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Bureau of Land Management

Safford Field Office

Safford, AZ

Final

Land Health Evaluation Report

Mud Springs Allotment

(No. 06252)

August 2018

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List of Acronyms

ADOT	Arizona Department of Transportation
ADWR	Arizona Department of Watershed Resources
AGFD	Arizona Game and Fish Department
AUM	Animal unit month
BLM	Bureau of Land Management
CFR	Code of Federal Regulations
MS-1	Key area on the Mud Springs Allotment
DPC	Desired plant community
EIS	Environmental impact statement
ESD	Ecological Site Description
F.	Degrees Fahrenheit
FEIS	Final Environmental Impact Statement
GPS	Global positioning system
HCPC	Historic climax plant communities
HUC	Hydrologic unit code
ID team	Interdisciplinary team
IPaC	Information for Planning and Conservation system
LHE	Land health evaluation
LPI	Line-point intercept
MLRA	Major Land Resource Area
NAD	North American Datum
NRCS	National Resources Conservation Service
p.z.	Precipitation zone
PRISM	Parameter-elevation Relationships on Independent Slopes Model
RHA	Rangeland health assessment
RMP	Resource Management Plan
Spp.	Multiple species of the same genus
TEAMS	[USFS] Talent, Expertise, Agility, Mobility, and Simplicity Enterprise Unit
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
UTM	Universal Transverse Mercator

1. Introduction

The purpose of this land health evaluation (LHE) report is to determine whether the Arizona standards for rangeland health are being achieved on the Mud Springs Allotment No. 06252, or, if the standards are not being achieved, to determine if livestock are the causal factor for not achieving or making significant progress towards achieving land health standards. This evaluation is not a decision document, but a stand-alone report that clearly records the analysis and interpretation of the available inventory and monitoring data.

The Secretary of the Interior approved the Bureau of Land Management (BLM) Arizona Standards for Rangeland Health and Guidelines for Grazing Administration (Arizona Standards and Guidelines) in April 1997. Signed by the Arizona BLM State Director, the Arizona Standards and Guidelines provide for full implementation of the standards and guidelines in Arizona BLM-administered land use plans (LUP). Standards and guidelines are implemented by the BLM portions of activity plans (including Allotment Management Plans) and through range improvement-related activities.

Land health standards are measurable and attainable goals for the desired condition of the biological resources and physical components/characteristics of desert ecosystems found within the allotment.

The LHE Report ascertains:

1. If standards are being achieved, not achieved, and if significant progress is being made towards achievement of the land health.
2. Whether livestock grazing is a significant causal factor where it is determined that land health standards are not being achieved.

This report covers an evaluation period of ten years (2007-2016). This is a standard evaluation period that provides the BLM the ability to collect an adequate amount of information related to grazing use and environmental factors pertaining to the lease renewal process.

1.1 Consultation, Cooperation, and Coordination

A letter to interested publics informing that the Mud Springs Allotment was being considered for lease renewal was distributed via certified mail January 31, 2017. Coordination with the Mud Springs Allotment lessee has been on-going. Data on special status species was obtained from the U.S. Fish and Wildlife Service (USFWS) and the Arizona Game and Fish Department (AGFD).

1.2 Definition of Arizona Standards for Rangeland Health and Guidelines for Grazing Administration

The Arizona standards for rangeland health are expressions of levels of physical and biological condition or degree of function required for healthy, sustainable rangelands and defines minimum resource conditions that must be achieved and maintained. Determination of rangeland health is based upon conformance with these standards.

Guidelines for grazing administration consider the type and level of grazing use. Guidelines for grazing management are types of methods and practices determined to be appropriate to ensure

the standards can be met, or that significant progress can be made toward meeting the standard. Guidelines are tools that help managers and lessees achieve standards.

Although the process of developing standards and guidelines applies to grazing administration, present rangeland health is the result of the interaction of many factors in addition to grazing livestock. Other contributing factors may include, but are not limited to: past land uses, land use restrictions, recreation, wildlife, rights-of-way, wild horses and burros, mining, fire, weather, and insects and disease (Arizona Standards and Guidelines, 1997).

The Arizona Standards and Guidelines identify three standards regarding (1) upland sites, (2) riparian-wetland sites, and (3) desired resource conditions based on specific indicators, as discussed in *Section 6 Rangeland Inventory and Monitoring Methodology* of this document.

2. Allotment Profile and General Description

2.1 Location

The Mud Springs Allotment (No. 06252) is located in Apache County, Arizona. It is approximately 15 miles southwest of the town of St. Johns, and near the divergence of SR-61 and US-60. The northern boundary of the allotment borders a mixture of Arizona State Trust land and private property. The southern boundary of the allotment is bordered by the Wildcat Creek Allotment with the eastern boundary bordering Wiregrass Lake and Big Hollow Wash BLM Allotments and the western boundary bordering Cerro Hueco BLM Allotment (Figure 1).

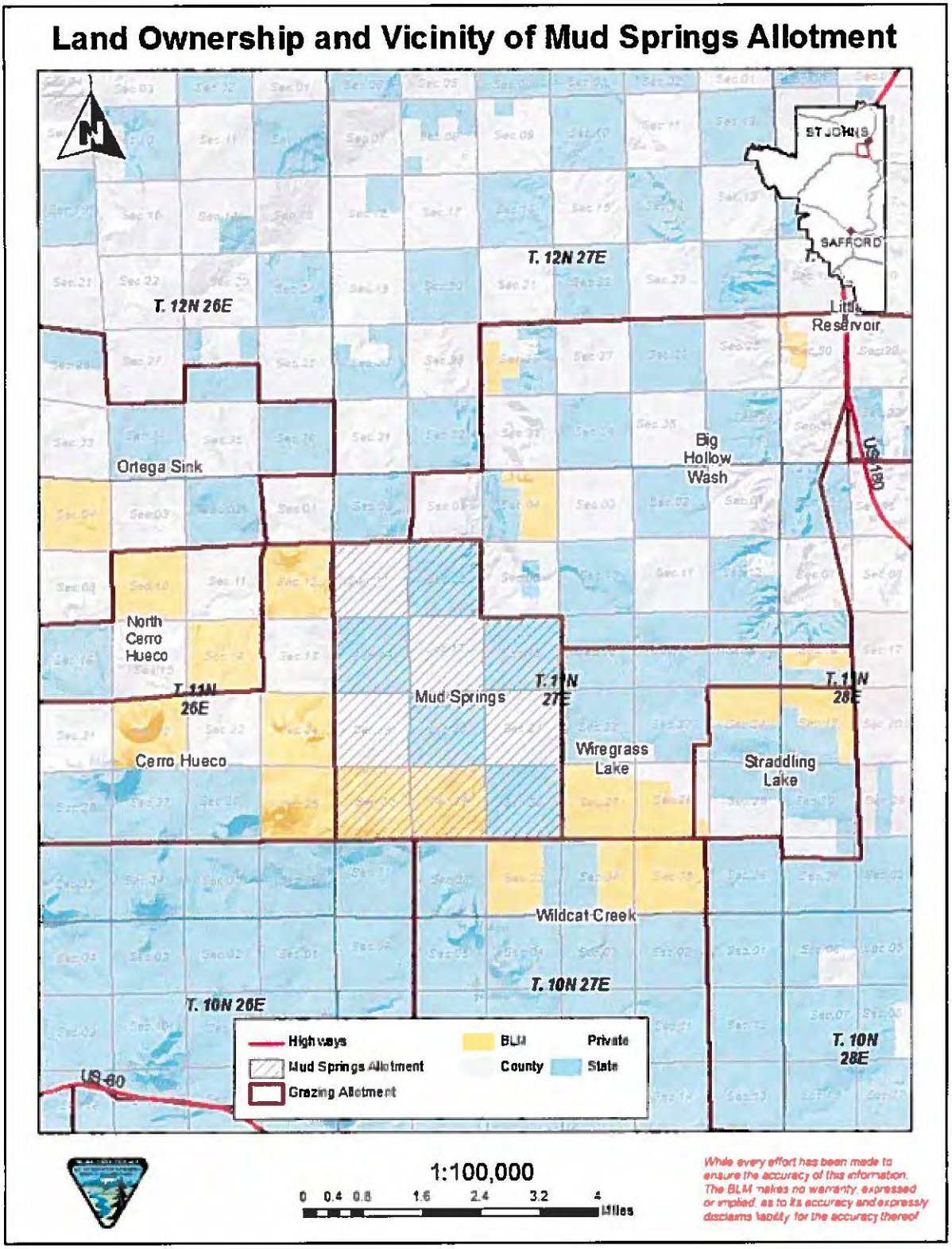

Figure 1. Land Ownership and Vicinity of Mud Springs Allotment
Source: USDI-BLM 2017, ADOT 2016

2.2 Physical Description

This section describes physical characteristics within the Mud Springs Allotment.

2.2.1 Surface Land Ownership

The Mud Springs Allotment is comprised predominately of private property and Arizona State Trust lands. The BLM-administered portion of the allotment is 1,294 acres, or approximately 18 percent of the allotment. Land ownership apportionments are displayed in Table 1.

Table 1. Mud Springs Allotment Landownership

Land Classification	Acres
Public Acres	1,294
State Acres	3,301
Private Land Acres	2,668
Total Acres	**7,263**

Source: BLM GIS data set

2.2.2 Precipitation

Average annual precipitation for the majority of Mud Springs Allotment ranges from 10-14 inches, with higher elevations receiving 14-18 inches. The average annual rainfall on the allotment between 2007 and 2016 is 11.71 inches (Figure 2). During the evaluation period, 2009 received the least amount of precipitation with 8.72 inches while 2015 received the greatest amount measuring 15.15 inches. Approximately 50% of precipitation falls during July and September and is the most effective, dependable moisture. The remainder falls between November and February as snow or light rain. Long periods of little or no effective moisture are common (NRCS, 2007).

Precipitation data from PRISM climate datasets (PRISM, 2017) were utilized by selecting a point within the Mud Springs Allotment as follows:

- Latitude: 34.3170
- Longitude: -109.5185
- Elevation of 6,529 feet

Climatic data from this source are not collected from a single station, but are modeled using data collected from many stations and physiographic factors in the area.

