisions would be used to modify management. Such changes may include annual administrative decisions to adjust the specific number of livestock and/or animal unit months (AUMs), specific dates for grazing, class of animal, or pasture rotations. These changes would not exceed limits for timing, intensity, duration, and frequency, as defined in annual grazing application. Adaptive management would be implemented through pre turn-out meetings with the lessee and the CRMP Stakeholder group, which would adjust livestock numbers and the timing of grazing, so use is consistent with current productivity and capacity and directed towards meeting long and short-term management objectives.

Proposed Lease Terms and Conditions: The following proposed terms and conditions would be added to the grazing lease for the Horseshoe Allotment with the implementation of the proposed action:

- All wildlife troughs would be left full of water and operational year round for wildlife accessibility, unless in limited circumstances where extreme freezing conditions may damage facilities.

- When entering the next scheduled pasture, all livestock would be removed from the previous pasture within two weeks. This is extremely critical for pastures with riparian reaches.

- Lessee would ensure that enough time is allowed to remove livestock to meet the pasture move date(s) and avoid unauthorized and/or excessive use.

- Lessee would ensure adequate range infrastructure to be in functioning condition prior to entering the next scheduled pasture.

- All rangeland improvement construction would take place outside of critical pronghorn fawning season (March 1 to June 1).

- All new fences and fence maintenance/reconstruction would be wildlife friendly and would be built to meet agency standards (BLM 2006).

- Changes from the use described above may be allowed for reasons of drought, flooding, or any other reasons acceptable to the BLM authorized officer. However, these changes must be requested in writing at least 30 days before the requested changes are proposed to occur, and be approved by the BLM authorized officer in writing.

- Supplementation feeding is limited to salt, mineral, and/or protein in block, granular, or liquid form. If used, these supplements must be placed at least one-quarter (1/4) mile from livestock water sources and known cultural sites, and one-eighth (1/8) mile away from major drainages and washes, sensitive wildlife habitat, and designated recreational sites. Supplements would be removed from pastures when cattle have left an area, and not placed within a pasture until the cattle arrive. Additionally, supplements would not be placed in the same location(s) each year.

- The lessee must properly complete, sign and date an Actual Grazing Use Report Form (BLM Form 4230-5) annually. The completed form(s) must be submitted to the BLM, Hassayampa Field Office (HFO) within 15 days from the last day of authorized annual grazing use (43 CFR 4130.3-2 9d)).

- If in connection with allotment operations under this authorization, any human remains, funerary objects, sacred objects or objects of cultural patrimony as defined in the Native American Graves Protection and Repatriation Act (P.L. 101-601; 104 Stat. 3048; 25 U.S.C. 3001) are discovered, the permittee shall stop operations in the immediate area of the discovery, protect the remains and objects, and immediately notify the Authorized Officer of the discovery. The permittee shall continue to protect the immediate area of the discovery until notified by the Authorized Officer that operations may resume.

2.1.4 Rangeland Infrastructure Projects

The proposed action also includes new infrastructure projects to promote better livestock grazing distribution, to provide reliable sources of water for wildlife, and to reduce surface water diversions (See Map 1 and Table 6) from riparian areas. The proposed infrastructure projects also include fences to exclude the North River and South River riparian areas from livestock grazing during warm periods (March 1 to Oct 31).The CRMP also calls for a permanent exclosure fence around the Silver Creek riparian area to protect Gila Chub habitat from livestock grazing while recovering from a recent wildfire. This reduces the amount of riparian areas being grazed by livestock to 12.5 miles from 17 miles. The CRMP also includes proposed water wells, storage tanks, pipelines, watering troughs, and old improvement removal (See Map 1 and Table 6).

Table 6. The range improvement projects proposed by the CRMP stakeholder group.

Project #	Pasture	Approx. Length (Miles)	Description
1	North River South River	2.1	Pipeline connecting four troughs to well and storage tank
2	North River South River	4.7	Fence paralleling the Agua Fria River on the west side to make upland and riparian pastures
3	Boone Tank	2.2	Fence paralleling Indian Creek on the east side to make upland and riparian pastures and exclude Long Gulch
4	Boone Tank	.7	Remove existing fence
5	Boone Tank	1.9	Well, storage tank, pipeline, and three troughs
6	Boone Tank, Double Tank	3.6	Fence off Silver Creek and provide for vehicle and livestock crossing
7	Boone Tank	1.4	Remove existing fence
8	Silver Creek, Double Tank	1.8	New well, storage tank, and three troughs
9	New Mill	< 0.1	Wildlife trough New Mill windmill
10	Joe's Hill, New Mill	8.4	Pipeline, four troughs, two wildlife troughs, and storage tank
11	Joe's Hill, Lousy	2.6	Pipeline, storage tank and three troughs
12	Boone	< 0.1	Maintain road
13	North River, New Mill, Joe's Hill	N/A	300' square fenced vegetation study plots

All new infrastructure projects would follow existing roads and trails (open and administrative) wherever possible to reduce the footprint of construction activities. Wherever possible, trough locations would also be located in areas that have previously been disturbed by livestock (e.g. dirt reservoirs). Class III cultural pedestrian surveys have been completed for all of the proposed improvements. Proposed locations were adjusted to avoid impact to cultural resources. All construction activities that would be ground disturbing would be monitored using an approved archaeologist. Any discovery of subsurface remains and/or cultural resources would immediately stop construction activity. All proposed range improvements would meet Visual Resource Management (VRM) Standards as outlined in the Agua Fria Record of Decision and approved Resource Management Plan (BLM 2010).

Maintenance responsibilities for all new range improvement projects would be assigned to the livestock grazing lease holder. All costs associated with the proposed livestock range improvement projects would be the responsibility of the livestock grazing lease holder. Wildlife specific range improvements would be funded by state and/or federal agencies or partnerships.

Corrals: Two of the corrals located in the Double Tank and Joe's Hill pastures (Map2) are in disrepair and would need to be reconstructed. The lessee has indicated interest in following the guidance and instruction of low-stress livestock handling expert Dr. Temple Grandin. Dr. Grandin has authored several scientific papers on low-stress handling and has shown positive benefits to livestock production from following such techniques (Grandin 2005, 2008, 2011). All corral designs would mimic designs that have already been implemented by Dr. Grandin.

Wells: The CRMP proposes several wells to be drilled or repaired to distribute groundwater through pipelines to watering troughs for both livestock and wildlife use. Three wells have been proposed in the North River, Double Tank, and Boone Tank pastures (See Map 1 and Table 6). It is estimated that the wells would produce up to 150,000-200,000 gallons of water per year. Wells would be constructed by a class 8 (3 axle) vehicle. Water facility infrastructure in the Indian Creek area would be constructed during the winter months (Nov 1. to March 1) to avoid impacts to ESA listed species.

Pipelines: The CRMP proposes pipelines to be associated with the wells previously mentioned. The pipelines would be located in the North River, South River, New Mill, Joe's Hill, Lousy, Upper Agua Fria (proposed), and Boone Tank pastures. Please refer to Table 6 for lengths of individual segments of each pipeline. The USFS has also proposed several wells to be located in the Copper Creek Allotment. These wells would potentially feed troughs located in the Joe's Hill, Lousy, and New Mill pastures. If the USFS is unable to authorize these wells through their own analysis, these segments would likely be abandoned or revisited by the BLM to be reconfigured. Water facility infrastructure in the Indian Creek area would be constructed during the winter months (Nov 1. to March 1) to avoid impacts to ESA listed species.

All pipelines would be laid on the soil surface to minimize disturbance to soils, vegetation, and cultural resources. In areas where the pipeline would need to be underground (e.g. near troughs and road crossings), trenches would be no more than 24 inches deep and would be backfilled appropriately.

Watering Troughs (including wildlife only troughs): Several troughs have been proposed to be associated with the previously mentioned wells and pipelines. The new troughs would be located in the North River, South River, New Mill, Joe's Hill, Lousy, Upper Agua Fria (proposed), and Boone Tank pastures. Please refer to Map 1 and Table 6 for more information about trough locations.

All proposed trough locations would have two separate troughs; a livestock designated watering trough and wildlife designated watering trough. When livestock are moved to other areas of the allotments, the livestock troughs would be turned off while the wildlife troughs would remain on. Small (100 meter x 100 meter) wildlife friendly barbed wire or pipe-rail fences

would be placed around the wildlife troughs to prevent livestock use. All troughs would have wildlife escape ramps to ensure that wildlife would not become trapped in the troughs.

Fences: The North and South River pastures have been proposed to be realigned with the addition of fences near the Agua Fria River. This action would allow the pastures to be managed with the maximum amount of flexibility that is needed for adaptive management. This action would also create two new riparian pastures, the Upper and Lower Agua Fria pastures that would only be used during the cool season (November 1 to March 1). A fence that currently acts as boundary fence between the North River and Boone Tank pastures would be removed with the addition of the new fences.

A fence has also been proposed for the western side of the Perry Mesa portion of the Boone Tank pasture. This would create an eastern pasture fence for the Upper Agua Fria riparian pasture. Other fences have also been proposed in the southern portion of the Boone tank and northern portion of the Double Tank Pastures; this would create a riparian pasture around the Silver Creek riparian area.

All new fences would be wildlife friendly and would be built specified to agency standards (BLM 2006). Please refer to Map 1 and Table 3 for more information about individual fence lengths and locations.

Old Range Infrastructure Removal: The Proposed Action also includes removing an existing fence and an existing steel pipeline from the soil surface (See Map 1 and Table 6). The pipelines have historically pumped water from the Agua Fria River and Silver Creek to dirt reservoirs located in the upland areas of the Horseshoe Allotment.

Gates and Cattle Guards: Gates are commonly used at road crossings to separate pastures. Frequently gates are not properly closed by recreation users which results in livestock movement into inappropriate areas. These gates may be replaced with cattle guards consistent with the proposed lease terms and conditions.

2.1.5 Rangeland Research Projects

The Agua Fria National Monument is a natural laboratory for research in natural and cultural sciences. University researchers from Arizona and other parts of the Unites States, as well as citizen scientists are currently conducting experiments in the AFNM. These experiments will hopefully help resource managers understand past and present conditions to make better decisions about resource management in the future at the AFNM.

The proposed action calls for implementing four study plots (~5 acres) on upland areas of the Horseshoe Allotment (Map 1) to evaluate vegetation treatments of non-native and invasive grass species such as wild oats (*Avena fatua*) and red brome (*Bromus rubens* L.) and shrubs such as catclaw acacia (*Senegalia greggii*). Treatment methods may include use of herbicide,

mechanical, or biological methods (or a combination of methods) to reduce or eradicate unwanted species within the allotments. Refer to Table 7 for a list of proposed herbicides.

Cattle may be used as biological control agents to help with vegetation treatments through intensively managed prescriptive grazing. Livestock would be used when the invasive plants are at their most palatable and susceptible stage of plant growth. Chemical and mechanical vegetation treatments would be implemented using hand tools and sprayers. Chemical application periods would occur during the time/date periods suggested by the chemical manufacturer. All suggested Personal Protective Equipment would be worn as appropriate and recommended by the chemical manufacturer.

No vegetation treatments would be implemented in areas with high densities of cultural resource artifacts or rock art. Vegetative treatments would not occur in areas where cultural resources have been identified unless the current conditions are an ongoing threat to cultural resources and these conditions could be improved with vegetative treatment without greater impact to cultural resources. The public would be notified about any proposed vegetation treatments through public outreach and signs posted near the treatment areas. Table 3 outlines BLM approved chemical herbicides and application amounts that may be used to treat unwanted weed species within the proposed study plots (BLM 2013).

Table 7. Proposed herbicide use for vegetation treatment study areas.

Herbicide Name (Trade/Common)	Application Amount (Oz/Acre)	Selective Herbicide	Application Method
Imazapic/Plateau	2-3	Y	Foliar/Soil
Glyphosate/Round-up	6.2-12.4	N	Foliar
Hexazinone/Velpar L.	128-320	N	Foliar or Soil
Imazapyr/Polaris	128-192	N	Foliar
Picloram/Tordon K.	10-30	Y	Foliar
Dichlorophenoxyacetic acid/2-4D	10-30	Y	Foliar
Non-ionic Surfactants	Varies	N/A	N/A

The proposed action also calls for two additional grazing exclosure plots to be implemented as control areas to evaluate grazing management and ecological conditions within the Horseshoe Allotment (Map 1). Similar to the grazing exclosures that already exist within the allotment, the proposed exclosures would have paired plot vegetation transects (one inside the exclosure and one outside) to help determine if grazing or other multiple uses are having adverse effects on vegetation and soil resources found within the allotment. These areas would be fenced using

standard wildlife friendly BLM fencing specifications. For locations of the exclosures, please refer to Map 1.

2.1.6 Natural and Heritage Resource Monitoring

Natural and cultural resource monitoring is a fundamental component of the draft CRMP (BLM 2018). Monitoring as discussed in the CRMP would be conducted to determine if resource conditions within the allotment are meeting or moving towards the goals and objective of the CRMP and the broader goals and objects identified in the Agua Fria RMP (effectiveness or long term Monitoring).

2.1.7 Livestock Use

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. Utilization levels would be similar a few differences (Table 7). The proposed action is similar to current management of the area except some conservation actions would not be conducted (Table 8).

