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Safford, AZ



Land Health Evaluation Report

Little Reservoir Allotment

(No. 06159)

July 2020



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List of Acronyms

ADEQ	Arizona Department of Environmental Quality
ADOT	Arizona Department of Transportation
ADWR	Arizona Department of Watershed Resources
AZGFD	Arizona Game and Fish Department
AUM	Animal unit month
BLM	Bureau of Land Management
BO	Biological Opinion
CFR	Code of Federal Regulations
DPC	Desired plant community
EDIT	Ecosystem Dynamics Interpretive Tool
EIS	Environmental impact statement
EPA	Environmental Protection Agency
ESD	Ecological Site Description
F.	Degrees Fahrenheit
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FLPMA	Federal Land Policy and Management Act of 1976
GIS	Geographic Information System
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
LR-1	Key area on the Little Reservoir Allotment
MLRA	Major Land Resource Area
NAD	North American Datum
NRCS	National Resources Conservation Service
P.L.	Public Law
p.z.	Precipitation zone
PRISM	Parameter-elevation Relationships on Independent Slopes Model
RMP	Resource Management Plan
ROD	Record of Decision
RPS	Range Program Summary
Spp.	Multiple species of the same genus
TEAMS	[USFS] Talent, Expertise, Agility, Mobility, and Simplicity Enterprise Unit
U.S.C.	United States Code
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

USGS
UTM

U.S. Geological Survey
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 Little Reservoir Allotment No. 06159, 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. Arizona Standards and Guidelines and the final rule by the Department of the Interior apply to grazing administration on public lands.

Standards and guidelines are implemented through terms and conditions of grazing permits and leases, and other authorizations, grazing-related 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 10 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 Little Reservoir Allotment was being considered for lease renewal was distributed via certified mail January 31, 2017. Coordination with the Little Reservoir 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 (AZGFD).

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 standards. 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).

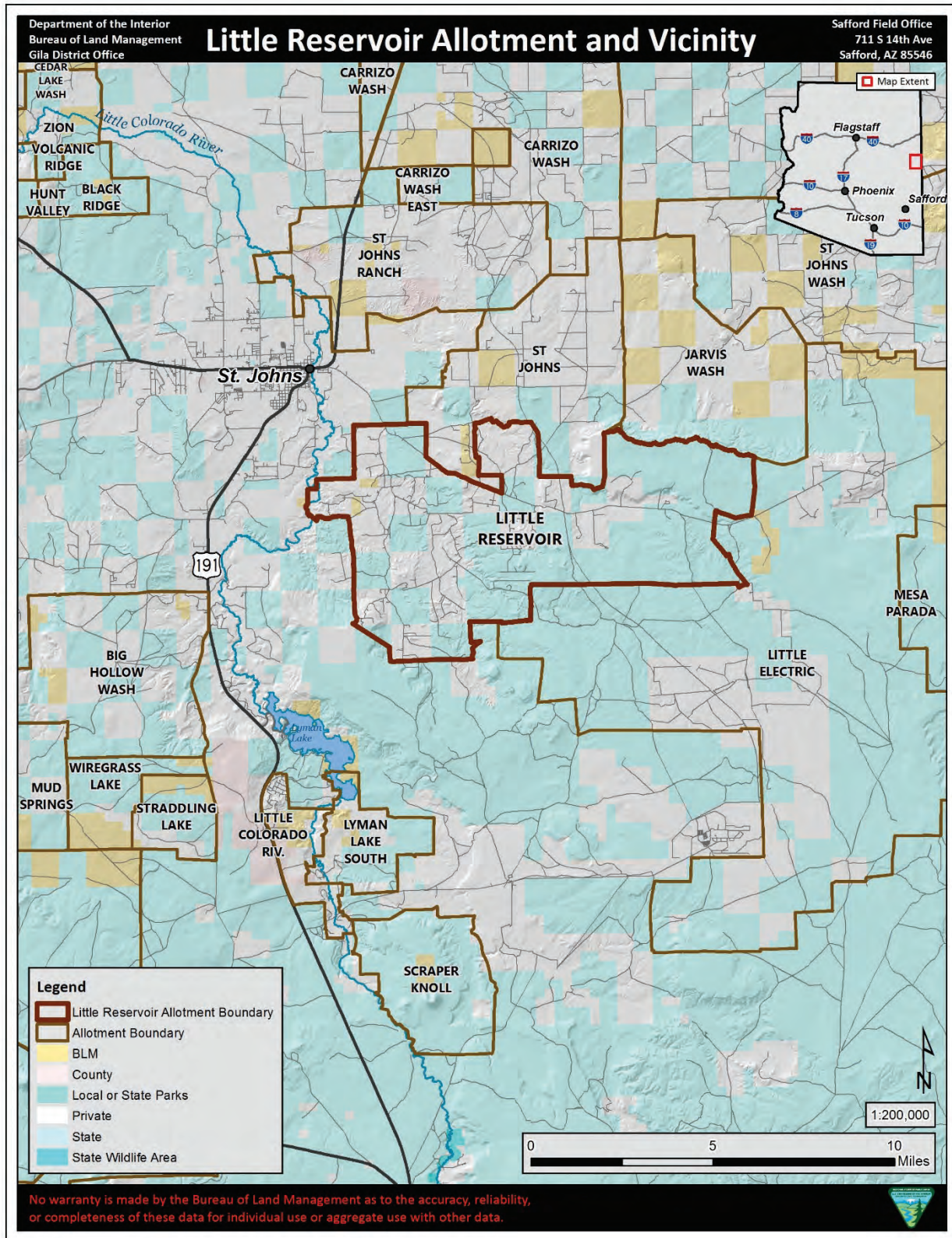
The Arizona Standards and Guidelines identify three standards regarding (1) upland sites, (2) riparian-wetland sites, and (3) desired resource conditions based on specific indicators, as discussed in *Section 5 Rangeland Inventory and Monitoring Methodology* of this document.