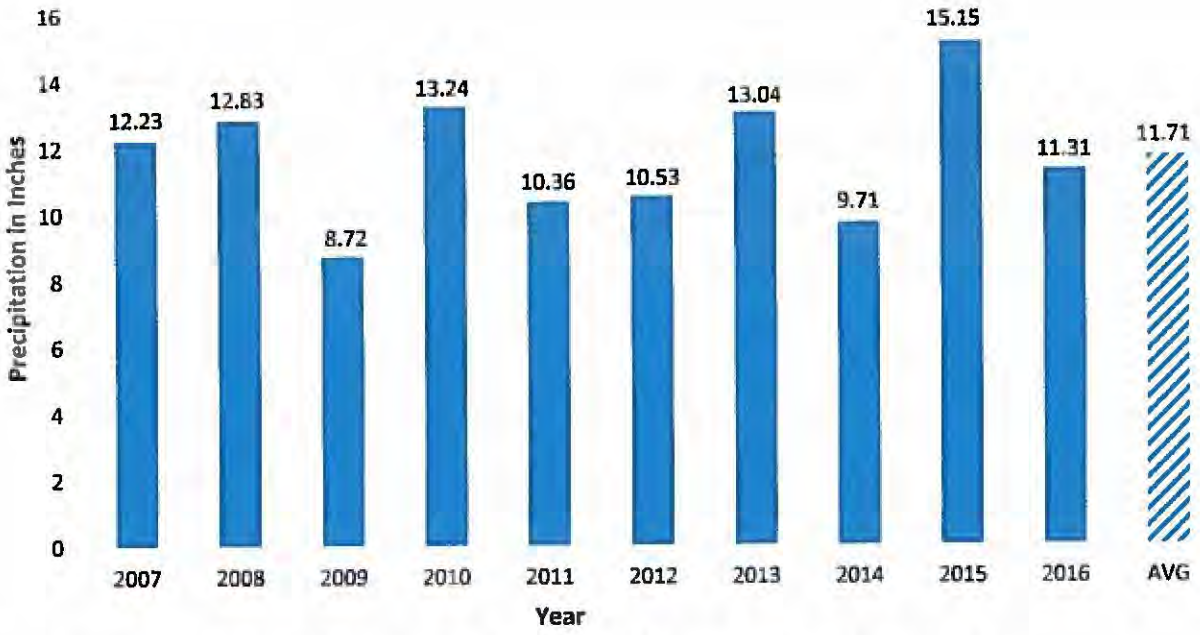

Figure 2. Average Annual Precipitation from PRISM Time Series Data 2007-2016
Source: PRISM, 2017

2.2.3 Temperature

The following table (Table 2) shows the average minimum, maximum, and overall temperature reported each month on the Mud Springs Allotment between 2007 and 2016. Average temperature for the hottest month (July) is 71 degrees Fahrenheit (F), and for the coldest month (January) is 33 degrees F. Extreme temperatures of 100 degrees F and -30 degrees F have been recorded (NRCS, 2007).

Table 2. Temperature in Degrees Fahrenheit on Mud Springs Allotment

Month	Average Minimum	Average Maximum	Average
January	18	47	33
February	22	52	37
March	28	60	44
April	33	66	50
May	40	73	57
June	50	86	68
July	57	85	71
August	56	83	69
September	49	78	64
October	37	70	53
November	27	58	43
December	21	47	34
Average Annual			52

Source: PRISM, 2017. Averaged 2007-2016.

2.2.4 Soils

The soil composition on the Mud Springs Allotment varies, as presented in Table 3 and Figure 3. Only two soil complexes are on BLM-administered land within the allotment (Table 3). They include Rudd complex, 0 to 8 percent slopes Thunderbird cobbly clay loam, 0 to 15 percent slopes.

Table 3. Soil Composition within the Mud Springs Allotment

Soil Map Unit Name	Allotment Acres	BLM Acres	BLM Composition
Hereford loam, 0 to 8 percent slopes	609.6	0	0%
Rudd complex, 0 to 8 percent slopes	5164.9	643.9	49.8%
Stony rock land	37.7	0	0%
Thunderbird cobbly clay loam, 0 to 15 percent slopes	1450.8	649.8	50.2%

Source: Natural Resource Conservation Service (NRCS, 2015)

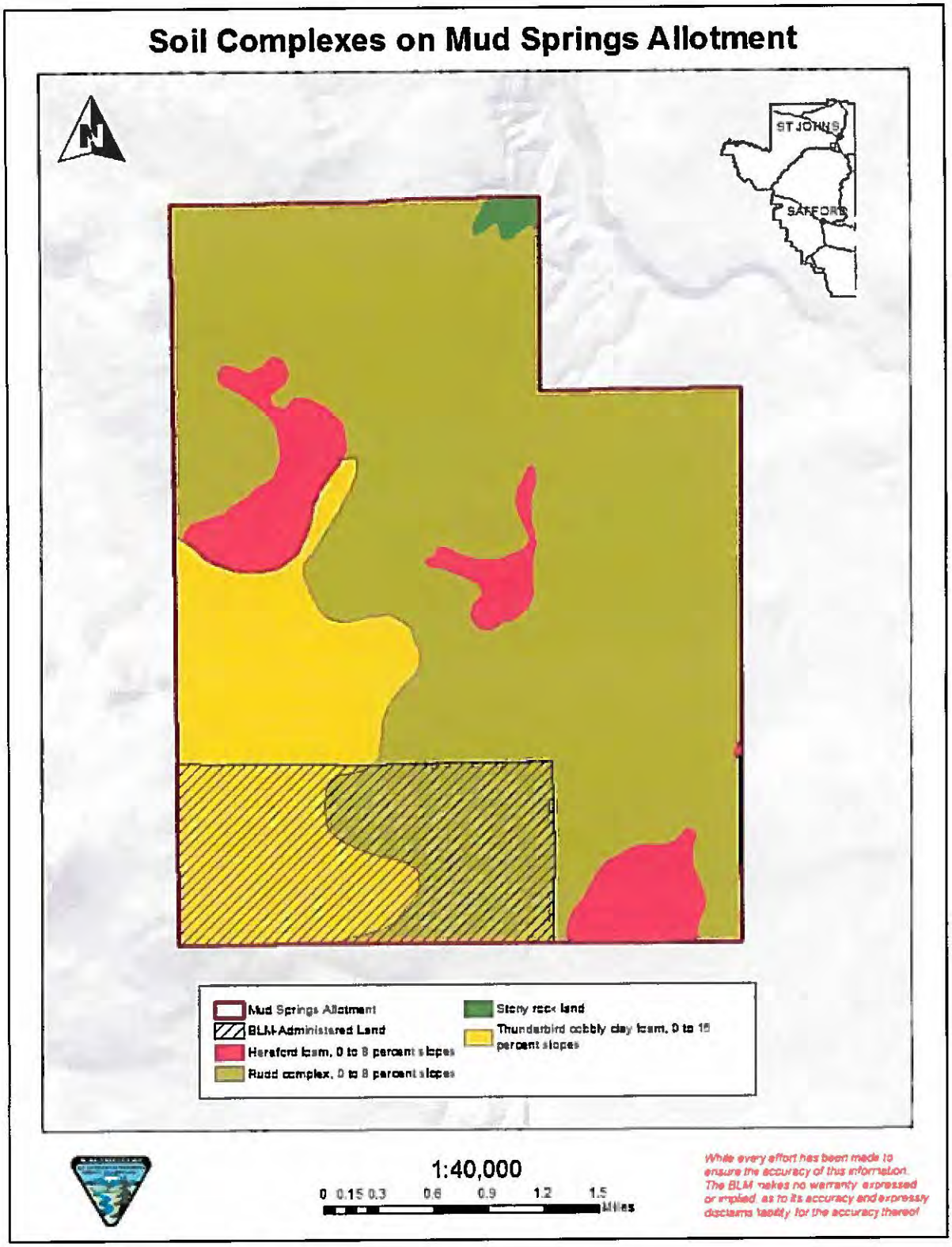

Figure 3. Soil Complexes on Mud Springs Allotment
Source: USDI-BLM 2017, USDA-NRCS 2015

Rudd complex, 0 to 8 percent slopes
Rudd soils are on basalt mesas and lava flows and have slopes of 0 to 45 percent. These soils formed in alluvium from basalt and closely related materials. Elevations range from 5,200 to 7,600 feet. The mean annual precipitation is 10 to 14 inches. The mean annual air temperature is 45 to 55 degrees F. The frost-free period is 120 to 160 days. This soil is well drained; has medium runoff; and moderate permeability. Typical use includes livestock grazing and wildlife habitat.

Thunderbird cobbly clay loam, 0 to 15 percent slopes
Thunderbird soils are on ridges, hills and basalt capped mesas and have slopes of 0 to 60 percent. These soils formed in alluvium from basalt and pyroclastics. Elevations range from 4,000 to 7,500 feet. The mean annual precipitation is 14 to 18 inches. The mean annual air temperature is 45 to 56 degrees F. The frost-free period is 120 to 180 days. This soil is well drained; has slow to medium runoff; and slow or very slow permeability. Typical uses include livestock grazing, wildlife habitat and fuelwood production.

2.2.5 Watersheds

The BLM managed portion of Mud Springs allotment lies entirely within the Big Hollow Wash watershed (HUC-10 1502000202). Big Hollow Wash, an intermittent tributary to the Little Colorado River, primarily drains Big Hollow Wash watershed. The Little Colorado River is an intermittent stream, with some reaches closer to its headwaters flowing perennially and is approximately 8 miles east of the eastern most BLM portion of the allotment. The Little Colorado River is one of two major tributaries in Arizona to the Colorado River and is the major drainage of the Little Colorado Basin (HUC-6 150200). The Little Colorado Basin has a drainage area of 26,000 square miles extending into New Mexico.

The allotment lies entirely within the "Little Colorado River Plateau" Arizona Department of Water Resources (ADWR) Groundwater Basin, and is not within an ADWR Active Management Area. The groundwater basin consists of the following aquifers: unconsolidated alluvium from streams, volcanic bedrock (Lakeside-Pinetop Aquifer), and consolidated sedimentary aquifers (Bidahochi, C, D, N, Springerville, and White Mountain Aquifers)(ADWR 2009).

The nearest surface waters to the allotment are ephemeral washes, primarily having peak flows from rainfall and snowmelt. The allotment has one ephemeral wash through the northwestern section of the BLM portion that flows into Big Hollow Wash. All of BLM managed land on the allotment lies within a FEMA designated Zone D: undetermined, but possible flood hazard floodplain. Water quality is monitored and listed by Arizona Department of Environmental Quality (ADEQ) for EPA 303(d) waterbody impairments under the federal Clean Water Act, and there are no impaired waters on the allotment.

2.2.6 Range Improvements

The Mud Springs Allotment consists primarily of private and State Trust land. Only range improvements on BLM-administered land are considered for this evaluation.

There are no water developments on BLM land in the allotment. There are 6.75 miles of fencing on or bordering BLM land on the allotment. This fencing is important for the operation of the allotment as a whole, as it facilitates livestock management and acts as the allotment boundary

fence, keeping livestock confined within their designated allotment. Location of the BLM portions of these boundary fences can be seen in Figure 4.