Table 7: Allowable Use in the Horseshoe Allotment.

Vegetation	Proposed Action Use Threshold	No Action (Current Management) Use Threshold
Upland Herbaceous Use	30-40% of current year's growth	40% utilization on key upland forage species
Upland Browse Species	50% of current year's growth	40% utilization on key upland forage species
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.	Tobosa height below 12"
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.	50% utilization of herbaceous riparian species
Riparian Woody Species*	Limited to 40% of leaders browsed on upper 1/3 plants up to 6 feet tall	N/A

*Designated critical habitat within Silver Creek has utilization limitation on woody species at 30 percent of apical stems. The No Action (Current Management) does not have woody species utilization limits.

Table 8. Table comparing various actions and authorizations between the proposed action and current management.

Action	Proposed Action	No Action (Current Management)
Livestock Grazing Authorized	Yes	Yes
New Range Improvements Authorized	Yes	No
Vegetation treatment Study Plots	Yes	No
New Riparian Exclosures	Yes	No
Adaptive Monitoring Requirements	Yes	Yes
Reductions in livestock intensity	Yes	No

3.0 Existing Resource Conditions and Management

The Horseshoe Allotment contains four general distinct habitat types which include semi-desert grasslands, granitic hills, Sonoran desert scrub, and riparian areas. Elevations range from 3300 feet to over 4600 feet and annual precipitation is about 14 inches. Semi-desert grasslands are found in the eastern half of the allotment and comprise the largest portion of the allotment. Granitic hill sites are found within the northwestern corner of the allotment west of the Agua Fria River. Sonoran desert scrub habitat is limited to the canyon walls of lower elevations. Riparian areas are found in valley bottoms where there is sufficient water in both duration and frequency to support riparian obligate plant growth. 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.

Semi-desert grasslands cap Perry Mesa as well similar ecological sites and are dominated by tobosa (*Pluraphis mutica*). Common wildlife includes pronghorn antelope (*Antilocapra americana*), mule deer (*Odocoileus hemionus*), Gambel's quail (*Callipepla gambelii*) and many other grassland obligate species. Granitic Hill upland sites favor the growth of shrub species but many of the animal species are similar to the semi-desert grassland habitat type. Sonoran desert scrub vegetation grows along canyon walls and lower elevation uplands. Common plants these areas include tobosa, velvet mesquite (*Prosopis velutina*), foothills palo verde *(Parkinsonia microphylla*), cholla (*Cholla* sp.), prickly pear (*Opuntia englemannii*), as well as an assortment of desert shrubs. These areas are designated as category II desert tortoise (*Gopherus morafkai*) habitat.

Riparian areas of the Horseshoe Allotment, found in valley bottoms, include approximately 17 miles of riparian habitat comprised of the Agua Fria River, Indian Creek, Silver Creek, Bishop Creek, and Larry Creek Tributary. Livestock use is permitted in these areas during the cool season (Nov. 1 to March 1) when riparian obligate plants are dormant. Riparian areas have been closed to motorized travel and multiple off-highway vehicle barriers have been installed.

Over story vegetation along riparian areas is frequently dominated by Gooding's willow (*Salix gooddingii*), Fremont cottonwood (*Populus fremontii*), and velvet ash (*Fraxinus velutina*). Isolated patches of salt cedar (*Tamarisk ramosissima*) occur in some areas. Understory species include various aquatic emergent herbaceous species such as common three square (*Schenoplectus pungens*), spike

rush (*Eleocharis palustris*), Bermudagrass (*Cynodon dactylon*), and deergrass (*Muhlenbergia rigens*). Riparian areas within the allotment have been designated as an important bird area by the Audubon Society. Many riparian obligate bird species such as the summer tanager (*Piranga rubra*), Bell's vireo (*Vireo bellii*), Brown-crested flycatcher (*Myiarchus tyrannulus*) and likely the threatened yellow-billed cuckoo (*Coccyzus americanus*) breeds and/or forages in portions of the allotment. Site specific discussions are found below.

The Agua Fria River, proposed as critical habitat for the yellow-billed cuckoo and northern Mexican gartersnake, has varied physiography which is reflected in various riparian obligate vegetative communities. Wider portions of the Agua Fria River tend to support large cottonwood and willow trees. Dense understory vegetation is present where water is sufficient in both duration and frequency to support recruitment (LHE 2018). Central portions of the Agua Fria River are dryer and tend to support less understory aquatic emergent vegetation and fewer riparian obligate tree species. Other portions of the Agua Fria, at the southern boundary of the allotment have steep, rocky banks with little soil formation on the stream banks. The narrow, canyon-bound physiography of the stream likely concentrates the energy of flood events which contributes to the low continuity of riparian vegetation relative to other portions of the allotment. The Agua Fria River contains many non-native fish species like the green sunfish (*Lepomis cyanellus*), fathead minnow (*Pimephales promelas*), red shiner (*Cyprinella lutrensis*), bullhead catfish (*Ameiurus natalis*) and the native longfin dace (*Agosia chrysogaster*). However, due to the abundance of non-native species, other native species occur in low numbers or are likely extirpated.

Indian Creek, proposed as critical habitat for the yellow-billed cuckoo, is a tributary to the Agua Fria River. Perennially wet portions are located at the northern end of the allotment but the majority of Indian Creek is ephemeral. Where perennial, dominant over story species include Gooding's willow, velvet ash, and velvet mesquite. Aquatic emergent vegetation cover is relatively low and discontinuous. Spike rush and deer grass are the two dominant understory species (LHE 2018). Many upland species are also found on the greenline as measured by the MIM protocol (DOI 2011). Dryer portions which are most common support some sycamore trees and facultative upland plant species such as velvet mesquite. Fish surveys have not occurred in Indian Creek within the allotment due to the lack of water and limited potential habitat.

Portions of Silver Creek have been designated as critical habitat for Gila chub. Yellow-billed cuckoo critical habitat has been proposed downstream of the chub critical habitat within Silver Creek. Chub are likely extirpated from the designated critical habitat due to an inundation of sediment from the 2005 Cave Creek Complex fire. Chub are present in low numbers in downstream portions of Silver Creek. Longfin dace, desert suckers (*Catostomus clarkii*), and fathead minnow occur in low numbers within the wetted reach. Non-native crayfish are abundant. This area was excluded from the critical habitat designation due to the presence of non-native green sunfish. However, Silver Creek is believed to no longer support green sunfish because of the sediment and altered hydrology as a result of the 2005 Cave Creek Complex Fire. The past six years of surveys have not documented presence of green sunfish in the creek. Yellow-billed cuckoo have been documented via auditory playback techniques consistent with the Harterman et al. 2015 protocol (or other auditory playback protocols) in surveys as periodically between 2003 and 2012. However, no breeding areas were documented in five years of survey efforts (Prager and Wise 2015).

Larry Creek Tributary Canyon is densely vegetated with riparian obligate plant species. This area contains abundant numbers of Gila chub which were salvaged from Silver Creek and Gila topminnow. This area is excluded from livestock use by terrain features. At minimum, over 1000 feet of distance and 500 feet of elevation separate upland areas from designated critical habitat for the Gila chub.

Bishop Creek is relatively dry in comparison to other riparian reaches found within the allotment. There is a limited amount of common three-square which makes up the understory vegetation. Limited numbers of woody vegetation such as Gooding's willow, velvet ash, and seep willow are present but there is a lack of old growth vegetation. Water availability seems to be driving riparian processes in Bishop Creek.

Fire is a natural component of many of the ecological sites within the Horseshoe Allotment. Fire is known to encourage tobosa and other native grass growth and increase and decrease the number of woody species such as mesquite, acacia, snakeweed, and juniper. Prescribed burns have been implemented since 1993, likely much earlier, to emulate the effect of natural fires and improve grassland habitats. Treatments included both broadcast burning of grasslands and juniper cutting and pile burning of juniper encroached grasslands. These grassland restoration treatments were initiated prior to monument designation but have continued since. Recent treatments within the Horseshoe Allotment, exclusively broadcast burns, have been implemented within the last 10 years.

Broadcast burns within the allotment have occurred on the semi-desert grasslands of Perry Mesa between 2009 and 2011. These fires have occurred in the north western portion of the allotment in Boone, Double Tank, Silver Creek and New Mill pastures (Map 2). Broadcast burns and beneficial use of wildfire typically burned between 1000-2000 acres.

Low amounts of monsoon rain following broadcast burns during these years resulted in higher tobosa mortality than anticipated and increased occurrences of bare ground which allowed the non-native annual wild oats (*Avena fatua*) to thrive in some areas (Horseshoe LHE 2018). Prescribed fire by broadcast burning has not occurred within the Horseshoe Allotment since 2012 due to the lack of anticipated rains and/or lack of Fire Staff available to conduct broadcast burns when rains were anticipated.

The 2017 Brooklyn Fire burned 33,550 acres of the AFNM and Tonto National Forest (Map 2). The fire burned upland areas largely dominated by tobosa grass, prickly pear cactus, wild oats, and other annual forbs and grasses. The amount of bare ground dramatically increased across many ecological sites following the Brooklyn Fire (LHE 2018). Vegetative cover also increased following the fire but annual plant growth was absent. This condition persists given the ongoing drought.

3.1 Horseshoe Allotment Land Health Assessment Summary

The draft Horseshoe Allotment Land Health Evaluation details resource conditions within the allotment (Horseshoe LHE 2018). Results, based on the Arizona Standards and Guidelines, are summarized below.

Standard 1: Upland Sites – Met
Standard 2: Riparian-Wetland Sites – Not met

Causal Factor – Loss of water, excessive sedimentation due to 2005 Cave Creek Complex Fire (Silver Creek only)

Standard 3: Desired Resource Conditions - Met

3.1.1 Standard 1

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 1, Upland soils exhibit infiltration, permeability and erosion rates that are appropriate to soil type, climate and landform (Ecological site)(Horseshoe LHE 2018). 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.

3.1.2 Standard 2

Riparian assessments have been completed within the allotment since the early 1990's by the Proper Functioning Condition Assessment protocol (DOI 1998). Assessments have been conducted on all designated riparian areas within the Horseshoe allotment. Many of the segments were determined to be Functional at Risk (FAR). Causal factors for the "at risk" were livestock, particularly in the 1990s, and the Cave Creek Complex fire which has and continues to inundate Silver Creek with sediment. Livestock use was seasonally restricted from riparian areas which had reduced livestock associated impacts to these areas. Off-highway vehicle barriers installed on Silver Creek and the Agua Fria River eliminated motorized travel in these areas and improved riparian conditions. Although riparian areas were found to still be at risk "at risk," remaining causal factors (e.g. drought, ground water pumping and fire) are outside of management control

3.1.3 Standard 3

Desired plant communities were largely intact across all upland monitoring sites within the Horseshoe Allotment and most riparian areas. Consequently, Standard 3 is met. Sites monitored were based on ecological site, not habitat type, and results are reported by ecological site for upland areas. Riparian results as they pertain to Land Health Standard 3 are reported separately. Comprehensive results are reported in the Horseshoe Land Health Evaluation (BLM 2018).

Clayey upland 12-16" pz sites on the Horseshoe Allotment had lower foliar cover of tobosa grass (*Pleuraphis mutica*) and basal plant cover relative to the NRCS ESD. Desired plant community objectives for clayey upland sites includes increasing both foliar cover of tobosa and basal vegetation cover given drought and recent fire history.

Volcanic Upland 12-16" pz sites within the Horseshoe Allotment overall were within NRCS ESD predicted ranges. The south end of Perry Mesa (Lousy Pasture) showed higher than expected shrub component which was attributed to climatic changes due to the relatively low use of livestock and lack of waters. These results are supported in the Horseshoe Land Health Evaluation (BLM 2018) though a comparison of Black Mesa which had a much higher water source density and greater livestock use than Perry Mesa (McAuliffe and King 2010).

Volcanic Hills, Clayey (R038XA117AZ) sites showed a similar trend to Volcanic Upland 12-16" pz sites. However, woody species appear to be increasing on this ecological site. The increase was attributed to climatic warming and fire.

Granitic Hills 12-16" pz sites (R038XA104AZ) were found to be within expected NRCS ESD site variability except for an excess of perennial grass. However, overall, shrubs and sub-shrubs were a larger component of the vegetative community as expected. This again may be attributed to climatic factors as found when comparing Volcanic Upland 12-16 pz sites on Black and Perry Mesas.

Clayey slopes 12-16" pz (R038XA108AZ) were found to be within the NRCS ESD variability. These sites were dominated by perennial grasses and shurbs. Non-native annual red brome (*Bromus rubens*) comprises a large part of the plant community in some years but does not grow in extreme drought such as 2018.

Standard 3 for riparian areas were assessed by quantitative riparian monitoring by the use of the Multiple Indicator Monitoring protocol (TR-1737-23). Riparian areas within the allotment were dominated by native obligate riparian species of diverse age classes. Woody species use was low (≤ 10 percent) and back alterations were none existent. Streambank stability was found to be high >85 percent and were generally well covered by native riparian vegetation or armored by rocks. Bermuda grass was a dominant understory component in some areas. These results are likely indicative of the benefits of the removal of off-highway vehicle travel from riparian areas, especially the Agua Fria River, and the limitation of grazing to the non-growing season though the implementation of the 2010 AFNM RMP.

3.2 Allotment Management

The ~32,000 acre Horseshoe Allotment, managed by the BLM, is used jointly with the ~35,000 acre Copper Creek Allotment which is managed by the Tonto National Forest. Although these allotments are run jointly, the focus of allotment management for this Biological Assessment is on the BLM managed Horseshoe Allotment but includes relevant information about grazing management across both allotments.

The Horseshoe Ranch was established in 1882 by William Mitchell, a wealthy mining magnate from Philadelphia. A patent was issued for 160 acres of private land on 12-16-1889. Information from 1880 to 1960 is from AZ State Land Department (ASLD) records. From 1960 through 1986 the Horseshoe Ranch, consisting of the Horseshoe allotment of the ASLD (#05-2074) and the Copper Creek allotment of the United States Forest Service (USFS), was owned and operated by Louis and Billie Wingfield. They ran between 700 and 800 cows yearlong on the ranch. From 1982 through 1990 the authorized grazing use on 25,450 acres of state lands on the Horseshoe allotment was 341 animal units (AU).

In 1986 the leases were assigned to Horseshoe Ranch Inc. In 1990 the authorized grazing use on state lands was reduced to 329 AUs. In 1998 Arizona State land on the Horseshoe allotment transferred to the Bureau of Land Management (BLM) through a land exchange. The allotment became part of BLM's Agua Fria National Monument on January 11, 2000 via Presidential Proclamation #7236 under the Antiquities Act of 1906. Grazing temporarily ceased on the Horseshoe allotment in 2006. In 2011 the AZ Game and

Fish Department (AGFD) purchased the 199 acre headquarters of the Horseshoe Ranch along the Agua Fria River. In 2011 the BLM and USFS allotments were assigned to AGFD. In 2012 the allotments were sublet to JH Grassfed Inc (John Holbrook) and grazing resumed on the Horseshoe allotment.

Since 2012, the amount of authorized livestock on only the Horseshoe Allotment has been 4572 Animal Unit Months (AUMs) (equivalent to 381 cow calf pairs grazing year around). The current permittee's herd size on both the Horseshoe and Copper Creek Allotments has ranged from 170 to 220 adult cattle grazing year around. Numbers have increased as the permittee continues to develop their ranching operation. Management is still based on the 1997 CRMP and adaptive management has been utilized in recent years setting pasture rotations. AUMs of cattle on a differred rest rotation across many of the 11 Horseshoe Allotment pastures. Upland pastures include Double Tank, New Mill, Joe's Hill, Copper Trap 1 and Copper Trap 2 Pastures. Riparian pastures, often associated with listed species include North and South River, Boone, Indian, Silver Creek and Lousy Pastures. Typically, cows spend winter months on the higher elevation pastures of the Copper Creek Allotment. During summer months, livestock are moved to the lower elevation pastures of the BLM. However, due to water limitations, particularlly in the southern portion of the allotment, use has been higher in the Double Tank, New Mill, Joe's Hill, Copper Trap 1 and Copper Trap 2 pastures.

Livestock are authorized to use riparian pastures within the allotment during the non-growing season (November 1 to March 1) (BLM 2010). Recent use of riparian areas has been limited to winter season of use of only the North River pasture. Other riparian pastures have not been actively grazed except by a small number (<20) which accessed Boone Pasture unintentionally in 2016.

4.1. Conservation Measures

The proposed action includes many conservation measures to maintain or improve habitat upon which threatened and endangered species rely as well as establish new populations of some species. Utilization levels would be monitored to ensure thresholds are not exceeded where are needed to maintain vegetation recruitment and maintain habitat (Table 7). Conservation measures specific to each species are listed below.

4.1.1 Yellow-billed cuckoo

Many conservation measures have been developed for the CRMP which would maintain and/or improve habitat conditions for multiple species including the cuckoo.

- Livestock grazing would be limited to the winter season of use (November 1 to March 1) in riparian pastures. This would aid in the recruitment of riparian vegetation (PCE 1) and reduce the disturbance to nesting activities.
- Silver Creek that contain the PCEs for the cuckoo will be excluded from livestock grazing. This would result in improved recruitment of riparian vegetation riparian function.

- To mitigate potential use of riparian obligate vegetation as a result of this phenotypic variability in vegetation, use of riparian vegetation would be limited to no more than 4"-6" of stubble height and 50 percent use of aquatic emergent vegetation. Riparian obligate woody species use would be limited to no greater than 40 percent of new leader growth.

- Livestock would be removed prior to exceeding stubble height, aquatic emergent, and riparian obligate woody species utilization thresholds.

- Season of use compliance would be conducted biannually to ensure thresholds are not exceeded.

- Quantitative riparian measurements would be collected annually to determine if utilization levels and desired plant community (DPC) objectives are being met. If DPC objectives are not being met and livestock are determined to be the causal factor, adaptive management changes in livestock management would occur. The desired plant community consists of stream banks dominated (>50 percent) by native riparian plant species. To ensure recruitment and retention of native riparian obligate tree species, the desired age class distribution is >15 percent seedling, >15 percent young, and >15 percent mature trees.

- Nutrients or other low-moisture supplements may be placed away from upland areas surrounding riparian areas to attract livestock away from these areas, creating more livestock use in upland areas and less use of riparian areas.

- Reductions in livestock intensity or AUMs would be implemented until DPC objectives are met if livestock are determined to be the causal factor in not meeting DPC objectives. These grazing restrictions would maintain or improve the habitat conditions required for all the life processes for the species. See the environmental consequences section for detailed rational.

- Annual cuckoo surveys would continue to be carried out. Areas surveyed would be a subset of the allotment. Presence and absence data would be used to inform adaptive management actions.

- The BLM would complete at least two compliance checks annually between March 1 and November 1 to ensure that the livestock pasture fences are effective at excluding the livestock from riparian pastures and exclosures. Water gap fences would be inspected at least two times per year by BLM staff and following exceptionally high flow events. The grazing permittee is responsible for maintaining and repairing the fences on the Allotment.

- Fence inspection and maintenance tasks would be requirements added to the terms and conditions of the grazing permit.

- Water facility construction in the Indian Creek area would be completed outside of the breeding season.

4.1.2 Gila chub

The following conservations measures would reduce impacts to Gila chub and its habitat.

- Silver Creek would be excluded from livestock use except for a 50 m crossing site at the 9023A road. Through this action both critical habitat and occupied habitat would be excluded which

would maintain and improve habitat conditions required for all of the life process for the species.

- Annual surveys for the Gila chub would continue to be conducted. This includes both designated critical habitat and occupied habitat.

- The BLM would complete at least two compliance checks annually between March 1 and November 1 to ensure that the livestock pasture fences are effective at excluding the livestock from the pastures and exclosure. Water gap fences would be inspected at least two times per year by BLM staff and following exceptionally high flow events. The grazing permittee is responsible for maintaining and repairing the fences on the allotment.

- Fence inspection and maintenance tasks would be requirements added to the terms and conditions of the grazing permit.

4.1.3 Northern Mexican gartersnake

The following conservations measures would reduce impacts to northern Mexican gartersnakes and its habitat.

- Livestock grazing would be limited to the winter season of use (November 1 to March 1) in riparian pastures. This would aid in the recruitment of riparian vegetation (PCE1) and reduce the disturbance to the species when in it active.

- Quantitative riparian measurements would be collected annually to determine if utilization levels and desired plant community (DPC) objectives are being met. If DPC objectives are not being met and livestock are determined to be the causal factor, adaptive management changes in livestock management would occur. The desired plant community consists of stream banks dominated (>50 percent) by native riparian plant species. To ensure recruitment and retention of native riparian obligate tree species, the desired age class distribution is >15 percent seedling, >15 percent young, and >15 percent mature trees.

- To mitigate potential use of riparian obligate vegetation as a result of this phenotypic variability in vegetation, use of riparian vegetation would be limited to no more than 4”-6” of stubble height and 50 percent use of aquatic emergent vegetation. Riparian obligate woody species use would be limited to no greater than 40 percent of new leader growth.

- Livestock would be removed prior to exceeding stubble height, aquatic emergent, and riparian obligate woody species utilization thresholds.

- Nutrients or other low-moisture supplements may be placed away from upland areas surrounding riparian areas to attract livestock away from these areas, creating more livestock use in upland areas and less use of riparian areas.

- Season of use compliance would be conducted biannually to ensure thresholds are not exceeded.

- The BLM would complete at least two compliance checks annually between March 1 and November 1 to ensure that the livestock pasture fences are effective at excluding the livestock from the pastures and exclosure. Water gap fences would be inspected at least two times per year by BLM staff and following exceptionally high flow events. The grazing permittee is responsible for maintaining and repairing the fences on the allotment.

- Reductions in livestock intensity or AUMs would be implemented until DPC objectives are met if livestock are determined to be the causal factor in not meeting DPC objectives. These grazing restrictions would maintain or improve the habitat conditions required for all the life processes for the species. See the environmental consequences section for detailed rational.

- Fence inspection and maintenance tasks would be requirements added to the terms and conditions of the grazing permit.

- Reintroductions of the species to the Horseshoe Allotment would improve the distribution of the species.

- The BLM would work with partners to reduce non-native species to improve native prey species when and where appropriate.

5.0 Species Analysis

5.1 Yellow-Billed Cuckoo (*Coccyzus americanus*)

5.1.1 Description

The threatened yellow-billed cuckoo (*Coccyzus americanus*) is a medium sized riparian obligate migratory bird species. For extensive species information and rational for listing refer to the Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Western Distinct Population Segment of the Yellow-Billed Cuckoo (USFWS 2014).

5.1.2 Current Conditions

Declines in the populations of western (distinct population segment) yellow-billed cuckoos are attributed to the loss and degradation of riparian habitat as a result of multiple land uses (USFWS 2014). These include poorly managed grazing, development and extractive uses, uncontrolled wildfire, and a reduction of forage availability as a result of pesticide use.

Yellow-billed cuckoos are known to breed within riparian areas of the Agua Fria National Monument. Survey efforts for the species were initiated in 2003 by Audubon Arizona, the Bureau of Land Management (BLM) and cooperators from the Sonoran Audubon Society (Wise-Gervais and Magill 2003). Specific to the Horseshoe Allotment in 2003, cuckoos were detected throughout much of the

Agua Fria River and Indian Creek. Surveys of Silver Creek did not result in detections but the wrong areas of the creek were surveyed though a portion of the field season.

Surveys for the yellow-billed cuckoo were not conducted again for the species until 2010 but have continued annually within the Agua Fria National Monument. Annual trends indicate that riparian areas within the Horseshoe Allotment are used seasonally by the species (Wise and Prager 2010, Prager and Wise 2011, Prager and Wise 2012, Prager and Wise 2013, Prager and Wise 2014, Prager and Wise 2015, Prager and Wise 2016). Areas used within the allotment have varied throughout the past years of survey effort. Areas such as Indian Creek and Silver Creek were removed from survey effort in 2014 and 2016 respectively due to low or no individuals being documented and the likelihood the areas are not used for nesting. Surveys ceased on the "Middle Agua Fria" transect, which is upstream of Horseshoe Ranch, in 2011 due to the lack of detections. However, the "Middle Agua Fria: was surveyed again between 2014 and 2016 which resulted in multiple detections and a probable breeding area was identified.

In 2010, the AFNM implemented a season of use restrictions for livestock grazing, limiting grazing use to the non-growing season. Additionally, the AFNM has installed off-highway vehicle (OHV) barriers in the Agua Fria River to exclude OHV use from riparian areas. These actions have improved habitat conditions for the species by reliving grazing pressure from livestock during the growing season and OHV vegetation damage.

Critical habitat for the species has been proposed within the Horseshoe allotment. Breeding activities within the Horseshoe allotment is likely limited to portions of the Agua Fria River (Prager and Wise 2016). Portions of Silver Creek may support breeding activities or other activates needed to meet basic biological needs for individuals of the species. Portions of Indian Creek within the Allotment may only support foraging. Rational for likelihood of use is explained in the Description of Critical Habitat section.

5.1.3 Description of Critical Habitat

Yellow-billed cuckoos rely on riparian areas for breeding and foraging needs. These areas tend to be large (greater than 200 acres) of cottonwood willow forests surrounded by mesquite trees. For extensive habitat preferences and primary constituent elements refer to Laymon and Halterman 1989 and USFWS 2014.

Critical habitat is proposed for the yellow-billed cuckoo in many riparian areas of the Horseshoe Allotment. Areas proposed within the allotment include most of the Agua Fria River, Indian Creek, and portions of Silver Creek (Map 1). An overview of critical habitat for the species is found in the Existing Conditions Section of this document and in the Horseshoe Land Health Evaluation (BLM 2018).

The area proposed as critical habitat within the Agua Fria River of the Horseshoe Allotment encompasses areas which meet the PCEs for the species and areas that do not. Areas that meet the PCEs for the species have a green line dominated by cottonwood trees (44 percent) with a mix of aquatic emergent vegetation such as cattail (8 percent), common three-square (5 percent), Gooding's willow (6 percent), Spike Rush (5 percent) and seep willow (6 percent) as well at a large component of rock (27 percent). Woody species age classes were found to be dominated by seedlings (54 percent) and young (46 percent). However, many larger trees were growing outside of the greenline. When woody species belt transects found the ratio of seedling was 37 percent, young 31 percent and mature 32 percent.