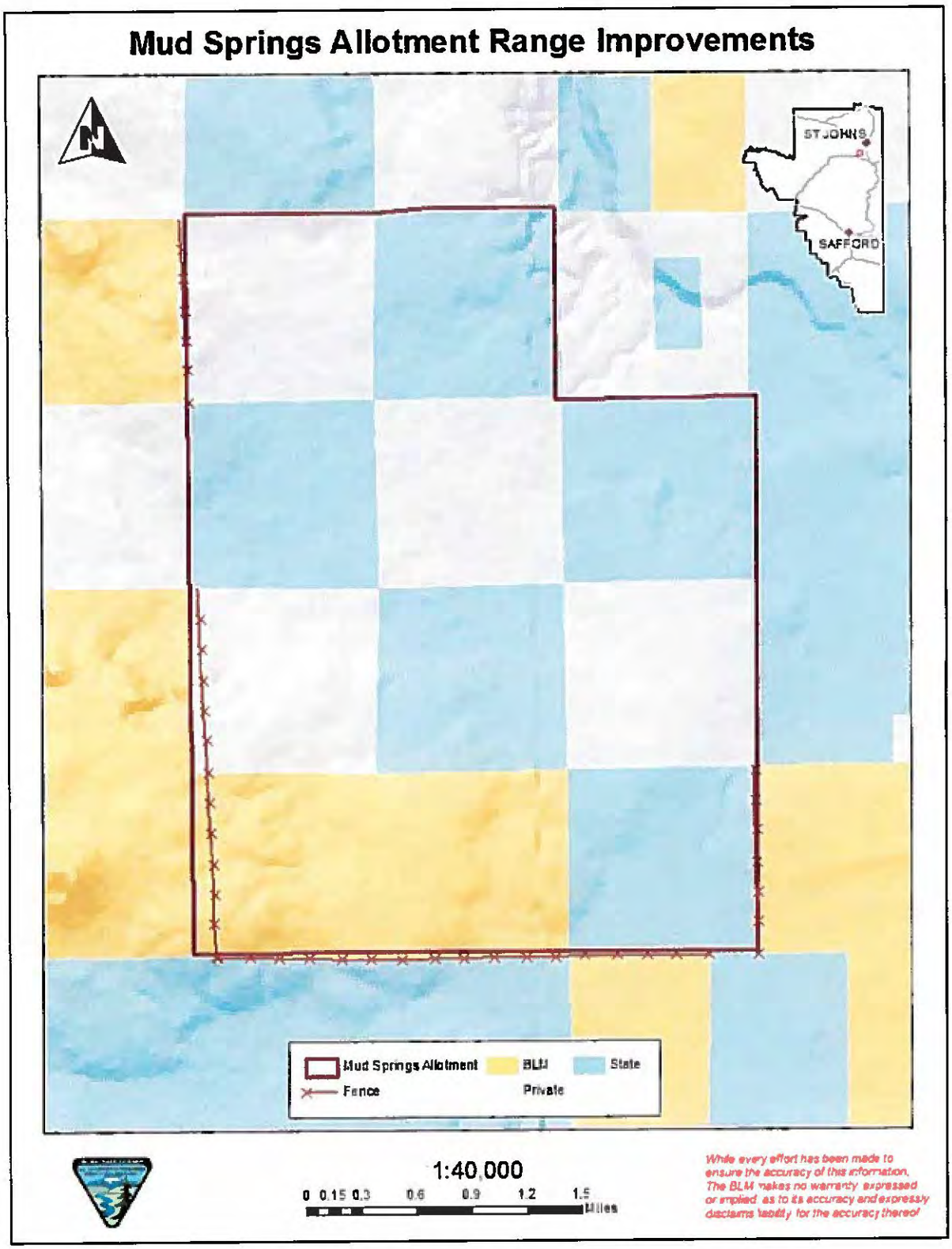

Figure 4. Range Improvements on Mud Springs Allotment BLM-Administered Land
Source: USDI-BLM 2017

2.3 Biological Resources

This section discusses the biological resources within the Mud Springs Allotment.

2.3.1 Major Land Resource Area

A Major Land Resource Area (MLRA) is a broad geographic area characterized by a particular pattern of soils, climate, water resources, vegetation, and land use. Each MLRA in which rangeland and forestland occur is divided into sub-resource areas, and further divided into ecological sites. The Mud Springs Allotment is located in the Colorado Plateau MLRA (35) and lies within the Mixed Grass Plains (35-1) sub-resource area.

2.3.2 Ecological Sites within the Mud Springs Allotment

Ecological sites provide a consistent framework for classifying and describing rangeland soils and vegetation thereby delineating land units that share similar capabilities to respond to management activities or disturbance. Ecological Site Descriptions (ESD) are developed by the National Resources Conservation Service (NRCS) and partners to document the properties of ecological sites. These include climate, soil, geomorphology, hydrology, and vegetation information that describe the behavior of individual ecological sites. Since an ecological site might feature several plant communities that occur over time or in response to land management, these descriptions can be used to interpret ecological changes (Perez, 2017).

Table 4 and Figure 5, below, provide a summary of the ecological sites present within the Mud Springs Allotment. The ESDs on BLM-administered portions of the allotment are also summarized. Detailed NRCS ESD reports for each ESD are stored and accessed within the Ecological Site Information System available online at https://esis.sc.egov.usda.gov. Not all ESDs have been fully evaluated; in such cases, the information that is currently available was used.

A key attribute of an ecological site is the historic climax plant community (HCPC), or reference state. The HCPC represents the natural potential plant community found on relatively undisturbed sites. The HCPC or reference state is often compared with existing range condition to determine current land health. Soils, topography, and climate are the factors that collectively form the basis for the classification of rangeland ecological sites.

Table 4. Ecological Site Composition on Mud Springs Allotment

Ecological Site	ESD ID	Allotment Acres	BLM Acres	BLM Composition
Breaks 10-14" p.z.	R035XA101AZ	37.7	0	0%
Clay Loam Upland 14-18" p.z.	R035XG707AZ	1450.8	649.8	50.2%
Loamy Upland 10-14" p.z.	R035XA113AZ	609.6	0	0%
Shallow Loamy 10-14" p.z.	R035XA119AZ	5,164.9	643.9	49.8%

Source: Natural Resource Conservation Service (NRCS, 2015)

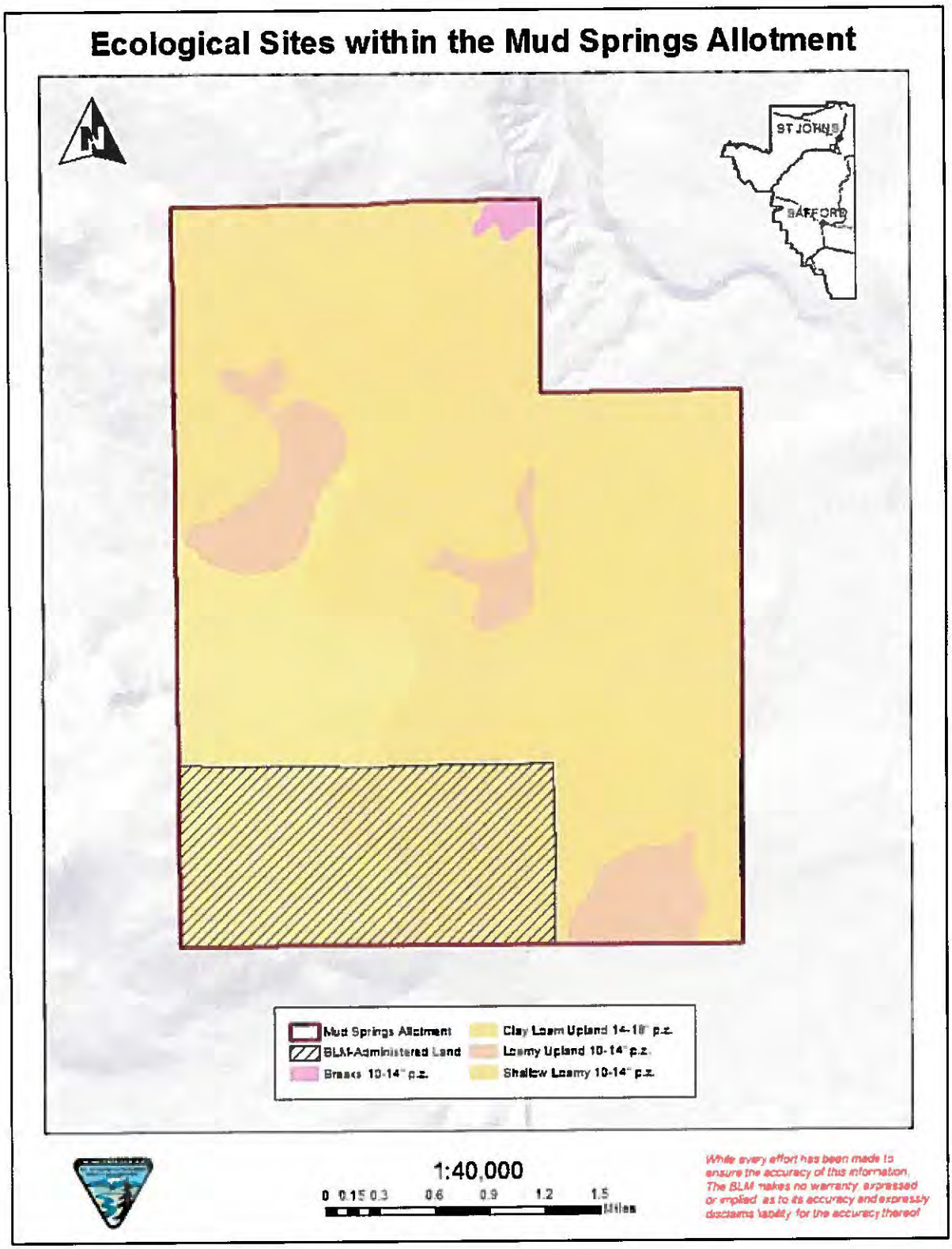

Figure 5. Ecological Sites within Mud Springs Allotment
Source: USDI-BLM 2017, USDA-NRCS 2015

Clay Loam Upland 14-18" p.z. (R035XG707AZ)

This ecological site occurs in Common Resource Area 35.1 - the Colorado Plateau Mixed Grass Plains. This site occurs in an upland position on gently sloping to steep mesas and hills, cinder cones, and plains. Elevations range from 5,500 to 7,000 feet and precipitation averages 14 to 18 inches per year. About 50 percent falls during July - September and is the most effective, dependable moisture. Soils are moderately deep to deep.

The HCPC on this range site has a mixed plant community made up of junipers and pinyon pine and an understory of mid and short grasses, shrubs and a relatively small percentage of forbs. In the HCPC, there was a mixture of both cool and warm season grasses.

Grass/grasslike species common in this Clay Loam Upland site include western wheatgrass (*Pascopyrum smithii*), needle and thread (*Hesperostipa comata*), squirreltail (*Elymus elymoides*), littleseed ricegrass (*Piptatherum micranthum*), Muttongrass (*Poa fendleriana*), prairie Junegrass (*Koeleria macrantha*), sideoats grama (*Bouteloua curtipendula*), black grama (*Bouteloua eriopoda*), spike muhly (*Muhlenbergia wrightii*), common wolfstail (*Lycurus phleoides*), blue grama (*Bouteloua gracilis*), Aristida, ring muhly (*Muhlenbergia torreyi*), and galleta (*Pleuraphis jamesii*). Forb species common to the site include Eriogonum, and Sphaeralcea species. Shrub/vine species include Winterfat (*Krascheninnikovia lanata*), Ephedra, fourwing saltbush (*Atriplex canescens*), Mexican cliffrose (*Purshia mexicana*), woolly groundsel (*Packera cana*), rubber rabbitbrush (*Ericameria nauseosa*),Greene rabbitbrush (*Chrysothamnus greenei*), narrowleaf yucca (*Yucca angustissima*), broom snakeweed (*Gutierrezia sarothrae*), gray horsebrush (*Tetradymia canescens*), Opuntia, Fremont barberry (*Mahonia fremontii*), skunkbush sumac (*Rhus trilobata*), and Utah juniper (*Juniperus osteosperma*). Common tree species include oneseed juniper (*Juniperus monosperma*). Other common shrub/vine species include alligator juniper (*Juniperus deppeana*) and Colorado pinyon (*Pinus edulis*).

Shallow Loamy 10-14" p.z. (R035XA119AZ)

This ecological site occurs in Common Resource Area 35.1 - the Colorado Plateau Mixed Grass Plains. Elevations range from 4,800 to 6,300 feet and precipitation averages 10 to 14 inches per year. 50 to 60 percent of moisture falls as rain July - September and is the most effective moisture for plant growth. This site occurs in an upland position on structural benches, mesas and ridges. Slopes generally range from 0 to 15 percent with occasional steeper slopes. Soils in this site are very shallow and shallow.

This HCPC is made up primarily of mid and short grasses, shrubs and a relatively small percentage of forbs and a scattered overstory of junipers. There is a mixture of both cool and warm season grasses.