Stubble height of the dominate key species, cattail, was 65 inches. This area, PFC 6235-1N, was rated as "Functional At Risk" in the most recent Proper Functioning Condition Assessment conducted in 2013 (BLM 2018).

Portions of Indian Creek proposed as critical habitat tend to be much dryer (AFNM Wet/Dry Reports [unpublished] and PFC data) and supports much less riparian habitat. A multiple indicator monitoring plot was established in 2014 in an area were riparian vegetation dominates the streambank. The area selected has adequate water in both time and duration to support riparian species recruitment. The greenline was found to primarily contain velvet ash (24 percent), Gooding's willow (20 percent), and velvet mesquite (17 percent). Other contributing greenline composition factors were spike rush (13 percent), deer grass (9 percent), and rock (7 percent) (Horseshoe LHE 2018). Stubble height of the dominate key species, deergrass, was 64 cm (~25 inches). The woody species age class ratio based on MIM was found to be 13 percent seedling, 73 percent young and 13 percent mature. Areas immediately downstream of the MIM plot largely consist of mesquite and other facultative upland species until Indian Creek reaches the Agua Fria River. The most recent PFC assessment of this area found the area to be "Functioning at Risk" with "No Apparent" trend. Rational for the rating attributed the condition of the area to be ground water pumping and drought. Drought likely was a larger contributing factor due to the limited amount of ground water pumping in the Indian Creek drainage.

Silver Creek is proposed as critical habitat for the species downstream of the 9023A road which includes PFC segment 43A and most of 43B (LHE 2018). Portions of PFC segment 43B support perennial water and riparian obligate species. The area is generally canyon bound. Further downstream, in PFC segment 43A, there are abundant mesquite trees and other facultative upland species but the amount of riparian vegetation and surface water limited (Photo 1). PFC segment 43C is upstream of the proposed critical habitat. This area is also canyon bound and has similar vegetative characteristics to PFC segment 43B. However, this area is heavily impacted by the 2005 Cave Creek Complex fire and no longer supports surface water due the heavy sediment load. A MIM plot was established in 2013 in PFC segment 43C and found the area be dominated by deergrass (31 percent), three-square (21 percent), spike rush 18 percent, and velvet ash (16 percent). The stubble height on the dominate key species, deergrass, was 33 inches. The ratio of woody species age class based on MIM monitoring was 56 percent seedling, 19 percent young, and 25 percent mature. It is anticipated the proposed critical habitat within PFC segment 43B which supports riparian obligate growth is similar in species compositions, stubble heights, and age class ratios.

5.1.4 Analysis of Effects to the Yellow-billed Cuckoo and Designated Critical Habitat

5.1.4.1 Effects of the Proposed Action:

Actions that have potential effects to the yellow-billed cuckoo and its habitat include:

- Continue seasonal restrictions of livestock grazing in the Agua Fria River and Indian Creek to winter use only (Nov. 1 to March 1).
- Build riparian exclosures around Silver Creek.
- Suspend surface water diversions of Indian Creek, Silver Creek and Copper Creek to increase threatened and endangered species populations.

5.1.4.2 Direct Effects to the Species:

The proposed action has insignificant effects to the yellow-billed cuckoo. Construction of the fence line may require the use of power tools such as augers, rock drills and power saws may be used to trim vegetation along the fence line and install fence posts in rock.

Anticipated noise levels (from: Construction Noise Handbook, Federal Highway Administration (2006)) of the equipment that may be used in exclosure construction:

Auger: 85 dBA
Rock drill: 85 dBA
Welder: 73 dBA
Generator: 82 dBA
Power saw: 76 dBA

Water facilities near Indian Creek would be constructed outside of cuckoo breeding season. No vegetation would be disturbed within proposed critical habitat. Therefore, impacts to the species and proposed critical habitat are discountable.

Fences, except for the lower portion of the Silver Creek Exclosure, would be constructed adjacent to proposed critical habitat. Although construction would occur in areas where individuals may forage which may result in up to two weeks of temporary displacement, individuals are likely to forage in nearby areas or remain in the area after construction activities cease throughout fence installation. Therefore fence construction activates would have an insignificant affect to the species.

Maintenance of riparian fences, the Silver Creek exclosure, and water facility within the yet unnamed pasture, may be needed periodically to keep livestock from entering seasonal or permanent exclosures. Maintenance actions would be carried out by the use of hand tools such as post pounders, hammers, fence stretchers. Noise associated with hand tool use and the presence of workers for maintenance purposes may cause birds to be startled and alter foraging behaviors which may result for displacement of individuals for two days. Because hand tools create less noise than mechanized equipment and individuals are likely to forage in nearby areas or remain in the area after maintenance activities cease, maintenance is likely to have an insignificant affect to the species.

5.1.4.3 Indirect Effects to the Species:

Livestock would have access to riparian areas outside of the breading season; therefore, indirect impacts to the species are discountable. The exclosure of Silver Creek may benefit nesting and foraging habitat. Refer to the Effects to Critical Habitat section below .

5.1.4.4 Interrelated/Interdependent Effects to the Species: None

5.1.5 Effects to Critical Habitat:

5.1.5.1 Direct Effects to the Critical Habitat:

Livestock Grazing

Livestock would be allowed access into many riparian areas proposed as critical habitat for the cuckoo including North River pasture, South pasture, Indian pasture, and a yet to be named pasture (formally

portions of Boone) during the non-growing season (Nov 1 to March 1) and would be excluded from portions of Silver creek. New growth is not expected to be removed pre-leaf drop which would otherwise impede regeneration of riparian vegetation. The effects of livestock access to riparian pastures, specific to each PCE for the cuckoo (79 FR48574) follow the list of PCEs for the species.

(1) Riparian woodlands. Riparian woodlands and/ or a mix of mesquite-thorn-forest vegetation and riparian woodland patches > 325 ft (100m) and greater than 200 acres (81 ha) of extent these habitat patches contain one or more nesting groves have above average canopy closure (greater than 70 percent), and have a cooler, more humid environment than the surrounding riparian and upland habitats.

(2) Prey base. Presence of a prey base consisting of large insect and tree frogs.

(3) Dynamic riverine processes. River systems that are properly functioning.

Livestock grazing is known to alter understory vegetation, trample existing vegetation, reduce density, or eliminate new growth in riparian areas (PCE 1) and thereby hampering recruitment of woody species that, when mature, provide nest sites. Over time, livestock grazing in riparian habitats, combined with other alterations in streamflow, typically results in reduction of plant species diversity and density (PCE 3) and may increase the distribution and density of nonnative tamarisk by eliminating competition from native cottonwood and willow saplings, which are preferred forage for livestock (Krueper et al. 2003, p. 608). Furthermore, the relatively cool, damp, and shady areas favored by western yellow-billed cuckoos are those favored by livestock over the surrounding drier uplands. This can concentrate the effects of habitat degradation from livestock in western yellow-billed cuckoo habitat (Ames 1977, p. 49; Valentine et al. 1988, p. 111; Johnson 1989, pp. 38–39; Clary and Kruse 2004, pp. 242–243).

Livestock are known to effect riparian vegetation, DPC and Arizona Land Health Standard 2. Seasonal restrictions to riparian pastures to the non-growing season and completion of an exclosure around much of Silver Creek would abate much of livestock impacts. Additionally, limiting aquatic emergent vegetation use to 6”-8” and riparian obligate woody species browse of new leader growth to no greater than 40 percent would maintain or improve riparian obligate vegetative community. The objectives developed in the Horseshoe LHE would maintain or improve Desired Plant Community objectives (PCE 1) and maintain or improve dynamic riverine processes (PCE 3). Since livestock use would seasonally occur in riparian pastures (excluding portions of Silver Creek), PCEs 1 and 3 may be adversely affected within the proposed critical habitat but this effect is insignificant due to the conservation measures.

Proposed cuckoo critical habitat within Silver Creek would largely be excluded except for a portion of Indian Pasture that does not contain all PCEs for the species by approximately 600 feet of fence at the west end of Silver Creek canyon and along the 9023A road Map 4. The crossing site near the 9023A road is not proposed as critical habitat and does not support PCEs needed to complete live processes for the cuckoo.

The Silver Creek Exclosure would exclude livestock from approximately 38 acres of proposed critical habitat which contain PCEs for the species. The exclosure would have a beneficial effect and result in the maximum amount of riparian vegetative recruitment and cover, height, etc. (PCE1) and eliminate the

impacts of livestock to dynamic riverine processes (PCE3). Also, only approximately 7 percent of the proposed critical habitat within Silver Creek, even though this area does not meet the PCEs for the species, would be exposed to livestock grazing.

Wells would not have a measureable impact riparian resources. The well located in North River Pasture is on a hill top approximately 1 mile from the closest riparian area. The well in Double Tank Pastures is located on a mesa top at least ½ miles from the closest riparian area. Therefore, there is no potential impact to riparian areas due to geographic isolation. The well in Boone Pasture is approximately .1 mile from Indian Creek. Although riparian obligate plant species grow upstream of the proposed well, this area and areas downstream are losing reaches, usually dry, supports very few riparian obligate species, and has limited potential for riparian obligate recruitment. Therefore, water use from the well in Boone Pasture will have a negligible effect to riparian resources and proposed critical habitat in Indian Creek due to the limited potential for riparian area development near the well.

The construction of a well (Project 5) in the yet to be named new riparian pasture would transverse proposed critical habitat for the cuckoo (Map 5). A small (~1" dia) PVC pipe would be installed sub-surface across Indian Creek. Burying this pipe and any maintenance activities would disturb vegetation. However, in this area, Indian Creek is ephemeral and does not support riparian obligate vegetation. Therefore, activities associated with construction and maintenance of this pipe would not likely effect proposed critical habitat.

5.1.5.2 Indirect Effects to the Critical Habitat

Although livestock damage riparian vegetation and destabilize stream banks which could lead to increased erosion and subsequent soil loss reducing available substrate for recruitment of riparian trees and other riparian vegetation, seasonal restrictions, construction of an exclosure, and utilization thresholds are expected to maintain or improve the habitat.

The proposed action also includes the abandonment of instream surface water diversions for livestock. The abandonment of these water systems would increase the amount of instream water, albeit a di minimis amount relative to surface flows in the Agua Fria River, Indian Creek and Silver Creek.

Since livestock would be seasonally restricted from use of many riparian areas, areas of Silver Creek would be excluded from grazing (where PCEs for the species area met), utilization limitations would be implemented, and surface water diversions would be abandoned; riparian habitat is expected to be maintained or improved. Therefore, the indirect effects of the proposed action to proposed critical habitat are insignificant and/or beneficial.

5.1.5.3 Interrelated/Interdependent Effects to Critical Habitat: None

5.2 Gila Chub (*Gila intermedia*)

5.2.1 Description

Gila chub (*Gila intermedia*) was listed as endangered with critical habitat in 2005 (USFWS 2005). In the final rule, primary threats to Gila chub include predation by and competition with non-native organisms, and secondary threats such as habitat alteration, destruction, and fragmentation.

The classification of the Gila chub as a unique species is currently under review. The American Fisheries Society and American Society of Ichthyologists and Herpetologists Joint Committee on the Names of Fishes did not support the recognition of three separate *Gila* complex species. Instead, the committee concluded the data available support the recognition of only one *Gila*, the roundtail chub (*Gila robusta*) Regardless, the species is currently recognized by the Fish and Wildlife Service as the Gila intermedia which is endangered.

5.2.2 Current Conditions

5.2.2.1 Rangewide:

Historically, Gila chub were recorded from nearly 50 rivers, streams and spring fed tributaries throughout the Gila River basin in southwestern New Mexico, central and southeastern Arizona, and northern Sonora, Mexico (Miller and Lowe 1967, Rinne and Minckley 1970, Minckley 1973, Rinne 1976, DeMarais 1986, Sublette et al. 1990, Weedman et al. 1996); and density of Gila chub throughout its range was higher. Currently occupied sites were likely more expansive in distribution as well (Minckley 1985, Rine and Minckley 1991).

Gila chub now occupies an estimated 10-15 percent of its historical range (AGFD 1996, WSFWS 2005) and approximately 25 of these current localities are considered occupied, but all are small, isolated and face one or more threats (Weedman et al. 1996, USFWS 2005).

5.2.2.2 Project area

Gila chub are located within two drainages of the Horseshoe Allotment. These drainages are Larry Creek Tributary and Silver Creek. Critical habitat within Silver Creek currently does not support Gila chub and the species is limited to portions of Silver Creek approximately 850 meters below the designated critical habitat. This is due to the influx of sediment from the 2005 Cave Creek Complex Fire. The vast majority of the critical habitat is covered in sediment which has resulted in a near total loss of surface flows except for a small number of isolated pools. Recent surveys have found these pools to be devoid of fish species including Gila chub. Larry Creek Tributary was stocked with Gila chub in 1995 and the area was designated as critical habitat in 2006. Gila chub are abundant in Larry Creek Tributary as recent as Oct. 2016 (personal observation).

5.2.3 Description of Critical Habitat

The primary constituent elements (PCEs) for the Gila chub include but are not limited to: space for individual and population growth, food, water, air light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, and rearing; and habitats that are protected from disturbance or are representative of historic geographical and ecological distributions of a species (USFWS 2005). Refer to the USFWS 2005 for detailed information on critical habitat designations and primary constituent elements.

Critical habitat for the Gila chub has been designated in two portions of the Horseshoe Allotment (USFWS 2005). Riparian areas designated as critical habitat within the allotment include ~ 4.0 km (2.5 mi) of Silver Creek and 0.7 km (0.4 mi) of Larry Creek, also referred to as Larry Creek Tributary.

Silver Creek is located in the north east corner of the Horseshoe Allotment. Portions designated as critical habitat include the upper half of the creek as it enters from the Tonto National Forest which is also designated as critical habitat (USFWS 2005). Critical habitat within Silver Creek of the Horseshoe Allotment is bounded by the BLM/FS boundary to the east and the 9023A road to the west. Gila chub currently only occupy portions of Silver Creek below the area designated as critical habitat where perennial water still flows.

Qualitative Proper Functioning Condition assessments were conducted along the three PFC segments of Silver Creek which included both occupied habitat and designated critical habitat for the Gila chub. The segment aligned with designated critical habitat (6235-43C) was rated as "Functional At Risk" with a "No Apparent" trend. This rating was attributed to the large sediment plug within the area that had been there following the Cave Creek Complex Fire. The occupied segment (6235-43B) was rated as "Functional At Risk" with a "Downward" trend due to the influx of sediment in 2012 (Horseshoe LHE 2018).

A Multiple Indicator Monitoring plot was established in portions of Silver Creek designated as critical habitat in 2013 for quantitative habitat measurements. The understory of Silver Creek was found to be dominated by deergrass at 32 percent, common three-square at 21 percent and spike rush at 18 percent. Stubble height of deergrass were 32 inches tall indicating little use which is expected given livestock did not use the pasture for multiple years prior to monitoring. Bank stability was determined to have a 93 percent stability rating. Woody species occurring within the plot were dominated by seedlings and young at 54 percent and 46 percent respectively. Mature trees were not captured within the plot but occur in abundance along the bank of Silver Creek outside of the MIM plot. The furthest downstream segment was also rated as "Functional At Risk" with a "Downward" trend due to general drying of the area and increased sediment load (Horseshoe LHE 2018).

Larry Creek Tributary is located on the southeastern portion of the Horseshoe Allotment and is also designated as critical habitat for the Gila chub. This area supports abundant Gila chub and Gila topminnow populations. Larry Creek Tributary supports dense vegetative growth. Understory vegetation that consists primarily of blackberries (*Rubus* spp.), Arizona grape (*Vitis arizonica*), and giant reed (*Phragmites* spp.) cover much of the stream banks. Gooding's willow, Arizona Sycamore, and Fremont cottonwood comprise the overstory vegetation. Quantitative measurements have not been collected due to the remoteness, safety concerns, and lack of management influence to the area. Qualitative assessments have been completed by the utilization of the Proper Functioning Condition assessment protocol. Larry Creek Tributary was determined to be "Properly Functioning." This small, approximately 0.7 km, long creek is geographically isolated from impacts by livestock due to steep canyon walls. Consequently, the proposed action is not expected to have an effect to this area.

5.2.4 Analysis of Effects to the Gila chub and Designated Critical Habitat

Effects of the Proposed Action – Gila chub

Actions that have potential effects to the species included the following:

- Build riparian exclosures around Silver Creek, and many springs to protect sensitive areas and resources including Gila chub.
- Stocking of Silver Creek with Gila topminnow
- Suspend surface water diversions of Indian Creek, Silver Creek and Copper Creek to increase threatened and endangered species populations

5.2.4.1 Effects to the Species – Gila chub

Direct Effects to the Species
Direct effects to the species are not anticipated. Although the riparian exclosure at Silver Creek would cross designated critical habitat at the BLM 9023A road, the crossing area is usually dry both upstream and downstream of the crossing (Photo 2). Small, shallow <15 cm (~ 6 inches) pools devoid of fish exist in a few isolated areas upstream of the crossing (to the Tonto Forest Service Boundary). It is likely that these pools dry up periodically throughout the year. Pools in adequate size and duration to support any fish species do not occur until approximately 1.5 miles downstream of the road crossings. Any sediment created during exclosure construction is anticipated to settle out prior to reaching occupied pools because:

- The area is usually dry or intermittent in between the road cosign and occupied pools;

- If water was present in adequate volume to reach occupied pools conduction would cease for safety concerns and the amount of sediment created by construction would be negligible relative to the amount of sediment moved by the creek while flooding.

Since the presence of Gila topminnow would add an additional forage resource for the Gila chub, the species may benefit by the additional food resource. Detrimental effects to the Gila chub are not anticipated by this action because Gila topminnow are not known to prey upon any life stage to Gila chub. However, the Gila topminnow, also endangered, would be directly adversely affected as a result of consumption by Gila chub.

Indirect Effects to the Species – Gila chub
Since livestock grazing would be removed from portions of Silver Creek that are occupied by Gila chub, recruitment of riparian obligate plant species including aquatic emergent vegetation, deer grass, and riparian obligate woody species is expected to increase thus improving PCE 5 for the species. Bank and in stream alterations by livestock would cease in both the critical habitat and occupied habitat would also cease (except for the crossing site) which would improve water quality and bank stability PCE 3 and 5. This action would be beneficial to individuals of the species.

Since the proposed action included the abandonment of surface water diversions for livestock within Silver Creek, Gila chub would benefit from an increase water volume and the elimination in probability of mortality incurred by use of surface water diversions.

Interrelated/Interdependent Effects to the Species: None

5.2.4.2 Effects to Critical Habitat

Direct Effects to Critical Habitat:

Since critical habitat within Silver Creek would be largely excluded from livestock grazing, except for a hardened crossing site at the 9023A road, approximately 25 acres at the crossing site may be trampled and used by livestock which may affect riparian vegetative recruitment and water resources at the crossing site. However, the remaining critical habitat within Silver Creek 380 acres would be excluded from livestock grazing. Vegetation and water resources within the exclosure would be unaffected by livestock which would be largely beneficial to the designated critical habitat. Because only a small area (~6 percent) would be exposed to livestock grazing, this impact is anticipated to be insignificant.

Since the proposed action included the abandonment of surface water diversions for livestock within Silver Creek, Gila chub would benefit from an increase water volume and the elimination in probability of mortality incurred by use of surface water diversions. Wells would not impact designated critical habitat (see section 5.1.5.1).

Interrelated/Interdependent Effects to Critical Habitat: None

5.3 Gila Topminnow (*Poeciliopsis occidentalis occidentalis*)

5.3.1 Description

The endangered Gila topminnow (*Poeciliopsis occidentalis*) occupy headwater springs, and vegetated margins and backwater areas of intermittent and perennial streams and rivers dominated by native riparian obligate plant species. For additional species information refer to the Gila Topminnow Revised Recovery Plan (Weedman 1998).

5.3.2 Current Conditions

Gila topminnow were once common throughout it range between South and Central America, and the Gila and lower Colorado River basins, populations have been greatly reduced due to habitat loss and the introduction of non-native species (Rosen and Bailey 1963, Minckley 1985. Deacon and Minckley 1991, USFWS 1983) Reintroductions or natural dispersals from reintroductions have occurred at 175 wild locations (Weedman 1998). The 2001 Arizona Game and Fish Department Heritage Database Management System noted that over 300 stocking attempts have resulted in only 15 established populations.

Introductions of the species occurred within the Horseshoe Allotment in Larry Creek Tributary in 2003. The Larry Creek Tributary population and nearby Lousy Canyon population have thrived as documented by BLM biologist monitoring efforts since 2010.

5.3.3 Description of Critical Habitat

Critical Habitat has not been proposed or designated for this species within the Horseshoe Allotment. Due to the rugged nature of Lousy Canyon, livestock do not have access to these drainages. Riparian

areas within these creeks are topographically isolated to livestock by cliff faces, waterfalls and boulder filled washes. Occupied habitat is separated by at a minimum of 1350 feet of distance between canyon walls and 600 feet of elevation. These areas are dominated by Sonoran desert vegetation and rock and. No livestock use has been observed in the past five years of population and habitat monitoring.

5.3.4 Effects of the Proposed Action on the Species and Critical Habitat

5.3.4.1 Direct Effects to the Species:

Since the proposed action includes stocking Silver Creek with Gila topminnow, the species would benefit by an expansion in range. Individuals may be preyed upon by Gila chub, which is also endangered. Any Gila topminnow that are washed into the Agua Fria River, which is dominated by non-native fish component, are not anticipated to persist.

5.3.4.2 Indirect Effects to the Species:

Since livestock would be excluded from portions of Silver Creek where Gila topminnow would persist, riparian vegetation recruitment and bank stability is expected in increase which would benefit the species by improving habitat conditions.

Indirect effects to the species occurring within the action area which result from upland livestock grazing are determined to be insignificant or discountable as measured through quantitative or qualitative measures such as watershed health and condition, use levels, or sedimentation.

5.3.4.3 Interrelated/Interdependent Effects: None

5.3.4.5 Effects to Critical Habitat

Direct Effects to Critical Habitat: None

Indirect Effects to Critical Habitat: None

Interrelated/Interdependent Effects to Critical Habitat: None

5.4 Northern Mexican Gartersnake (Thamnophis eques megalops)

5.4.1 Description

The threatened northern Mexican gartersnake (*Thamnophis eques megalops*) is considered a "terrestrial-aquatic generalist" (Drummond and Marcias-Garcia 1983). Streams, rivers, cienegas, stock tanks, and spring sources containing riparian woodlands dominated by broadleaf deciduous trees are common habitat types for the species (Rosen and Schwalbe 1988). For information on the primary constituent elements refer to the Endangered and Threatened Wildlife and Plants; Threatened Status for the Northern Mexican Gartersnake and Narrow-Headed Gartersnake (USFWS 2013).

5.4.2 Current Conditions

The northern Mexican gartersnake was historically constrained largely to Arizona and, to a lesser degree and New Mexico. The species is now found in four geographic areas in Arizona but remains demonstrably extant in New Mexico.

5.4.3 Description of Critical Habitat

The Agua Fria River within the Horseshoe Allotment has been proposed as critical habitat for the Northern Mexican gartersnake (USFWS 2013) under section 3(5)(A)(i) of the Endangered Species Act. The total area proposed as critical habitat within the allotment is 1055 acres.

The Agua Fria River within the Allotment is varied. The southern third of the Agua Fria River is generally canyon bound and contains large boulder falls, particularly in the northern portion of the allotment. These areas support low densities of riparian obligate vegetation. The middle portions of the river support dense stands of riparian obligate trees such as the Fremont cottonwood (*Populus fremontii*), and Gooding's willow (*Salix gooddingii*) and banks comprised to common three square (*Schenoplectus pungens*), cattails (*Typha latifolia*) and seep willow (*Baccharis salicifolia*) (Horseshoe LHE 2018). The upper portions of the Agua Fria River within the allotment near Horseshoe Ranch area are dryer and support relatively less riparian obligate vegetation. Proper Functioning Condition assessments of the Agua Fria River, consistent with TR-1737-15, determined that all portions of the Agua Fria River within the allotment are rated as "functional at risk." Refer to the Horseshoe Land Health Evaluation (2018) for detailed data summaries.

5.4.4 Effects of Proposed Action:

Actions that have potential effect to the species and its habitat include:

- Continue seasonal restrictions of livestock grazing in the Agua Fria River and Indian Creek to winter use only (Nov. 1 to March 1).
- Reintroduction of the northern Mexican gartersnake to the Agua Fria River within the Horseshoe Allotment.

5.4.4.1 Direct Effects to the Species:

Direct effects of the proposed action to the species as it relates to livestock management are discountable. Livestock may alter foraging behavior for the species by causing individuals to flee to avoid trampling if individuals are active when livestock are present. However, because livestock will be present in riparian pastures during the winter season (Nov. 1 to March 1), impacts to individuals are discountable.

During periods of brumation (extended inactivity), it is expected the species would take refuge in rocky outcrops that characterize the upland areas that surround the Agua Fria River in the Horseshoe Allotment. Although livestock have access to these areas during the winter season of use (Nov. 1 to March 1), adequate shelter sites provided by rock would shelter individuals from trampling by livestock and impacts to the species are discountable.

Since the proposed action includes reintroductions of the northern Mexican gartersnake into the Allotment, this may expand the species range and increase population numbers albeit the success of species introductions is not currently known and more research in this topic is needed (N. Englemann, personal communication September 24, 2018). If successful, this may have beneficial affects to the species. If the species were still present within the watershed, additional individuals would increase numbers of individuals within the area and increase genetic diversity.