Dominant grasses common to this Shallow Loamy site include sideoats grama (*Bouteloua curtipendula*), black grama (*Bouteloua eriopoda*), blue grama (*Bouteloua gracilis*), squirreltail (*Elymus elymoides*), needle and thread (*Hesperostipa comata*), New Mexico feathergrass (*Hesperostipa neomexicana*), and galleta (*Pleuraphis jamesii*). Forbs may include sego lily (*Calochortus nuttallii*), whitemargin spurge (*Chamaesyce albomarginata*), rose heath (*Chaetopappa ericoides*), Eriogonum, whitestem stickleaf (*Mentzelia albicaulis*), notchleaf scorpionweed (*Phacelia crenulata*), common purslane (*Portulaca oleracea*), and Sphaeralcea species. Dominant shrubs include fernbush (*Chamaebatiaria millefolium*), Rabbitbrush (*Chrysothamnus spp.*), Whipple cholla (*Cylindropuntia whipplei*), Apache plume (*Fallugia*

paradoxa), broom snakeweed (*Gutierrezia sarothrae*), Fremont barberry (*Mahonia fremontii*), Opuntia, woolly groundsel (*Packera cana*), Mexican cliffrose (*Purshia Mexicana*), and gray horsebrush (*Tetradymia canescens*). Trees include oneseed juniper (*Juniperus monosperma*), Utah juniper (*Juniperus osteosperma*), and Colorado pinyon (*Pinus edulis*).

2.3.3 Wildlife Resources

This section discusses the wildlife resources in and around the Mud Springs Allotment, including threatened and endangered species, other special status species, and game species. Refer to Appendix A for a list of species.

Threatened & Endangered Species

The grazing program for the BLM Gila District, including grazing activities within the Mud Springs Allotment, was assessed pursuant to Section 7 of the Endangered Species Act to determine whether the program would jeopardize the continued existence of an endangered or threatened species and/or their designated or proposed critical habitat. The U.S. Fish and Wildlife Service rendered Biological Opinion (BO) on the Gila District Livestock Grazing Program #22410-2006-F-0414 (2012). Additionally, a query conducted on June 1, 2018, of the USFWS Information for Planning and Conservation (IPaC; USDI 2016) website identified seven species listed as threatened, endangered, or proposed species for consideration within the allotment.

The IPaC query indicated the gray wolf as being potentially present within the allotment; however, "Mexican wolf" is the correct common name of *Canis lupus baileyi* and will be referred to as Mexican wolf in this document.

Due to a general lack of forested habitat, Mexican spotted owl and Mexican wolf are expected to be absent on the allotment. The allotment lacks suitable forested habitat to support Mexican wolves, but is located within a Mexican wolf experimental population area and may be used by wolves for movement between blocks of suitable habitat.

Due to a general lack of perennial water and riparian habitat, Chiricahua leopard frog, yellow-billed cuckoo, Zuni bluehead sucker, Little Colorado spinedace, and northern Mexican gartersnake are expected to be absent from the allotment.

Yellow-billed cuckoo are a riparian obligate species that utilize cottonwood gallery forests, and may use upland areas for foraging. The allotment does not contain the primary riparian habitat; however, yellow-billed cuckoos may utilize the upland areas temporarily, or may be found on this allotment during times of migration.

Other Special Status Species

The BLM sensitive species that have suitable habitat present and are known to exist or have the potential to exist within this allotment are the northern leopard frog (low potential), bald eagle (wintering only), ferruginous hawk, golden eagle, pinyon jay, Allen's lappet-browed bat, Arizona myotis, spotted bat, Townsend's big-eared bat, and succineid snails.

A total of eleven USFWS Birds of Conservation Concern (USDI, 2008) not already addressed as BLM sensitive species have the potential to occur within the allotment (Appendix A). The

allotment offers an array of habitats for migratory birds, providing valuable food and cover. Migratory species of concern that have the highest potential to occur on the allotment include Bendire's thrasher, and gray vireo. No surveys have been conducted specifically within this allotment for this assessment to determine presence but these species have the potential of occurring if habitat is available.

Bird species utilize the grassland, open shrub, and rocky outcrop habitat for hunting prey. Bat species may occur on the allotment if roosting habitat is available. Generally, the composition, structure, and distribution of habitat for both classifications of sensitive species are intact and would be suitable for use if the species were present.

Game Species

Game species within the Mud Springs Allotment include pronghorn, elk, Merriam's turkey, mule deer, mountain lion, black bear, and a variety of small game species. Mountain lion and black bear occur in limited numbers or only occasionally on the allotment as resources meet their needs. Grasslands with dispersed shrub thickets offer forage and cover habitat for mule deer and pronghorn. Elk and Merriam's turkey prefer forested habitat with open grassland meadows and dispersed water. Livestock water allows game species to occupy habitat that would otherwise only be available ephemerally as precipitation allowed.

2.4 Special Management Areas

There are no special management areas within the Mud Springs Allotment.

2.5 Recreation Resources

There are no developed recreation sites within the allotment. Dispersed recreation primarily involves small and big game hunting, target shooting, hiking, and off-highway vehicle operation.

2.6 Cultural Resources

Guidelines 3-7 in the Arizona Standards and Guidelines provides that, *"Management practices to achieve desired plant communities will consider protection and conservation of known cultural resources, including historical sites, and prehistoric sites and plants of significance to Native American peoples."*

A Class I cultural resources library records check was conducted April 11, 2017, by Safford Field Office Archaeologist Daniel L. McGrew. This library records search noted that there are no known archaeological sites, properties of traditional religious or cultural importance (i.e., traditional cultural properties), or sacred sites.

3. Grazing Management

This section discusses the grazing history, permitted use, and terms and conditions on the current lease for the Mud Springs Allotment.

3.1 Grazing History

The BLM grazing lease for the Mud Springs Allotment allows for 17 cattle year-round for a total of 204 animal unit months (AUM) on BLM-administered land within the allotment. No changes have been made to the permitted AUM use on the allotment during the evaluation period.

Grazing management on the Mud Springs Allotment consists of grazing on private land, State Trust land, and BLM-administered land. For allotments such as Mud Springs, livestock grazing is authorized by the BLM under Section 15 of the Taylor Grazing Act. The carrying capacity for the whole allotment is not set by the BLM; instead, the lessee is billed for the available forage utilized on public lands only.

3.2 Terms and Conditions for Permitted Use

Grazing use on the Mud Springs Allotment is in accordance with the terms and conditions of the current term lease. Table 5, below, provides a summary of the current permitted use for the allotment.

Table 5. Mandatory Terms and Conditions of the Mud Springs Allotment Lease

Allotment Name/ Number	Livestock Number/Kind	Grazing Period Begin End	% Public Land	Active Use (AUM)
Mud Springs (No. 06252)	17 Cattle	3/1 - 2/28 Yearlong	100	204

Source: BLM, Rangeland Administration System

Existing Other Terms and Conditions

1. In order to improve livestock distribution on the public lands, all salt blocks and /or mineral supplements will not be placed within a ¼ mile of any riparian area, wetland meadow, or watering facility (either permanent or temporary) unless stipulated through a written agreement or decision in accordance with 43 CFR 4130.3-2(c).
2. If in connection with operations under this authorization, any human remains, funerary objects, sacred 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/lessee 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/lessee shall continue to protect the immediate area of the discovery until notified by the Program Manager that operations may resume.
3. In accordance with 43 CFR 4130.8-1(F): Failure to pay grazing bills within 15 days of the due date specified in the bill shall result in a late fee assessment of $25.00 or 10 percent of the grazing bill, whichever is greater, but not to exceed $250.00. Payment made later than 15 days after the due date, shall include the appropriate late fee assessment. Failure to make payment within 30 days may be a violation of 43 CFR Secs. 4150.1 and 4160.1-2.

4. Objectives

This section provides an overview of the Safford Field Office management objectives that are associated with the Mud Springs Allotment per the Phoenix Resource Management Plan (RMP)(BLM, 1989), as amended by the decision record for Arizona Standards and Guidelines. The Phoenix RMP incorporates by reference the decisions from the Eastern Arizona Grazing Final Environmental Impact Statement (FEIS) Record of Decision (1987).

4.1 Land Use Plan Management Objectives

- Grazing Management (GM-02): The grazing program in the area is managed under the provisions of the Taylor Grazing Act of 1934, FLPMA, and the Public Rangelands Improvement Act of 1978. [Phoenix] RMP page 14-15.
- GM-03: Management of rangeland resources is guided by the Range Program Summary Record of Decision (RPS/ROD) which selected the Preferred Alternative analyzed in the 1987 Arizona Grazing FEIS. [Phoenix] RMP page 15.
- Wildlife/Fisheries (WF-03): Wildlife and plants which are federally listed or proposed for listing as either threatened or endangered are protected under provisions of the Endangered Species Act of 1973, as amended. [Phoenix] RMP page 15.
- WF-04: It is BLM policy to avoid jeopardizing the continued existence of any listed or proposed species and to actively promote species recovery. [Phoenix] RMP page 15.
- WF-05: It is BLM policy to manage federal candidate species and their habitat to prevent the need for listing as threatened or endangered. [Phoenix] RMP page 15.

Further, the Phoenix RMP provides the following grazing management objectives: 1) to restore and improve rangeland condition and productivity, 2) to provide for use and development of rangeland, 3) to maintain and improve habitat and viable wildlife populations, 4) to control future management actions and 5) to promote sustained yield and multiple use.

4.2 Allotment-Specific Objectives

The Mud Springs Allotment is subject to the following objectives as established in the Arizona Standards for Rangeland Health:

4.2.1 Land Health Standards

Standard 1 - Upland Sites

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

Standard 2 - Riparian-Wetland Site

Objective: Riparian-wetland areas are in proper functioning condition.

Standard 3 - Desired Resource Conditions

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

4.2.2 Key Area Objectives

In grazing administration, a key area is defined as a relatively small portion of a range selected because of its location, use, or grazing value as a monitoring point for grazing use. Key areas are indicator areas that are able to reflect what is happening on a larger area as a result of on-the-ground management actions. A key area should be a representative sample of a large stratum, such as a pasture, grazing allotment, wildlife habitat area, herd management area, watershed area, etc. Objectives should be developed so that they are specific to the key area. Monitoring studies can then be designed to determine if these objectives are being met (USDI, 1996).

The key area for the Mud Springs Allotment was established in the Clay Loam Upland 14-18" p.z. (R035XG707AZ) ecological site. This location is approximately a mile from water, located on private land, which is expected to adequately represent livestock utilization for the whole allotment. This location was chosen because it is the dominant ESD within the BLM-administered land on the allotment and is representative of the allotment's vegetation composition, soils, and vegetative production. Therefore, assessments of the other ecological sites present on the Mud Springs Allotment have not been undertaken as doing so would not provide additional meaningful data to inform the land health evaluation.

Refer to Table 6 and Figure 6 for the location of the key area on the Mud Springs Allotment. Addressed in this LHE report are the results from the key area monitored by the U.S. Forest Service (USFS) TEAMS in 2016 (Appendix B).

The key area objective for the Mud Springs Allotment is to meet the land health standards as established in the Arizona Standards for Rangeland Health. Specific objectives are defined below to guide the determination of whether the land health standards are being met.