***5.4.4.2 Indirect Effects to the Species*:**
Since livestock would have access to the Agua Fria River during the winter months, damage to riparian vegetation though herbivory and trampling is expected. This would result in a reduction in riparian obligate vegetative recruitment and cover. Damage to riparian vegetation would also lead to increased erosion and subsequent soil loss reducing available substrate from recruitment of riparian obligate vegetation. Since these areas provide hiding and thermal cover as well as foraging areas, this may adversely affect the species. However, retaining at least 4"-6" of aquatic emergent vegetation would maintain adequate hiding cover for the species. Utilization of aquatic emergent vegetation and riparian obligate browse would also reduce forage availability for macro-invertebrates which are used opportunistically by the species.

The prey base for individuals foraging in the Agua Fria River proposed as critical habitat is a mix of native and non-native fish species as well as an abundance of crayfish. Other portions of the Agua Fria River and its tributaries upstream and downstream are dominated by non-native fish species including green sunfish as well as crayfish. Because of the abundance of crayfish in the area as well as sources for non-native fish upstream and downstream of the Allotment, the prey base for individuals foraging within the Allotment is anticipated to remain unchanged irrespective of the proposed action. Therefore, indirect effects to the species are insignificant. However, the BLM will work with partners to reduce non-native species in an effort to increase native prey and reduce threats to the species when and where appropriate.

5.4.4.5 Interrelated/Interdependent Effects to the Critical Habitat: None

5..4.4.6 Effects to the Critical Habitat
The proposed actions would have varied effects to the PCEs for the northern Mexican gartersnake within the proposed critical habitat of the Horseshoe Allotment. Each PCE is listed below with rational on the effects of the proposed action on each specific PCE.

1) Aquatic or riparian habitat that include:
    a. Perennial or spatially intermittent streams of low to moderate gradient that possess appropriate amounts of in channel pools, off-channel pools, or backwater habitat, and that possess a natural, unregulated flow regime that allows for periodic flooding or, if flows are modified or regulated, a flow regime that allows for adequate river functions, such as flows capable of processing sediment loads;
    c. Shoreline habitat with adequate organic and inorganic structural complexity to allow for thermoregulation, gestation, shelter, protection from predators, and foraging opportunities (e.g., boulders, rocks, organic debris such as downed trees or logs, debris jams, small mammal burrows, or leaf litter); and

d. Aquatic habitat with characteristics that support a native amphibian prey base, such as salinities less than 5 parts per thousand, pH greater than or equal to 5.6, and pollutants absent or minimally present at levels that do not affect survival of any age class of the northern Mexican gartersnake or the maintenance of prey populations.

Since livestock would be excluded from the Agua Fria River during the warm season (March 1 to November 1), the proposed action would not affect the amount of water (PCE 1) available during the snake's active period. Riparian functions driven by water available would remain unaffected by the proposed action.

Since livestock would have access to the Critical Habitat (North River and South River Pastures), the proposed action would directly affect PCE 1 (c,d) (aquatic habitat characteristics), emergent, herbaceous wetland vegetation. Livestock would forage on species such as common three square if still actively growing during the period of authorized use (Nov. 1 to March 1). However, this effect would largely occur when riparian obligate plant species are dormant and livestock would preferentially select other food resources in upland areas. Aquatic emergent utilization would be limited to no less than 4"-6" stubble height. Browse of riparian obligate woody species would be limited to 40 percent of new leader growth. These utilization levels would ensure adequate recruitment of riparian obligate species.

The Horseshoe LHE has an objective to meet Arizona Land Health Standards. This includes Standard 2 – Riparian Areas are at PFC. Riparian areas within the Horseshoe Allotment are "Functional- At Risk". The most recent ratings of "Functional At Risk" were attributed to drought and ground water pumping within the watershed (Horseshoe LHE 2018).

Winter season of use by livestock and the aforementioned utilization limitations are intended to maintain or improve riparian function. Given the nature of the livestock use, desired plant community objectives (DPC) have been developed to maintain the vegetative community in the riparian areas which influences the hydrology and erosion and deposition ratings. As outlined in the Horseshoe LHE, DPC objectives are to maintain an overstory dominated by native riparian obligate trees including Fremont cottonwood (*Populus fremontii*), Gooding's willow (*Salix gooddingii*), velvet ash (*Fraxinus velutina*) and Arizona sycamore (*Platanus wrightii*). The age class distribution should be >15 percent seedlings, > 15 percent young, and >15 percent mature (AFNM ROD/RMP 2010). Herbaceous riparian streambank vegetation would be dominated by three square sedge (*Schoenoplectus pungens*), spike rush (*Eleocharis palustris*) and cattail (*Typha latifolia).*

2) Adequate terrestrial space (600 ft (182.9 m)) lateral extent to either side of bankfull stage adjacent to designated stream systems with sufficient structural characteristics to support life-history functions such as gestation, immigration, emigration, and brumation (extended inactivity)

Since livestock would have access to upland areas within the Critical Habitat, the proposed action would affect PCE 2 (terrestrial habitat) such as basking, cover and retreat sites needed to support life history functions. Livestock would have access to upland areas paralleling the Agua Fria River which includes the 600 ft (182.9 m) lateral extent of either side of bankfull stage during the winter season (November 1 to March 1). Livestock use of these upland areas in the riparian pasture may reduce hiding cover of perennial vegetation and increase chance of depredation. However, grazing intensity for the allotment would be conservative. Livestock would be allocated up to 40 percent average utilization on native

perennial upland forage species (e.g. palatable grasses) during normal precipitation years and 30 percent average utilization during drought periods (Holechek 1988). This conservative utilization level would serve to ensure DPC objectives are met and would be maintain or improve the upland vegetative community. Consequently, adequate terrestrial space (PCE 2) would be maintain or improved for the species.

Livestock would be excluded from the riparian pasture during the growing season and annual growth by both perennial and annual species would likely compensate for the use during the winter season of use. DPC objectives and Land Health Standards in the Horseshoe Allotment LHE would maintain the reproductive capability and presence of upland species and forage base for macro-invertebrates for the species. Grazing intensity for the allotment would allow no greater than 40 percent of average utilization on native perennial upland forage species during normal or wet years and no greater than 30 percent utilization during drought periods.

The following DPC objectives for granitic hill sites (R038XA104AZ) as outlined in the Horseshoe Allotment LHE are intended to maintain the vegetative community given livestock use:

1. Maintain foliar cover between 60-100%.
2. Maintain bare ground between 5-10%.
3. Maintain basal cover between 5-10%.
4. Maintain total litter between 60-80%
5. Maintain gravel and rock between 5-60%

By maintaining these DPC objectives in granitic hill sites, which comprise upland areas surrounding much of the Agua Fria River, adequate terrestrial space with adequate structural characteristics would be maintained to support life history functions of the species. Livestock may utilize some upland vegetation but plant maintenance and reproductive capabilities would remain sufficient to support growth and recruitment; thus, PCE 2 would be maintained for the species.

If DPC objectives are not being met and livestock were determined to be the causal factor, changes in livestock management would occur. Nutrients or other low-moisture supplements may be placed away from upland areas surrounding the Agua Fria River to attract livestock away from these areas, creating more livestock use in the upland areas and less use in the Agua Fria river corridor. After management changes were implemented, if DPC objectives were still not being met, reductions in livestock intensity or AUMs would be implemented until DPC objectives were met. Additionally, the proposed action includes the installation of new fences in the upland areas of the North and South River pastures. This would increase management flexibility and make it possible to move livestock out of the Agua Fria River while allowing the use of upland areas outside of proposed critical habitat.

3) An absence of nonnative fish species of the families Centrarchidae and Ictaluridae, bullfrogs (*Lithobates catesbeianus*), and/or crayfish (*Orconectes virilis, Procambarus clarki*, etc.), or occurrence of these nonnative species at low enough levels such that recruitment of northern Mexican gartersnakes and maintenance of viable native fish or soft-rayed, nonnative fish populations (prey) is still occurring.

The proposed action would not affect PCE 3 (prey base). Non-native fish species and crayfish dominate the species composition in the Agua Fria River system including the portions of the Agua Fria River

within the Horseshoe Allotment (Burger 2016). In the 2016 survey efforts, the species/taxa caught in order of abundance were crayfish, green sunfish, longfin dace, non-crayfish invertebrates, fathead minnow, unidentified small tadpoles, bullfrogs, bullhead catfish, and one lowland leopard frog.

Livestock are not likely to affect prey base through trampling or habitat modification great enough to appreciably alternative to non-native fish species compositions due to the dominance of rock in the system. Rinne 1985 found little difference in species compositions between excluded riparian areas and areas exposed to grazing. Instead it was found that natural variability among all pools was too great to detect a difference.

Range Improvement projects are located outside of proposed critical habitat or in uplands geographically isolated for the northern Mexican gartersnake and implementation and maintenance would not affect the species.

Indirect Effects to the Critical Habitat:
Since livestock use of areas proposed as critical habitat (Upper and Lower Agua Fria Pastures which were formally riparian areas of North and South River Pastures), bank alterations by hoof shear would occur. Grazing livestock are known to break up root masses and reduce the continuity of herbaceous ground cover in riparian areas (TR 1737-20). Areas where emergent herbaceous vegetation occurs would be susceptible to hoof shear. Bank alterations through hoof shear have similar effect to the species and proposed critical habitat as the aforementioned emergent herbaceous vegetation use.

Since livestock use of these areas would occur during the winter season (Nov. 1 to March 1) which is outside the typical growing season for riparian obligate vegetation and utilization and stubble height limitations would also be implemented, the riparian obligate and upland vegetation would be maintained or improved.

Interrelated/Interdependent Effects to the Critical Habitat: None

6.0 Conclusions – Determination of Effects

6.1 Determination of Effects – Yellow-billed cuckoo

Based on the analysis of effects, we have concluded that impacts to the cuckoo are insignificant due to the implementation of conservation measures within the Proposed Action and the Proposed Action **may affect but is not likely to adversely affect** the threatened yellow-billed cuckoo along the Agua Fria River, Indian Creek and Silver Creek within the Horseshoe Allotment.

Rationale:

- Direct impacts to the cuckoo are not anticipated because the cuckoo would not be present during the livestock season of use or when projects occurring within proposed critical habitat would be implemented.

- Implementation of conservation measures are expected to maintain or improve riparian habitat conditions and would prevent adverse effects to the cuckoo.

- Since implementation of construction activities associated with the Proposed Action would be limited to the period of time when the cuckoo is not present, the effects to the cuckoo are discountable.

- Maintenance activities associated with the Proposed Action would largely be abated by seasonal restrictions and the use of hand tools, thus impacts to the cuckoo as a result of these actions are discountable.

Based on the analysis of effects, we have concluded that impacts to the cuckoo proposed critical habitat are insignificant due to the implementation of conservation measures within the Proposed Action and the Proposed Action **may affect is not likely to adversely modify proposed critical habitat** in the Agua Fria River, Indian Creek and Silver Creek.

Rationale:

- The effect to the cuckoo proposed critical habitat would largely be abated by seasonal restriction and utilization thresholds developed to maintain or improve habitat conditions because:
    - Habitat conditions (PCEs 1 and 3) for cuckoo proposed critical habitat would be maintained or improved by restricting livestock use to areas of proposed critical habitat to the winter season (Nov. 1 to March 1).

    - Habitat conditions (PCEs 1 and 3) would be maintained or improved for the cuckoo proposed critical habitat because use of riparian vegetation would be limited to no more than 4”-6” of stubble height and 50 percent use of aquatic emergent vegetation, and obligate woody species use would be limited to no greater than 40 percent of new leader growth,

- Approximately 93 percent of the proposed critical habitat for the cuckoo within the Horseshoe Allotment, the areas that largely contain the PCEs for the cuckoo, would be seasonally excluded to livestock during the non-growing season and the remaining portion would be excluded to livestock.

- Portions of Silver Creek that meet the PCEs for the cuckoo proposed critical habitat would be excluded from livestock by the construction of an exclosure thus benefiting proposed critical habitat within the exclosure by the removal of livestock use.

6.2 Determination of Effects – Gila chub

Based on the analysis of effects, we have concluded that impacts to the Gila chub are insignificant due to the implementation of conservation measures within the Proposed Action and the Proposed Action **may affect and not likely to adversely affect** the endangered Gila chub on the Horseshoe allotment.

Rationale:

- Livestock would be excluded from the portion of Silver Creek that is currently occupied by Gila chub. Habitat areas that meet PCEs for the Gila chub would benefit from the removal of livestock grazing pressure (PCEs 1, 2, 4, and 5).

- Indirect effects to listed fish occurring within the action area which result from upland livestock grazing are determined to be insignificant or discountable as measured through quantitative or qualitative measures such as watershed health and condition, use levels, or sedimentation in critical habitat (PCE 3).

Based on the analysis of effects, we have concluded that impacts to the Gila chub critical habitat are insignificant due to the implementation of conservation measures within the Proposed Action and the Proposed Action **may affect and is not likely to modify designated critical habitat** in Silver Creek of the Horseshoe Allotment.

Rationale:

- Livestock would be excluded from approximately 94 percent of designated critical habitat within Silver Creek which is expected to improve riparian habitat conditions within the exclosure (PCEs 1, 2, 4, and 5).

- Livestock use would be concentrated at the crossing site collocated with the BLM 9023A road which encompasses approximately 6 percent of designated critical habitat within Silver Creek which is an insignificant portion of the critical habitat because:

    - 94 percent of the critical habitat would be excluded from impacts associated with livestock grazing.
    - Water flows at the site are intermittent.
    - The area crossing site at the 9023A road does not currently meet the PCEs for the Gila chub.
    - The crossing site at the 9023A road is hardened.

- Indirect effects to Gila chub critical habitat as a result of livestock grazing and the construction of the exclosure would be discountable because the exclosure would be constructed on mesa tops approximately 300 feet from Silver creek which would buffer the area from the livestock waste affecting water quality and bank stability (PCE 3 and 5).

6.3 Determination of Effects – Gila topminnow

Based on the analysis of effects, we have concluded that impacts to the Gila topminnow are insignificant and beneficial due to the implementation of conservation actions within the Proposed Action and the Proposed Action **may affect and not likely to adversely affect** the endangered Gila topminnow on the Horseshoe allotment.

Rationale:

- The proposed action incudes stocking Gila topminnow in Silver Creek which would be beneficial to the Gila topminnow because this action would increase the distribution and presumably increase population numbers. Gila topminnow would be stocked into an area which would be excluded from livestock impacts.

- Livestock would be excluded from the portion of Silver Creek that would be stocked with Gila topminnow. Indirect effects to the Gila topminnow resulting from upland livestock grazing are determined to be insignificant or discountable as measured through quantitative or qualitative measures such as watershed health and condition, use levels, or sedimentation.

Based on the analysis of effects, we have concluded that the Proposed Action would have **no effect to designated critical habitat** for the Gila topminnow within the Horseshoe Allotment.

Rationale:
Critical Habitat is not designated or proposed for the Gila topminnow within the Horseshoe Allotment.

6.4 Determination of Effects – Northern Mexican gartersnake

Based on the analysis of effects, we have concluded that impacts to the northern Mexican gartersnake are insignificant and beneficial due to the implementation of conservation measures within the Proposed Action and the Proposed Action **may affect and is not likely to adversely affect** the northern Mexican gartersnake along the Agua Fria River within the Horseshoe Allotment.

Rationale:

- The effects to the northern Mexican gartersnake would largely be abated by seasonal restrictions and utilization thresholds developed to maintain or improve habitat conditions (PCE1, 2, and 3) because:

    - Herbivory of riparian obligate vegetation including woody species and trampling by livestock would be limited to the winter season (Nov. 1 to March 1).

    - The proposed action would not affect the amount of water available to the northern Mexican Gartersnake (PCE 1) because livestock would be excluded from the Agua Fria River during the warm season (March 1 to November 1).

    - Hiding cover for the northern Mexican gartersnake in riparian (PCEs 1 and 2) and upland areas (PCE 3) would be retained by limiting use of aquatic emergent vegetation to 4”-6” and 40 percent of upland vegetation.

- The proposed action incudes reintroduction of the northern Mexican gartersnake to the Allotment. This action would be beneficial to the species because this action would increase the distribution of the species and presumably increase population numbers.

Based on the analysis of effects, we have concluded that the impacts to proposed critical habitat for the northern Mexican gartersnake are insignificant due to the implementation of conservation measures within the Proposed Action and the Proposed Action **may affect is not likely to adversely modify the proposed critical habitat** in the Agua Fria River within the Horseshoe Allotment.

Rationale:

- Winter season use of proposed critical habitat would result in herbivory of riparian obligate vegetation including woody species and trampling however, the implementation of conservation measures is expected to maintain or improve riparian habitat conditions (PCEs 1, 2, and 3).

- Retaining at least 4”-6” of aquatic emergent vegetation (PCE 1 and 2) and limiting 40 percent utilization levels on upland vegetation (PCE 2) would maintain or improve both riparian (PCEs 1 and 2) and upland (PCE 3) habitats within the proposed critical habitat for the northern Mexican gartersnake.

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8.0 List of Preparers

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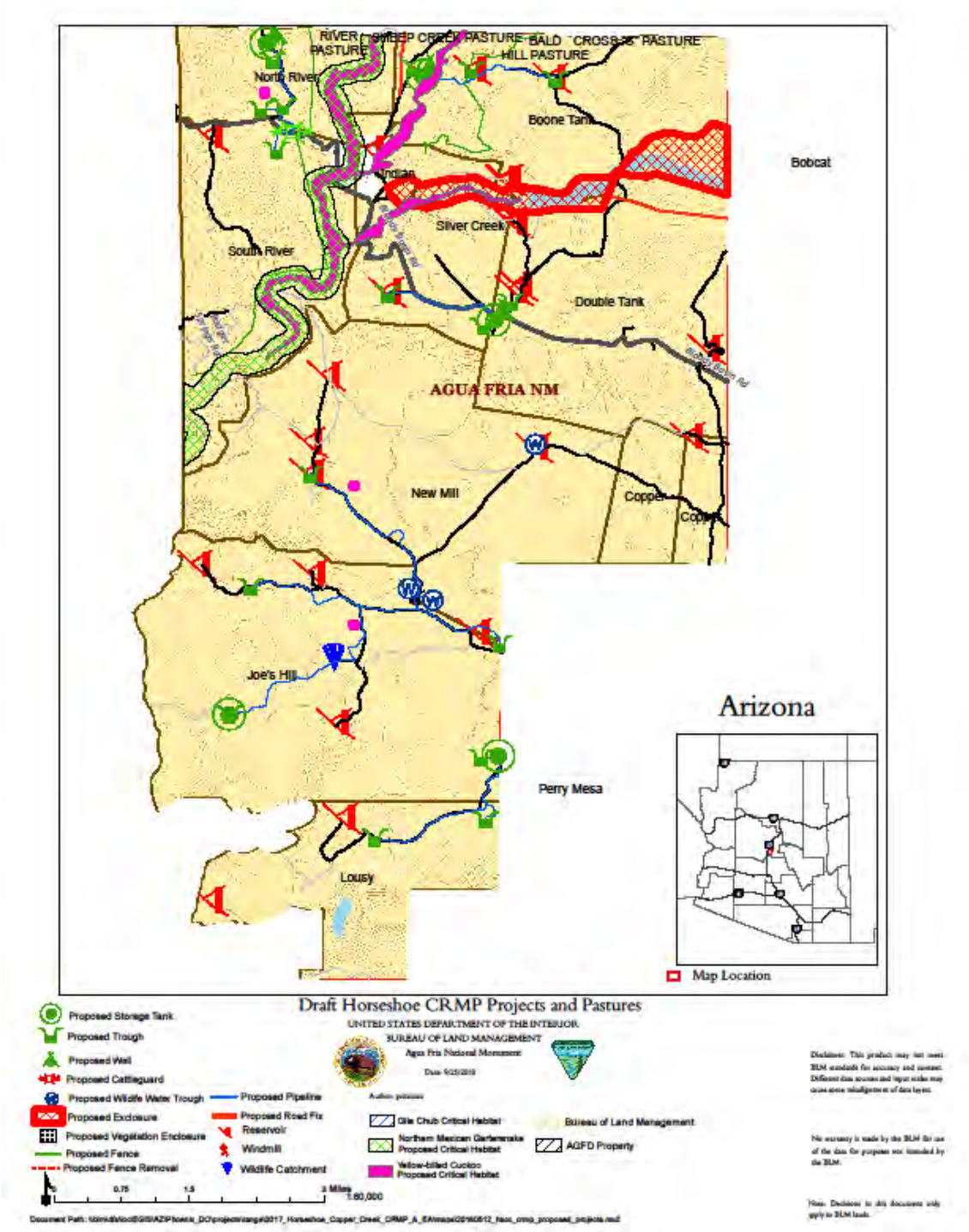
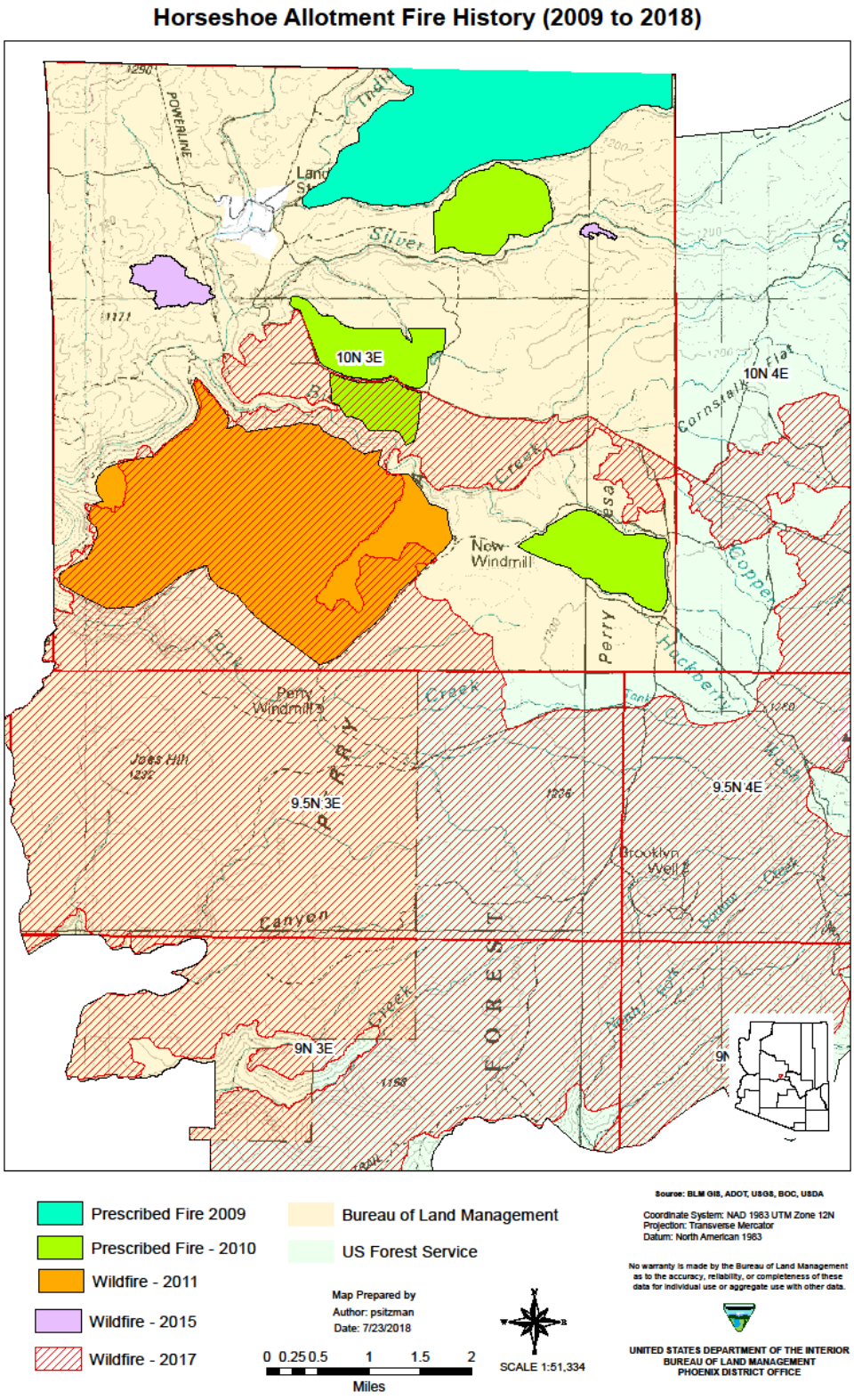
9.0 Maps and Photos