Table 6. Location of the Mud Springs Allotment Key Area

Key Area	Ecological Site	Ecological Site ID	GPS Coordinates (NAD83 CONUS)
MS-1	Clay Loam Upland 14-18" p.z.	R035XG707AZ	12S UTM 0636308 m E 3798254 m N

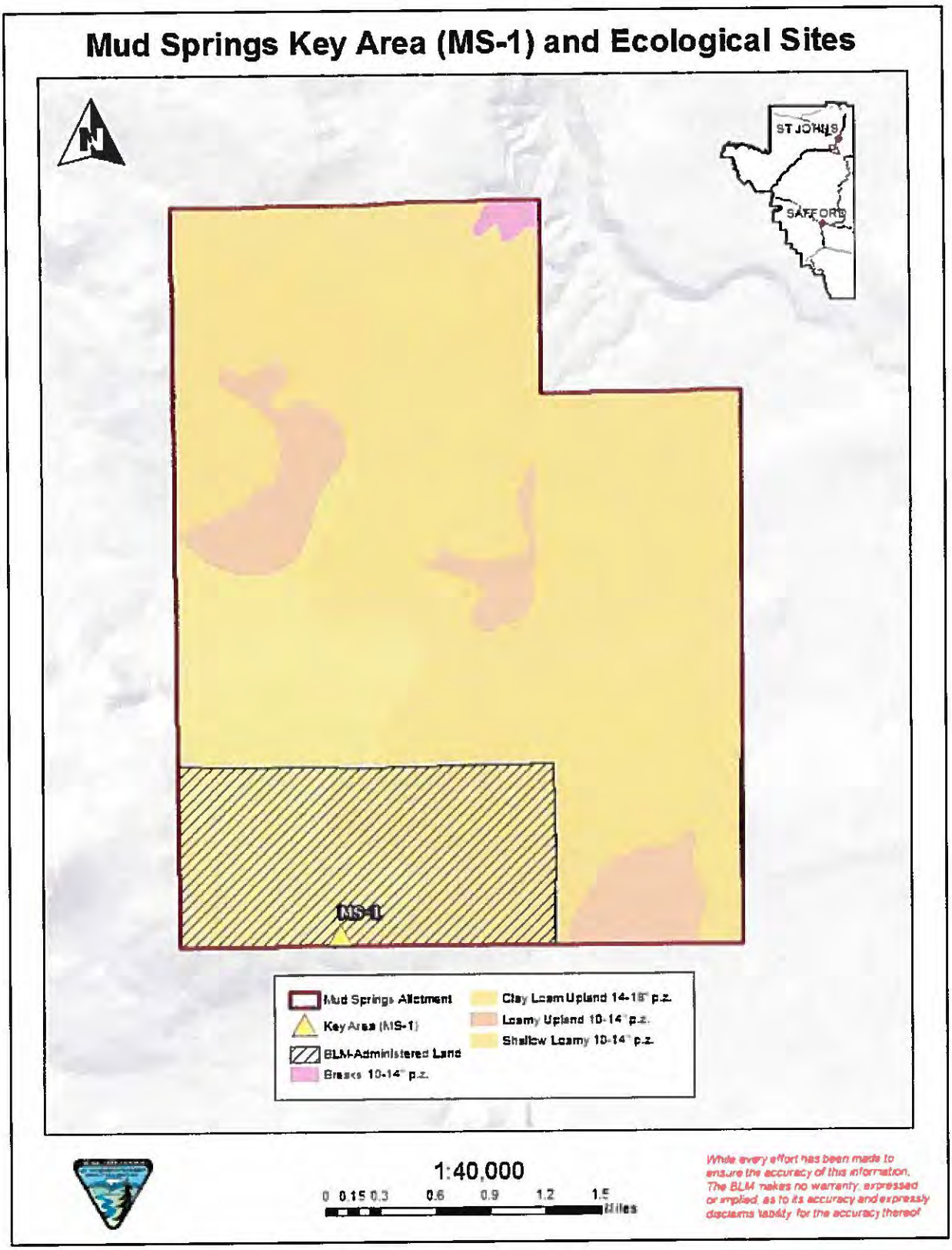

Figure 6. Ecological Sites within Mud Springs Allotment and Key Area
Source: USDI-BLM 2017, USDA-NRCS 2015, USDA-USFS TEAMS

Standard 1 - Upland Sites

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

Signs of accelerated erosion that are None to Slight or Slight to Moderate and are appropriate for this ecological site as indicated by ground cover (litter, rock, vegetative (canopy) cover, etc.) and signs of erosion. This objective applies to the key area and the corresponding ecological site. A departure of Moderate or greater would not be achieving the standard. A departure of None to Slight or Slight to Moderate is considered achieving the Standard.

Standard 2 - Riparian-Wetland Site

Objective: Riparian-wetland areas are in proper functioning condition.

Standard 2 is **not applicable** because no Riparian-Wetland sites exist within the Mud Springs Allotment.

Standard 3 - Desired Resource Conditions

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

Desired plant community (DPC) objectives are criteria established to evaluate a site's capability of achieving desired resource conditions. DPC objectives are typically specific to the ecological site within the allotment. However, the published ESD for Clay Loam Upland 14-18" p.z. (R035XG707AZ) lacks the necessary information (e.g., state and transition and accompanying narrative) at this time (NRCS, 2007). Therefore, the BLM interdisciplinary team established DPC objectives based on ESD reference sheets of similar and nearby ecological sites (proxies) as follows: Clay Loam Upland 10-14" p.z. (R035XA107AZ), Clay Loam Upland 13-17" p.z. (R035XF603AZ), and Clay Loam Upland 14-18" p.z. (R035XG707AZ) as applicable. These ecological sites were collectively analyzed based on their similar elevations, vegetative communities, soil complexes, water capacities, and run off potentials. Also, all three sites have moderate to high potential to produce cover based on available water capacities.

Desired resource conditions are based upon the following DPC objectives:

- Canopy/basal cover
- Plant community composition
- Bare ground
- Litter

Appendix C presents a detailed methodology for deriving the DPC objectives for the Clay Loam Upland 14-18" p.z. (R035XG707AZ) based upon the proxy ecological sites.

Canopy/Basal Cover

The ESD reference sheet for Clay Loam Upland 14-18" p.z. (R035XG707AZ) characterizes the site as exhibiting relatively uniform distribution of mostly grasses with some shrubs and a few forbs. Some areas may experience up to 25 percent tree canopy cover. Both canopy and basal cover values decrease during prolonged drought.

The proxy sites' reference sheets indicate a desired range of canopy cover as follows:

- 30-50 percent for Clay Loam Upland 10-14" p.z. (R035XA107AZ), with most cover being grass. Basal cover of plants range from 10-20 percent, most of which should be grass.
- 25-50 percent canopy cover for Clay Loam Upland 13-17" p.z. (R035XF603AZ). Basal cover averages 5-9 percent.

Therefore, the average for canopy cover for Clay Loam Upland 14-18" p.z. (R035XG707AZ is 39 percent, with an acceptable average range of 25-50 percent canopy cover. The average for basal cover is 11 percent, with an acceptable average range of 5-20 percent basal cover.

Plant Community Composition

The ESD reference sheet for Clay Loam Upland 14-18" p.z. (R035XG707AZ) characterized the site as relatively uniform distribution of mostly grasses with some shrubs and a few forbs, with the potential of up to 25 percent canopy cover of trees in some areas.

The additional similar reference sheets indicate a desired range of plant composition as follows:

- Clay Loam Upland 10-14" p.z. (R035XA107AZ) ESD states that the dominant aspect of the site is a grassland with scattered large and half shrubs followed by lesser amounts of forbs, succulents, and occasional trees.
- Clay Loam Upland 13-17" p.z. (R035XF603AZ) ESD states that the site is characterized by a relatively uniform distribution of mostly grasses and shrubs, with a few patches of trees in some areas (grasses>shrubs>forbs=trees). The Structure of Canopy Cover section of this ESD shows grasses at 10-15 percent, forbs at 0-1 percent, shrubs at 5-10 percent and trees at 0-1 percent in this site.

The Rangeland Wildlife book (Yoakum, 1996) and Pronghorn Management Guide 2006 (Autenrieth, 2006) establishes that grassland requirements for pronghorn include plant compositions of 50-80 percent grasses, 10-20 percent forbs, and less than five percent shrubs.

Therefore, the DPC objective for plant community composition is to maintain an average of 50-80 percent grasses, 0-20 percent forbs, 0-10 percent shrubs, and 0-25 percent trees. This plant community composition objective is considered adequate for providing cover and forage for wildlife and livestock.

Bare Ground

The ESD reference sheet for Clay Loam Upland 14-18" p.z. (R035XG707AZ) describes the site as having Moderate to High potential for the production of plant cover.

The proxy sites' reference sheets indicate a desired range of bare ground as follows:

- 30-50 percent Clay Loam Upland 10-14" p.z. (R035XA107AZ)
- 20-40 percent Clay Loam Upland 13-17" p.z. (R035XF603AZ)

Therefore, the resulting 35 percent bare ground average, with an acceptable range of 20-50 percent bare ground, is deemed sufficient for preventing accelerated erosion on the Clay Loam Upland 14-18" p.z. (R035XG707AZ) ecological site.

Litter Cover

The reference sheet for Clay Loam Upland 14-18" p.z. (R035XG707AZ) describes litter cover to be mostly herbaceous with some woody litter.

The proxy sites' reference sheets indicate a desired range of litter cover as follows:

- 20-40 percent for Clay Loam Upland 10-14" p.z. (R035XA107AZ), with litter being mostly herbaceous litter with some woody litter.
- 40-50 percent for Clay Loam Upland 13-17" p.z. (R035XF603AZ), with the majority (70-90 percent) being herbaceous litter and the remaining (10-30 percent) being woody litter.

Therefore, the resulting 38 percent litter cover average, with an acceptable range of 20-50 percent litter cover, is desired for Clay Loam Upland 14-18" p.z. (R035XG707AZ) ecological site.

Summary

In summary, the Mud Springs Allotment desired resource conditions, based on the Clay Loam Upland 14-18" p.z. (R035XG707AZ) ecological site, are presented as the following evaluation area DPC objectives:

- Maintain an average canopy cover of 25-50 percent, and an average basal cover between 5 and 20 percent.
- Maintain an average of 50-80 percent grasses, 0-20 percent forbs, 0-10 percent shrubs, and 0-25 percent trees.
- Maintain average bare ground between 20 and 50 percent.
- Maintain an average litter cover of 20-50 percent.

The recommended levels of canopy cover and basal cover will provide sufficient cover for wildlife species, such as antelope and small game, and will prevent accelerated erosion and provide site stabilization. In addition, maintaining the DPC objective for plant community composition for grasses, shrubs, forbs and trees will provide important nesting and escape cover for birds, as well as adequate forage for wildlife and livestock on the Mud Springs Allotment while continuing to achieve land health standards.

BLM-administered land is approximately 18 percent of the overall Mud Springs Allotment, which is intermingled in checkerboard fashion with state, private, and other land ownerships. As a Section 15 lease, there are limitations to the degree in which the BLM can control or influence plant community changes across the broader allotment. The DPC objectives established above are realistic in terms of what is possible to achieve within the BLM-administered portions of the allotment.

5. Plant List

Table 7 presents a list of plant species within the dominant ecological site, Clay Loam Upland 14-18" p.z. (R035XG707AZ), located within the Mud Springs Allotment. Specific plant species are generally an important component of a plant community as they serve as indicators of change and may or may not be forage species. This ecological site has the capability of producing a large array of species. However, this LHE focuses on plant species that provide forage and cover for wildlife species and livestock.

Table 7. Plant Species

Scientific Name	Common Name	Plant Symbol
Grasses		
Aristida spp.	Three awns	ARIST
Bouteloua curtipendula	Sideoats grama	BOCU
Bouteloua eriopoda	Black grama	BOER4
Bouteloua gracilis	Blue grama	BOGR2
Elymus elymoides subsp.	Squirreltail	ELELE
Hesperostipa comata	Needle and thread	HECOC8
Hesperostipa neomexicana	New Mexico feathergrass	HENE5
Koeleria macrantha	Prairie junegrass	KOMA
Lycurus phleoides	Common wolfstail	LYPH
Muhlenbergia torreyi	Ring muhly	MUTO2
Muhlenbergia wrightii	Spike muhly	MUWR
Panicum obtusum	Vine mesquite	PAOB
Pascopyrum smithii	Western wheatgrass	PASM
Piptatherum micranthum	Littleseed ricegrass	PIMI7
Pleuraphis jamesii	James' galleta	PLJA
Poa fendleriana	Muttongrass	POFE
Sporobolus cryptandrus	Sand dropseed	SPCR
Forbs		
Achillea millefolium	Common yarrow	ACMI2
Eriogonum spp.	Eriogonum	ERIOG
Sphaeralcea	Globe mallow	SPHAE
Shrubs		
Artemisia bigelovii	Bigelow sagebrush	ARBI3
Atriplex canescens	Fourwing saltbush	ATCA2
Chrysothamnus greenei	Greene rabbitbrush	CHGR6
Ephedra spp.	Ephedra	EPHED
Ericameria nauseosa var. nauseosa	Rubber rabbitbrush	ERNAN5
Gutierrezia sarothrae	Broom snakeweed	GUSA2
Krascheninnikovia lanata	Winterfat	KRLA2
Juniperus osteosperma	Utah juniper	JUOS
Mahonia fremontii	Fremont barberry	MAFR3
Opuntia spp.	Opuntia	OPUNT
Packera cana	Woolly groundsel	PACA15
Purshia mexicana	Mexican cliffrose	PUME
Rhus trilobata	Skunkbush sumac	RHTR
Yucca angustissima	Narrowleaf yucca	YUAN2
Trees		
Juniperus deppeana	Alligator juniper	JUDE2
Juniperus monosperma	Oneseed juniper	JUMO
Pinus edulis	Colorado pinyon	PIED

Source: Ecological Site Description for Clay Loam Upland 14-18" p.z. (R035XG707AZ) (USDA, 2007), and monitoring data.

6. Rangeland Inventory and Monitoring Methodology

The Arizona standards for rangeland health were assessed for the Mud Springs Allotment by a U.S. Forest Service Interdisciplinary (ID) team on May 13, 2016. The ID team consisted of a rangeland management specialist and a wildlife biologist. Documents and publications used in the assessment process include the Web Soil Survey of Arizona (NRCS, 2015), Ecological Site Descriptions for Major Land Resource 35 (NRCS, 2007), Interpreting Indicators of Rangeland Health Technical Reference 1734-6 (USDI-BLM et al., 2005), Sampling Vegetation Attributes Technical Reference 1734-4 (USDI-BLM et al., 1996), and the National Range and Allotment Handbook (USDA-NRCS, 2003). A complete list of references is included at the end of this document. All are available for public review in the BLM Safford Field Office. The ID team used rangeland monitoring data and professional observations to assess conformance with the Arizona standards for rangeland health.

6.1 Monitoring Protocols

Monitoring occurred on the Mud Springs Allotment at key area MS-1. Quantitative measurements for cover and species composition were collected along each transect and were analyzed in conjunction with qualitative indicators of soil quality, hydrologic function, and biological health. This was completed to assess the existing conditions within the ecological site Clay Loam Upland 14-18" p.z. (R035XG707AZ). The existing conditions were compared to site specific reference conditions established by the NRCS, which are considered to be representative of relatively undisturbed states within a given soil-plant community type. This comparison between existing and reference conditions determines the level of departure from the potential natural community.

The key area was recorded using a global positioning system (GPS) using a projection of North American Datum (NAD) 83. Inventory and monitoring data are provided in Appendix B.

Line Point Intercept

The method used to obtain transect data pertaining to species composition and soil cover is line point intercept (LPI). This method consists of a horizontal, linear measurement of plant intercepts along the course of a line (tape) 100 feet in length. LPI is a rapid and accurate method for measuring occurrence of grass or grass-like plants, forbs, shrubs, and trees in which vegetation composition is extrapolated. It also quantifies soil cover, including vegetation, litter, rocks, and biotic crusts. These measurements are indicators of wind and water erosion, water infiltration, and the ability of the site to resist and recover from degradation.

6.1.1 Indicators of Rangeland Health

The five steps for a rangeland health assessment (RHA) are protocols for evaluating the three rangeland health attributes (soil and site stability, hydrologic function, and biotic integrity), as outlined in Technical Reference 1734-6. They are:

Step 1. Identify the Key Area; Determine the Soil and Ecological Site

Step 2. Obtain or Develop the Reference Sheet and the Corresponding Evaluation Matrix

Step 3. Collect Supplementary Information

Step 4. Rate the 17 Indicators on the Evaluation Sheet

Step 5. Determine the Functional Status of the Three Rangeland Health Attributes:

1. Soil and site stability (S) – The capacity of an area to limit redistribution and loss of soil resources (including nutrients and organic matter) by wind and water.
2. Hydrologic function (H) – The capacity of an area to capture, store, and safely release water from rainfall, run-on and snowmelt (when relevant), to resist a reduction in this capacity, and to recover this capacity when a reduction does occur.
3. Biotic integrity (B) – The capacity of the biotic community to support ecological processes within the normal range of variability expected for the site, to resist a loss in the capacity to support these processes, and to recover this capacity when losses do occur. The biotic community include plants, animals, and microorganisms occurring both above and below ground.

The RHA provides information on the functioning of ecological processes (water cycle, energy flow, and nutrient cycle) relative to the reference state for the ecological site or other functionally similar unit for that land area. This assessment provides information that is not available with other methods of evaluation. It gives an indication of the status of the three rangeland attributes chosen to represent the health of the "key area" (i.e., the area where the evaluation of the rangeland health attributes occurs). The following are the 17 indicators that are evaluated during a RHA assessment and the attribute(s) they measure:

1. Rills: S, H
2. Water Flow Patterns: S, H
3. Pedestals and/or Terracettes: S, H
4. Bare Ground: S, H
5. Gullies: S, H
6. Wind-Scoured, Blowout, and/or Depositional Areas: S
7. Litter Movement: S
8. Soil Surface Resistance to Erosion: S, H, B
9. Soil Surface Loss or Degradation: S, H, B
10. Plant Community Composition and Distribution Relative to Infiltration and Run off: H
11. Compaction Layer: S, H, B
12. Functional/Structural Groups: B
13. Plant Mortality/Decadence: B
14. Litter Amount: H, B

15. Annual Production: B
16. Invasive Plants: B
17. Reproductive Capability of Perennial Plants: B

Attribute ratings reflect the degree of departure from expected levels for each indicator per the reference sheet. The degree of departure may be categorized (rated) as:

- None to Slight
- Slight to Moderate
- Moderate
- Moderate to Extreme
- Extreme to Total

7. Management Evaluation and Summary of Studies Data

The following information is the evaluation and summary of the 2016 RHA utilizing the inventory and monitoring protocols that have been conducted on the Mud Springs Allotment.

7.1 Actual Use

Full permitted AUMs have been implemented on the allotment during the evaluation period years (2007-2016) totaling 17 head of cattle or 204 AUMs each year.

Livestock grazing for the Mud Springs Allotment is permitted as a Section 15 grazing lease. Allowable AUMs are calculated on BLM-administered land only. Lease holders are billed for their maximum use available on public lands unless non-use is requested and approved. Non-use by the lessee was not requested during the evaluation period.

7.2 Utilization

Utilization is the proportion or degree of the current year's forage production that is consumed or destroyed by animals (including insects). Utilization may refer either to a single plant species, a group of species, or the vegetation as a whole. Utilization is a comparison of the amount of vegetation left compared with the amount of vegetation produced during the year (USDA, NRCS, and USDI, 1996).

U.S. Forest Service TEAMS completed LPI monitoring in May 2016. While an official utilization survey was not conducted, minor livestock sign as well as small mammal sign of use was noted as part of the evaluation.

7.3 Rangeland Health Assessments

A RHA of the three rangeland attributes was completed at key area MS-1. Ratings of Moderate or more are considered to indicate resource concerns for soil erosion, water quantity, and plant productivity. It is important to remember that these ratings are made relative to the potential for the site. For example, a site with highly erodible soils and low potential for stabilizing vegetation may be rated as having a Slight departure from reference conditions even though the actual

amount of soil movement is significant, while a site with a high potential for stability rated "Moderate" may have relatively little soil movement. Monitoring data recorded for the RHA is provided in Appendix B. A summary of the assessment conducted at key area MS-1 on the Mud Springs Allotment is presented in Table 8 below.

Table 8. Summary of Range Health Assessment Ratings

Key Area	Ecological Site	Range Health Attributes – Degree of Departure		
		Soil	Hydrology	Biotic Integrity
MS-1	Clay Loam Upland 14-18" p.z.	None to Slight	None to Slight	None to Slight

17 Indicators: Key Area MS-1 (Clay Loam Upland 14-18" p.z. [R035XG707AZ])

For the 17 indicators of rangeland health, the ecological reference sheet condition indicates:

1. A few minor rills may form due to fine sandy loam and clay loam surface textures, slow permeability, and medium to rapid run off, especially on steeper slopes.
2. Some water flow patterns may form due to slow permeability and medium to rapid run off, especially on steeper slopes.
3. A few pedestals and terracettes may form, but they should be very short.
4. The site has an average available water capacity of 5 inches, so it has a moderate to high potential for the production of plant cover. Drought may cause an increase in bare ground.
5. No gullies or erosion should be present.
6. No wind scoured blowouts should be present.
7. Herbaceous and fine woody litter will be transported in water flow pathways. Coarse woody litter will remain under shrub and tree canopies.
8. Soil surface textures are fine sandy loam and clay loam. Most surface horizons have gravels, cobbles, or stones. When well vegetated or covered with rock armor, these soils have a high resistance to both water and wind erosion.
9. Surface structure is mostly granular (moderate to strong, very fine to fine), but some areas have a platy structure (weak to strong, thin to medium). Surface thickness is 2-3 inches. Color is variable depending upon parent materials.
10. This site is characterized by a relatively uniform distribution of mostly grasses with some shrubs and a few forbs. Some of the areas may have up to 25 percent canopy cover of trees. Both canopy and basal cover values (especially canopy cover) decrease during prolonged drought. This type of plant community is moderately to highly effective at capturing and storing precipitation.
11. No compaction layer due to fine sandy loam and clay loam surface textures, these soils may be easily compacted, but only within the top 3 inches. Many soils are protected from compaction by rock fragments. Some of the soils have a naturally platy surface structure.
12. There is not a dominant functional structural group at this site. It does have a sub-dominant group: warm season bunchgrasses >> cool season colonizing grasses = cool

season bunchgrasses > forbs > trees = warm season colonizing grasses > shrubs > cacti = Agave family.