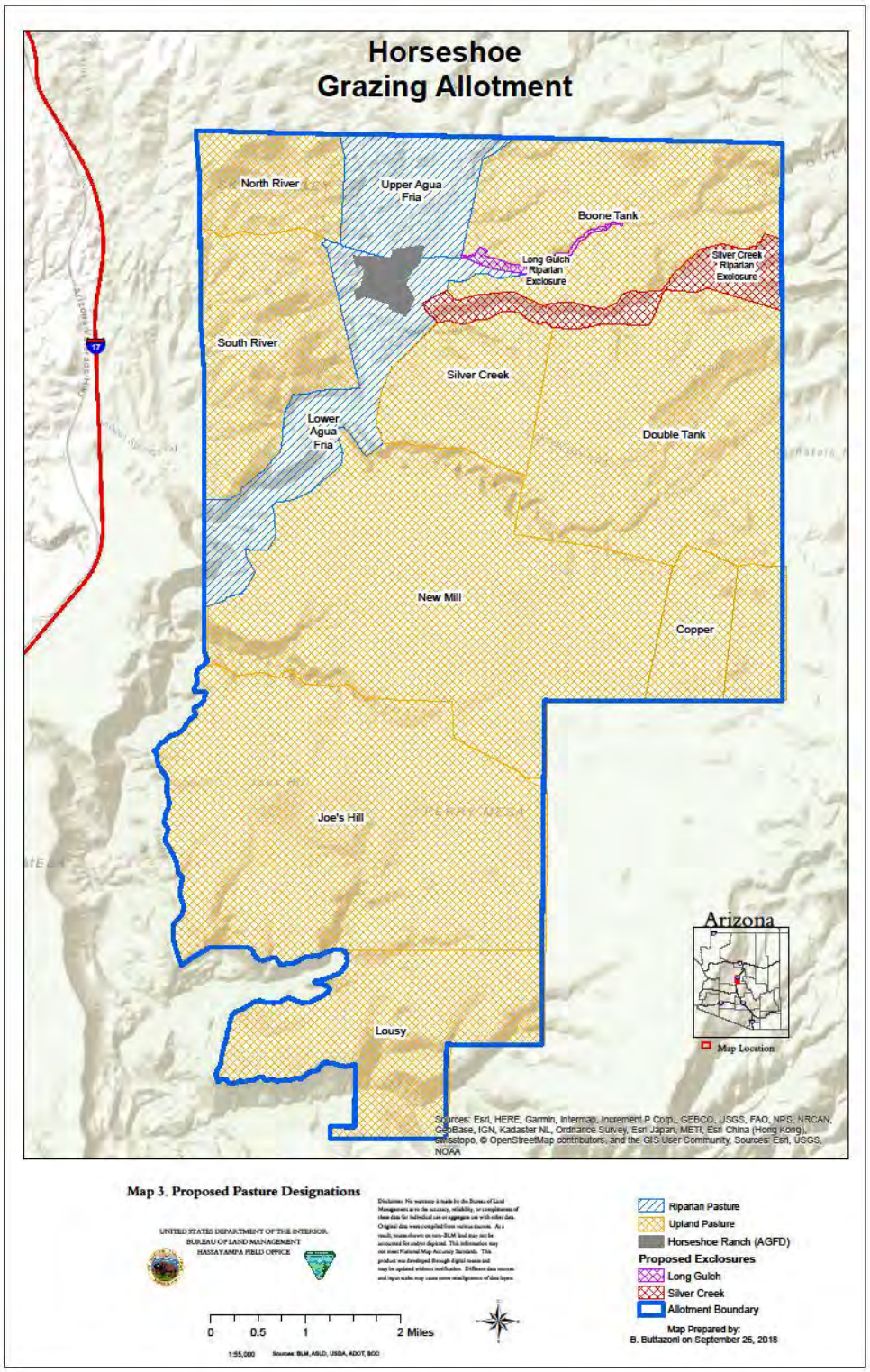
Map 1. Threatened and endangered species habitat designations within the Horseshoe Allotment and proposed range improvements.



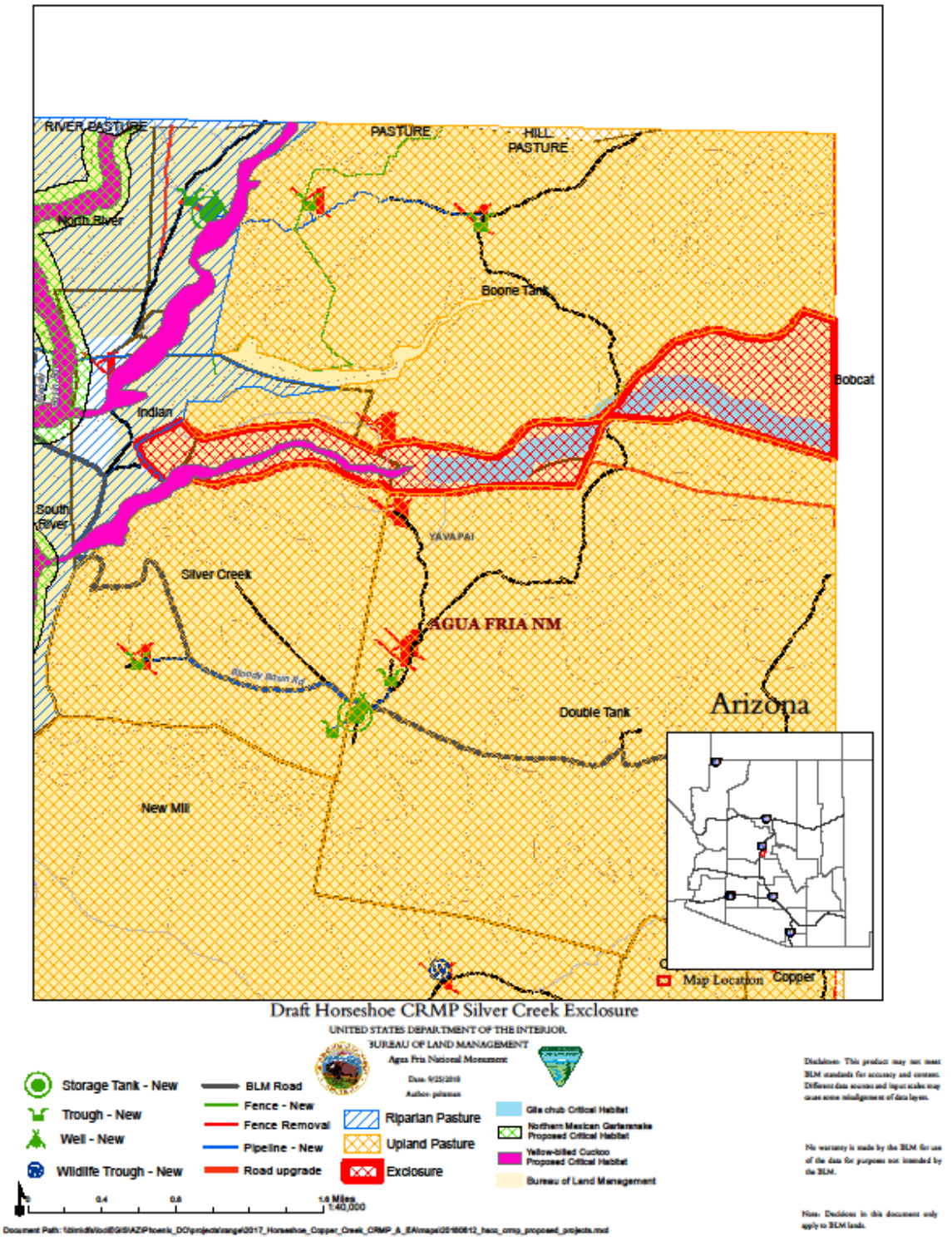
Map 2. Fire History of the Horseshoe Allotment between 2009 and 2017.



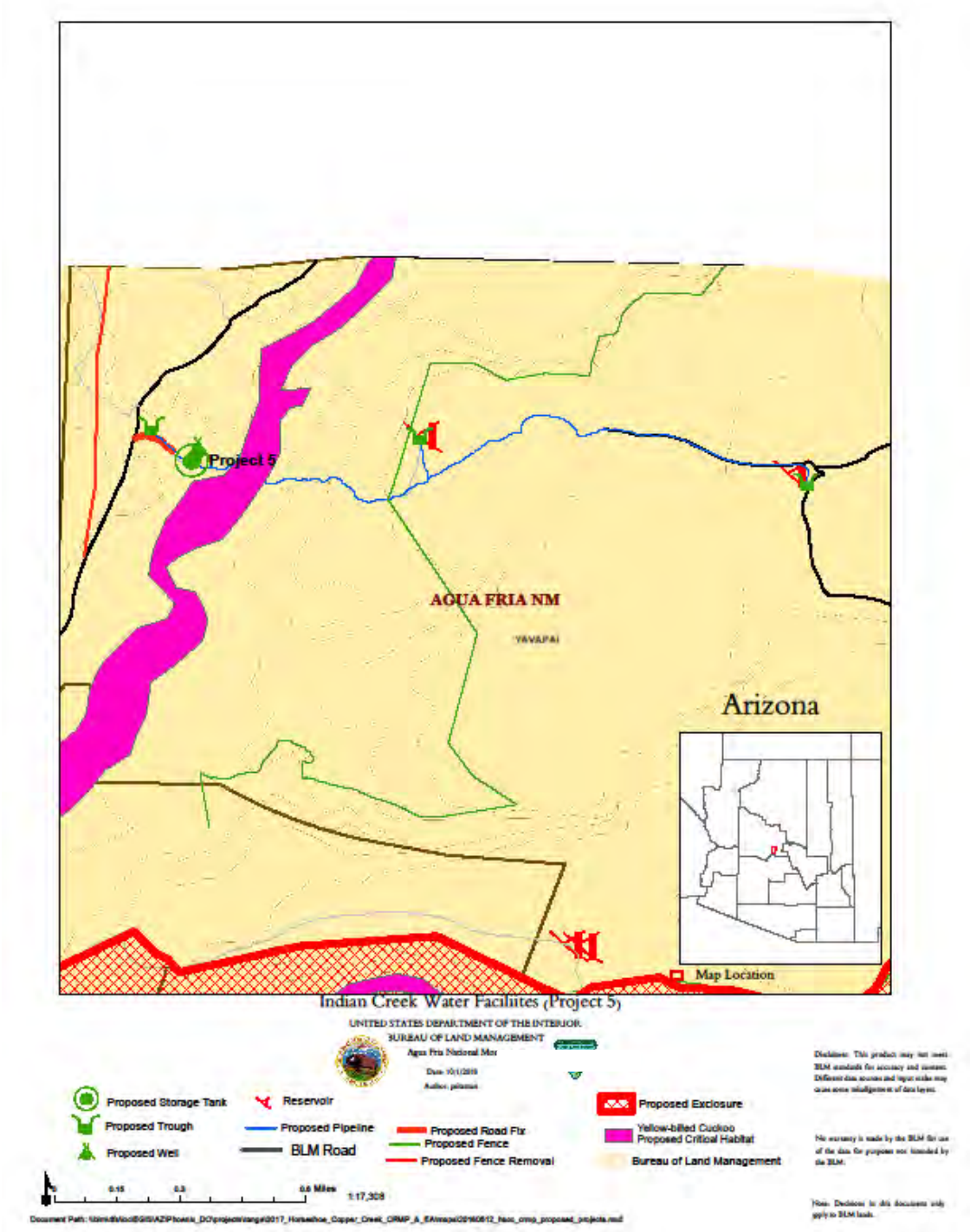
Map 3.Overview Map of upland and riparian pastures as well as the Silver Creek and Long Gulch exclosures.



Map 4. Map of the Silver Creek Exclosure, proposed yellow-billed cuckoo and Gila chub critical habitat.



Map 5. Map of Indian Creek Water Facilities (Project 5).



Map 6. Areal image of Gila chub critical habitat in red and allotment boundary. Note the topographic isolation of the Gila chub critical habitat.

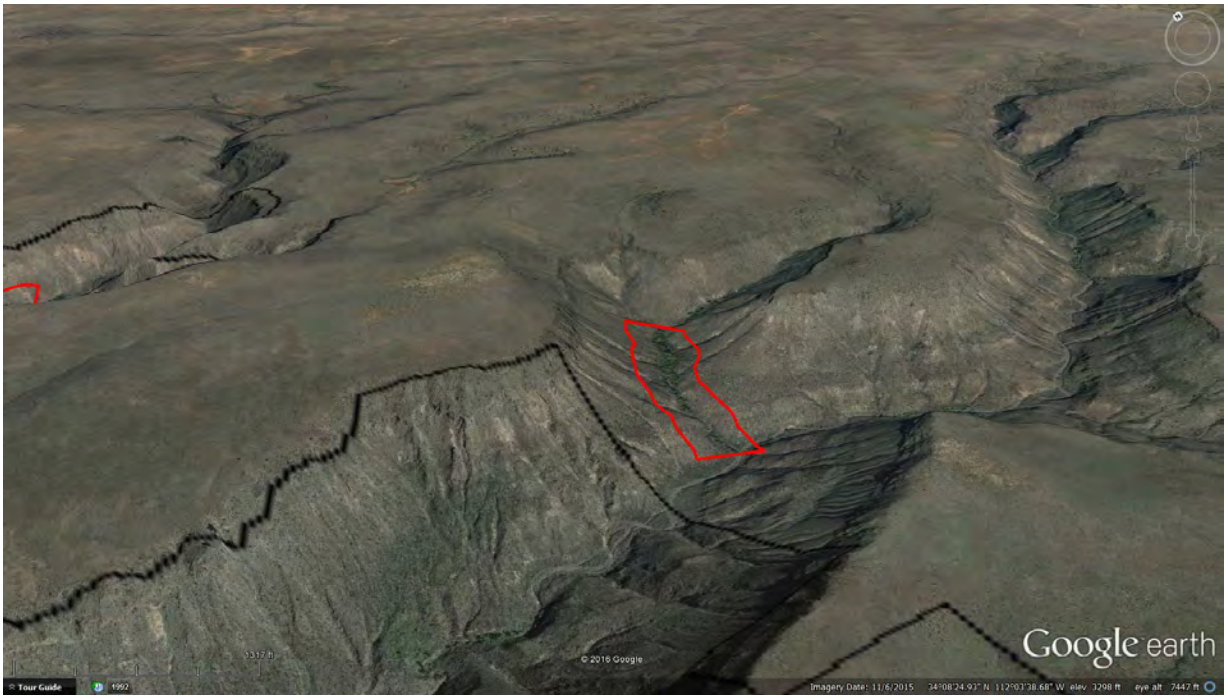


Photo 1. Image of proposed the downstream end of the Silver Creek exclosure. Note the isolated patches of Sycamore trees.

Photo 2. Image of the water gap crossing site on Silver Creek at the 9023A road. Note the absence of riparian obligate trees and bedrock in the stream channel.