13. All plant functional groups are adapted to survival in all years except during the most severe droughts. Severe winter drought affects trees and shrubs most. Severe summer drought affects grasses the most.
14. This site is comprised mostly of herbaceous litter with some woody litter. Litter amounts increase during the first few years of drought, then decrease in later years.
15. Expected annual production is 700-800 lbs/ac dry years; 800-1100 lbs/ac median years; 1100-1300 lbs/ac wet years.
16. Broom snakeweed, Greene rabbitbrush, Ericameria (rubber rabbitbrush), and Opuntia (prickly pear cactus) are all native to the site but have the ability to increase and dominate after heavy grazing. Utah, oneseed, and alligator juniper are also native to the site but also have the ability to increase and dominate after heavy grazing and/or fire exclusion.
17. All plants native to the site are adapted to the climate and are capable of producing seeds, stolons, and rhizomes in most years except during the most severe droughts.

The HCPC plant community is a range site that has a mixed plant community made up of junipers and Pinyon pine and an understory of mid and short grasses, shrubs, and a relatively small percentage of forbs. In the HCPC, there was a mixture of both cool and warm season grasses.

Rangeland Health Attribute 1: Soil and Site Stability

There were no rills or gullies observed, these indicators were rated None to Slight. Water flow patterns were not observed and were rated None to Slight. Pedestals and/or Terracettes were rated as None to Slight because there were none observed on the site. Bare ground was measured at zero percent, indicating the site has moderate to high plant cover, and that the soils were well armored by rock fragments and was rated None to Slight. There was no evidence of wind-scouring observed due to a heavy gravel and rock component and was rated None to Slight. All litter size classes remained at the base of plants with little to no movement and was rated None to Slight. Soil surface resistance to erosion was rated as None to Slight due to the area being naturally armored by the heavy gravel and rock component. Rock and gravel fragments covered 68 percent of the soil surface. Plants were able to grow thought these fragments and provided a canopy cover measured at 63 percent and 19 percent basal cover at MS-1 (Appendix B). Soil surface loss and degradation were None to Slight as soils are stable and in place. Compaction layers were not present and not restricting water infiltration or root penetration and was rated None to Slight.

The overall rating for Soil and Site Stability was None to Slight. All 10 indicators for soil site stability were rated as None to Slight.

Rangeland Health Attribute 2: Hydrologic Function

There were no rills or gullies observed. These indicators were rated None to Slight. Water flow patterns were not observed and were rated None to Slight. Pedestals and/or Terracettes were rated as None to Slight because there were none observed on the site. Bare ground was measured at zero percent, indicating the site has moderate to high plant cover, and that the soils were well armored by rock fragments and was rated None to Slight. Soil surface resistance to erosion was

rated as None to Slight due to the area being naturally armored by rock and canopy cover. Rock and gravel fragments covered 68 percent of the soil surface. Canopy cover was measured at 63 percent and 19 percent basal cover at MS-1 (Appendix B). Soil surface loss and degradation were None to Slight as soils are stable and in place. Compaction layers were not present and not restricting water infiltration or root penetration and was rated None to Slight. Litter amounts were measured at 48 percent. It was rated None to Slight.

Plant community composition and distribution relative to infiltration was rated None to Slight. Vegetative cover is comprised of primarily perennial grasses and shrubs. This vegetation composition is effective at soil stability due to the basal area cover and root systems that are not restricted by a compaction layer. This type of plant community is moderately to highly effective at capturing and storing precipitation.

The overall rating for Hydrologic Function was None to Slight. All 10 indicators for hydrologic function were rated as None to Slight.

Rangeland Health Attribute 3: Biotic Integrity

Soil surface resistance to erosion was rated as None to Slight. Soil surface is naturally armored by rock and canopy cover. Rock and gravel fragments covered 68 percent of the soil surface. Canopy cover was measured at 63 percent and 19 percent basal cover at MS-1 (Appendix B). Soil surface loss and degradation were None to Slight as soils are stable and in place. Compaction layers were not present and not restricting water infiltration or root penetration and was rated None to Slight. Functional/structural groups displayed grasses being dominant, followed by shrubs. Trees were conspicuously absent from the site. Functional/structural groups was rated None to Slight. Plant mortality/decadence was rated None to Slight; all age classes were evenly represented. The ESD describes the current functional groups as being adapted to survival in all years, except during the most severe droughts. Litter amounts were measured at 48 percent, and were therefore rated None to Slight. Annual production was rated as None to Slight and is appropriate for the site. Invasive plants was rated None to Slight as there were none noted on the site. Greene rabbitbrush was present. This species is native and has the ability to increase after heavy grazing. It currently comprises six percent of canopy cover. Reproductive capability of perennial plants was rated None to Slight, as the native plants are adapted to the climate and are capable of producing seeds, stolons, and rhizomes except during the most severe droughts.

The overall rating for Biotic Function was None to Slight. All Nine indicators for biotic function were rated as None to Slight.

Figure 7. Key Area MS-1 looking East in May 2016
Source: USDA-USFS TEAMS 2016

8. Determinations of Land Health Standards

Standard 1: Upland Sites

Objective: Upland soils exhibit infiltration, permeability, and erosion rates that appropriate to soil type, climate and land form.

Determination:

☒ Meeting the Standard
☐ Not Meeting the Standard; Making Significant Progress Toward Standard
☐ Not Meeting the Standard; Not Making Significant Progress Toward Standard

Rationale:
Overall, the soils throughout the Mud Springs Allotment are productive, stable, and in a sustainable condition. The key area monitoring data reflects the conditions described in the ESD. The data at the key area shows that the canopy cover, litter, and rock cover are adequate to ensure soil stabilization and appropriate permeability rates within the ecological sites. Little to no signs of erosion were observed at the site. There were no rills/gullies present and terracettes were rated None to Slight. Wind-scouring and litter movement were both rated None to Slight. Soil surface is naturally armored by rock and canopy cover.

Standard 2: Riparian-Wetland Sites

Objective: Riparian-wetland areas are in proper functioning condition.

Determination:

☐ Meeting the Standard
☐ Not Meeting the Standard; Making Significant Progress Toward Standard
☐ Not Meeting the Standard; Not Making Significant Progress Toward Standard
☒ Standard Does Not Apply

Rationale:
There are no riparian-wetland sites located on the Mud Springs Allotment; therefore, Standard 2 does not apply.

Standard 3: Desired Resource Conditions

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

Determination:

☒ Meeting the Standard
☐ Not Meeting the Standard; Making Significant Progress Toward Standard
☐ Not Meeting the Standard; Not Making Significant Progress Toward Standard

Rationale:
Based on the monitoring data and this evaluation, current livestock grazing is allowing the Mud Springs Allotment to maintain and achieve the DPC objectives identified in *Section 4.2.2 Key Area Objectives,* for continued land health and wildlife habitat. The RHA indicates that soil/site

stability, hydrologic function, and biotic integrity are meeting the standard (as outlined in standard 1) for this site. Data from the allotment's key area and RHA indicate that the site is achieving the objectives for canopy cover, plant community composition, bare ground, and litter cover. The tree, shrub, and forb composition and density is sufficient to provide forage and shelter for livestock and wildlife species.

The DPC objectives for canopy cover are established as follows: maintain an average canopy cover of 25-50 percent, and an average basal cover of 5-20 percent.

> MS-1: Canopy cover was measured at 63 percent, and basal cover at 19 percent. Both of these measurement are within or exceed the range of acceptability for the objective. Exceeding the canopy cover objective better provides cover for wildlife species, more efficiently prevents accelerated erosion, and provides site stabilization. The DPC objectives for canopy cover on the Mud Springs Allotment are being achieved.

The DPC objectives for plant community compositions are established as follows: maintain an average of 50-80 percent grasses, 0-20 percent forbs, 0-10 percent shrubs, and 0-25 percent trees. The data collected for the RHA are:

> MS-1: Plant community composition was derived from the canopy cover LPI data, see Appendix B. The dominant vegetation type is grasses at 90 percent composition. Shrubs were a minor component at nine percent, and forbs on the site were a trace component at one percent. No trees were encountered during data collection on MS-1 key area LPI monitoring.
>
> There is a higher composition of grasses than expected on the site. The Clay Loam Upland 14-18" p.z. (R035XG707AZ) ecological site description states that *"severe winter drought affects trees and shrubs most. Severe summer drought affects grasses the most."* Additionally, The ESD for the Clay Loam Upland 14-18" p.z. (R035XG707AZ) ecological site describe the plant community as *"naturally variable"* where *"Composition and production will vary with yearly conditions, location, aspect, and the natural variability of the soils."* Overall, the DPC objective for composition on the Mud Springs Allotment is being achieved.

The DPC objective is to maintain bare ground between 20 and 50 percent and was deemed sufficient for preventing accelerated erosion. The data collected for the RHA indicates:

> MS-1: Bare ground was measured at zero percent. The percentage of bare ground exceeds the objective for this site. The site had 68 percent presence of gravel and rock fragments and 63 percent vegetative cover which reduced the percentage of exposed soils, providing sufficient soil protection, and allowing for adequate infiltration. The DPC objective for bare ground on the Mud Springs Allotment is being achieved.

The DPC objective for litter is a range of 20-50 percent. Data collected for the RHA indicates:

> MS-1: Litter was measured at 48 percent. Overall, the DPC objective for litter on the Mud Springs Allotment is being achieved.

9. Recommended Management Actions

9.1 Terms and Conditions

Based on the determinations in *Section 8 Determinations of Land Health Standards*, the following management actions are recommended:

1. Grazing management on the Mud Springs Allotment will continue in accordance with the terms and conditions of the term lease, as follows:

Allotment Name/ Number	Livestock Number/Kind	Grazing Period Begin End	% Public Land	Active Use (AUM)
Mud Springs (No. 06252)	17 Cattle	3/1 2/28 Yearlong	100	204

2. Continue with these Other Terms and Conditions:
   - In order to improve livestock distribution on the public lands, all salt blocks and/or mineral supplements shall not be placed within a ¼ mile of any riparian area, wet meadow or watering facility (either permanent or temporary) unless stipulated through a written agreement or decision in accordance with 43 CFR 4130.3-2(C).

3. The following Other Terms and Conditions should be added to the BLM lease:
   - The lessee shall submit, upon request, a report of the actual grazing use made on this allotment for the previous grazing period, March 1 to February 28. Failure to submit such a report by March 15 of the current year may result in suspension or cancellation of the grazing lease.

4. The following Other Terms and Conditions should be deleted as it is a duplicate of the Standard Terms and Conditions associated with this BLM lease:
   - If in connection with operations under this authorization, any human remains, funerary objects, sacred 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/lessee 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/lessee shall continue to protect the immediate area of the discovery until notified by the Program Manager that operations may resume.
   - In accordance with 43 CFR 4130.8-1(F): Failure to pay grazing bills within 15 days of the due date specified in the bill shall result in a late fee assessment of $25.00 or 10 percent of the grazing bill, whichever is greater, but not to exceed $250.00. Payment made later than 15 days after the due date, shall include the appropriate late fee assessment. Failure to make payment within 30 days may be a violation of 43 CFR Secs. 4150.1 and 4160.1-2.

10. List of Preparers

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11. Consultation

Arizona Game and Fish Department
USFWS, Arizona Ecological Services
Platt Cattle Company, Mud Springs Allotment Lessee

12. Authorized Officer Concurrence

I have reviewed the determinations presented in *Section 8 Determinations of Land Health Standards* and the grazing and other management actions identified in *Section 9 Recommended Management Actions*.

X I concur with the conclusions and recommendations as written.

___ I do not concur.

___ I concur, but with the following modifications.

for Scott C. Cooke
Field Manager

8/22/18
Date

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Appendix A: Special Status Species

Federally Listed Species		
Species	**Federal Status**	**Comments**
Chiricahua leopard frog *Rana chiricahuensis*	Threatened	Chiricahua leopard frog occurs in wetlands of the sky island regions of central and southeast Arizona. There are no natural wetlands on the Mud Springs Allotment and no known populations of the species at the man-made water source. No effect.
Mexican spotted owl *Strix occidentalis lucida*	Threatened	This species occurs in the oak woodland and mixed conifer forests of mountainous areas of Arizona. There is no suitable habitat on the Mud Springs Allotment to support Mexican spotted owl and there is no critical habitat within the allotment. No effect.
Mexican wolf *Canis lupus baileyi*	Endangered, experimental	No wolves occur within the action area. If individual wolves disperse from the experimental population into the action area, humans working near individuals could disturb the wolves, but they would only move to other areas. Livestock grazing would be managed to improve or maintain the productivity of the area, and would not affect the native prey base of the wolf. May affect, not likely to adversely affect.
Northern Mexican garter Snake *Thamnophis eques megalops*	Threatened	The northern Mexican garter snake is a riparian obligate species; there is no suitable habitat on the Mud Springs Allotment. No Effect.
Yellow-billed cuckoo (distinct population segment) *Coccyzus americanus*	Threatened	Yellow-billed cuckoos primarily occur in cottonwood-willow gallery forests of riparian zones of Arizona. The Mud Springs Allotment does not have habitat considered suitable for this species, however cuckoos may utilize upland areas of the allotment, comprised of pinyon-juniper, for 2-3 weeks prior to migration to and from suitable breeding habitat (Hughes, 2015). There is no suitable breeding habitat within 40 miles of the allotment. Due to the short duration of potential occurrence and the lack of nearby habitat, we expect no effect to the species. May affect, not likely to adversely affect.
Little Colorado Spinedace *Lepidomeda vittata*	Threatened	No perennial water or suitable aquatic habitat exist on the Mud Springs Allotment. No effect.
Zuni bluehead sucker *Catostomus discobolus yarrowi*	Endangered	No perennial water or suitable aquatic habitat exist on the Mud Springs Allotment. No effect.

Migratory Birds, Birds of Conservation Concern [1, 2]	
Species	**Comments**
Bald eagle *Haliaeetus leucocephalus*	Addressed as BLM Sensitive in table below.
Bendire's thrasher *Toxostoma bendirei*	Inhabits arid brushy grasslands. Nests are constructed in shrubs, trees and cacti. May occur on the allotment. This species may be impacted but impacts will be less than significant to the population.
Black-chinned sparrow *Spizella atrogularis*	Black-chinned sparrow can be found in arid brushlands on rugged mountain slopes. Little of this habitat exists on this allotment. The species will not be impacted.
Black-throated gray warbler *Setophaga nigrescens*	This species inhabits pine and mixed oak-pine forests in northern Arizona. Little of this habitat exists on this allotment. The species will not be impacted.
Brewer's sparrow *Spizella breweri*	Brewer's sparrow can be found in sagebrush steppe of the western United States. Little of this habitat exists on this allotment. The species will not be impacted.
Chestnut-collared longspur *Calcarius ornatus*	This species is found in short-grass prairie habitat. Little of this habitat exists on this allotment. The species will not be impacted.
Golden eagle *Aquila chrysaetos*	Addressed as BLM Sensitive in table below.
Grace's warbler *Setophaga graciae*	Grace's warbler is found in open pine forest, pine-oak association, and pine savanna. Little of this habitat exists on this allotment. The species will not be impacted.
Gray vireo *Vireo vicinior*	Gray vireo is found in chaparral-juniper and dwarf conifer forests. This species may be impacted but impacts will be less than significant to the population.
Lewis's woodpecker *Melanerpes lewis*	Lewis's woodpecker occurs in mature and burned pine forest and cottonwood. Little of this habitat exists on this allotment. The species will not be impacted.
Olive-sided flycatcher *Contopus cooperi*	Inhabits montane coniferous forests. Little of this habitat exists on this allotment. The species will not be impacted.
Pinyon jay *Gymnorhinus cyanocephalus*	Addressed as BLM Sensitive in table below.
Red-faced warbler *Cardellina rubrifrons*	Red-faced warbler occurs in montane fir, pine, and pine-oak woodland. Little of this habitat exists on this allotment. The species will not be impacted.
Willow flycatcher *Empidonax traillii*	Willow flycatcher inhabits in shrubby riparian areas. Little of this habitat exists on this allotment. The species will not be impacted.

[1]The migratory birds species listed are species of particular conservation concern (e.g. Birds of Conservation Concern) that may occur on or near the allotment. It is not a list of every bird species that may be found in this location, nor a guarantee that all of the bird species on this list will be found on or near this location.
[2] Habitat information and determinations compiled from species profiles found on USFWS website. https://ecos.fws.gov

BLM Sensitive Species	
Species	**Comments**
Amphibians	
Northern leopard frog *Lithobates pipiens*	No perennial water or suitable aquatic habitat exist on the Mud Springs Allotment. Low potential of occurrence.
Birds	
Bald eagle (wintering) *Haliaeetus leucocephalus*	Wintering bald eagles occur along the Little Colorado river and may use the allotment as foraging habitat. There are no known impacts of livestock on bald eagles.
Ferruginous hawk *Buteo regalis*	Ferruginous hawk nest in grasslands, shrublands and forest lands. Suitable nesting habitat occurs on the Mud Springs Allotment. There are no known impacts of livestock on ferruginous hawks.
Golden eagle *Aquila chrysaetos*	There is no suitable nesting habitat for golden eagles on the Mud Springs Allotment. Golden eagles may fly and hunt over the areas of the allotment. There are no known impacts of livestock on golden eagles.
Pinyon jay *Gymnorhinus cyanocephalus*	Pinyon jay occurs in pinyon-juniper woodland. This habitat is available on the allotment in limited amounts; therefore this species may be impacted by livestock browsing seedling trees or low-hanging branches. This species is known to travel vast distances in response to localized abundance or shortages of forage. The objectives set in this document will not alter the production of forage for this species, resulting in impacts that are less than significant.
Fish	
No perennial water or suitable aquatic habitat exist on the Mud Springs Allotment.	
Invertebrates	
Succineid snails, all species in the family	No perennial water or suitable aquatic habitat exist on the Mud Springs Allotment.
Mammals	
Allen's lappet-browed bat *Idionycteris phyllotis*	This species inhabits ponderosa pine, pinyon juniper, Mexican woodland and riparian areas. Due to the lack of available water on the Mud Springs Allotment, this species is not likely to occur. This species will not be impacted.
Arizona myotis *Myotis occultus*	Arizona myotis occurs in ponderosa pine and oak-pine woodlands near water. Little of this habitat exists on this allotment. The species will not be impacted.
Spotted bat *Euderma maculatum*	Spotted bats inhabits desert scrub and open forests, and are always associated with a water source such as a spring, river, creek or lake. Little of this habitat occurs on the allotment. This species will not be impacted.
Townsend's big-eared bat *Corynorhinus townsendii*	This species occurs in pine forests and arid desert scrub, always near caves or other roosting sites. Little of this habitat occurs on the allotment. This species will not be impacted.
Reptiles	
There are no BLM sensitive reptiles known to occur in the Mud Springs Allotment.	
Plants	
There are no BLM sensitive plants known to occur in the Mud Springs Allotment.	

Appendix B: USFS TEAMS Monitoring Data 2016

Summary of MS-1 Line Point Intercept Data.

Key Area Information	Species	Line point intercept cover at MS-1	
		Canopy	Basal
Mud Springs Allotment	Blue grama *(Bouteloua gracilis)*	60%	19%
Ecological Site ID: R035XG707AZ	Globemallow *(Sphaeralcea spp.)*	1%	0%
UTM 0636308 E - 3798254 N	Greene Rabbitbrush *(Chrysothamnus greenei)*	6%	0%
	Annual Grasses	2%	0%

Cover/Litter/Bare Ground	
Bare Ground	0%
Basal Cover	19%
Canopy Cover	63%
Litter	48%
Surface Fragments > ¼" & <= 3"	56%
Surface Fragments > 3"	12%

Desired plant Community Compared to Species Composition.

DPC Objectives for Plant Community Composition	Species Composition BM-1
Grasses 50-80% Composition	Blue grama – 87.0% Annual grass – 2.9%
	Total - 89.9%
Forbs 0-20% Composition	Globemallow - 1.4%
	Total - 1.4%
Trees 0-25% Composition	None
	Total - 0%
Shrubs 0-10% Composition	Greene rabbitbrush – 8.7%
	Total - 8.7%

Functional/structural plant group ranking at MS-1.

Ranking	Species List for Functional/Structural Groups at MS-1
Dominant	Blue grama
Minor	Greene rabbitbrush
Minor	Anual grasses
Trace	Globemallow

Dominant roughly 40-100% composition, Minor roughly 2-10% composition, or Trace roughly <2% composition.

Appendix C: Desired Plant Community Methodology

Proxy Ecological Sites

CLU-10 = Clay Loam Upland 10-14" p.z. (R035XA107AZ)

CLU-13 = Clay Loam Upland 13-17" p.z. (R035XF603AZ)

CLU-14 = Clay Loam Upland 14-18" p.z. (R035XG707AZ)

RWB = Rangeland Wildlife Book (Yoakum, 1996)

DESIRED PLANT COMMUNITY OBJECTIVES		
Average % = [(SUM: CLU-10 Range / 2) + (SUM: CLU-13 Range / 2)] / 2		
Canopy Cover	[(30+50 / 2) + (25+50 / 2)] / 2 = 39%	
Basal Cover	[(10+20 / 2) + (5+9 / 2)] / 2 = 11%	
Bare Ground	[(30+50 / 2) + (20+40 / 2)] / 2 = 35%	
Litter	[(20+40 / 2) + (40+50 / 2)] / 2 = 38%	
Range = Low and High % Values Amongst Proxy Ranges		
Canopy Cover	CLU-10 = 30 – 50% CLU-13 = 25 – 50%	Range = 25 – 50 %
Basal Cover	CLU-10 = 10 – 20% CLU-13 = 5 – 9%	Range = 5 – 20 %
Bare Ground	CLU-10 = 30 – 50% CLU-13 = 20 – 40%	Range = 20 – 50 %
Litter	CLU-10 = 20 – 40% CLU-13 = 40 – 50%	Range = 20 – 50 %

DESIRED PLANT COMMUNITY OBJECTIVES		
Plant Community Composition	Plant Community Composition is based on vegetation type	
Range = Low and High % Values Amongst Proxy Ranges		
Grasses	CLU-10 & 14 = "mostly grasses" CLU-13 = 10 – 15% RWB = 50 – 80%	Range = 50 – 80 %
Forbs	CLU-10 & 14 = "few forbs" CLU-13 = 0 – 1% RWB = 10 - 20%	Range = 0 – 20 %
Shrubs	CLU-10 & 14 = "some shrubs" CLU-13 = 5 – 10% RWB = less than 5%	Range= 0 – 10%
Trees	CLU-10 = "occasional trees" CLU-13 = 0 – 1% CLU-14 = "up to 25% trees"	Range = 0 – 25 %

Appendix D: Interested Public

Arizona Cattle Growers
1401 North 24th Street
Phoenix, AZ 85008

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WMHB – Project Evaluation Program
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Phoenix, AZ 85086-5000

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