2. Allotment Profile and General Description

2.1 Location

The Little Reservoir Allotment (No. 06159) is located in Apache County, Arizona. It is located 5 miles southeast of the town of St. Johns, on the East side of State Road 191. The allotment is near several other BLM grazing allotments including Jarvis Wash and St. Johns Allotments to the North, Little Electric Allotment to the East, and Lyman Lake South Allotment to the South. Much of the area surrounding the allotment is privately owned, State Trust land, or other ownership unassociated with a BLM grazing allotment (Figure 1).

Figure 1. Land Ownership and Vicinity of Little Reservoir Allotment



Source: USDI-BLM 2020, ADOT 2016

2.2 Physical Description

This section describes physical characteristics within the Little Reservoir Allotment.

2.2.1 Surface Land Ownership

The Little Reservoir Allotment is comprised predominately of Arizona State Trust lands intermixed with private property. The BLM-administered portion of the allotment is 163 acres, less than one percent of the total allotment. Land ownership apportionments are displayed in Table 1.

Table 1. Little Reservoir Allotment Landownership

Land Classification	Acres
BLM-administered Acres	163
State Trust Land Acres	18,664
Private Land Acres	12,521
Total Acres	31,348

Source: BLM GIS data set

2.2.2 Precipitation

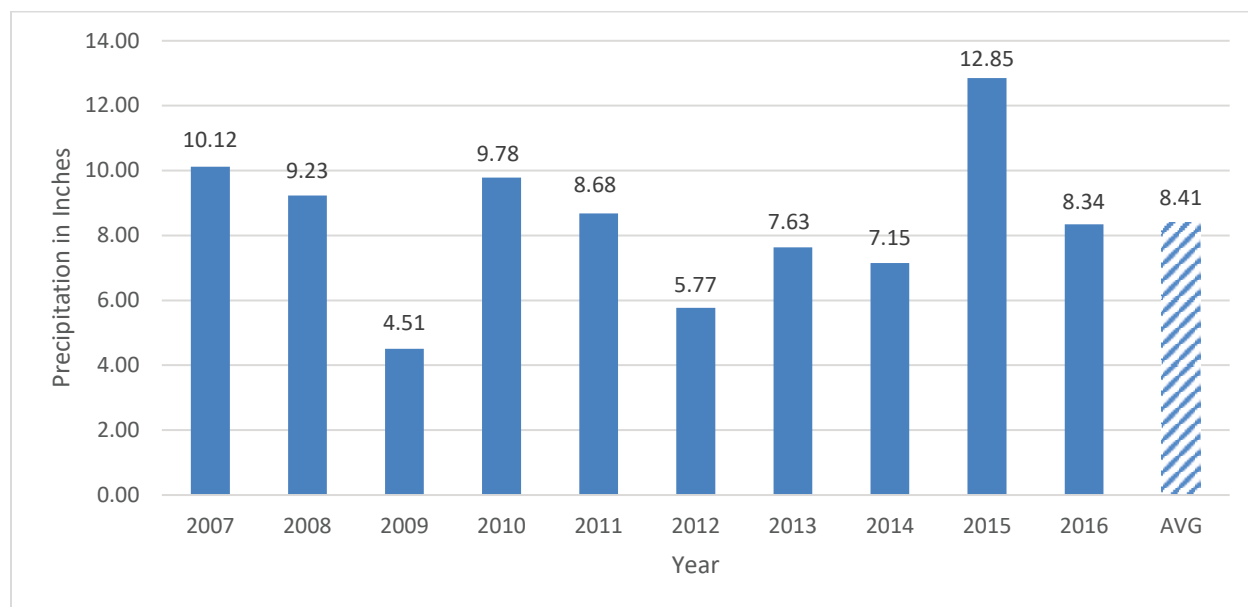
Average annual precipitation for the majority of Little Reservoir Allotment ranges from 10 to 14 inches, with some areas receiving 6 to 10 inches. The average annual rainfall on the allotment between 2007 and 2016 was 8.41 inches (Figure 2). During the evaluation period, 2009 received the least amount of precipitation with 4.51 inches while 2015 received the greatest amount measuring 12.85 inches. Most of the precipitation falls as rain from July through September, and the remaining moisture is received as snow during the winter months. (USDA NRCS, 2008).

Precipitation data from Parameter-elevation of Independent Slopes Model (PRISM) climate datasets (PRISM, 2017) were utilized by selecting a point within the Little Reservoir Allotment as follows:

- Latitude: 34.4600
- Longitude: -109.3311
- Elevation: 5,883 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 Little Reservoir Allotment between 2007 and 2016. Average temperature for the hottest month (July) is 75 degrees Fahrenheit (°F), and for the coldest month (January) is 33°F. Extreme temperatures of 105°F and -26°F have been recorded (USDA NRCS, 2008).

Table 2. Temperature in Degrees Fahrenheit on Little Reservoir Allotment

Month	Average Minimum	Average Maximum	Average
January	18	48	33
February	22	54	38
March	28	63	46
April	34	69	52
May	42	77	59
June	52	90	71
July	60	89	75
August	58	87	72
September	51	82	66
October	38	72	55
November	27	60	43
December	21	48	34
Average Annual			54

Source: PRISM, 2017.

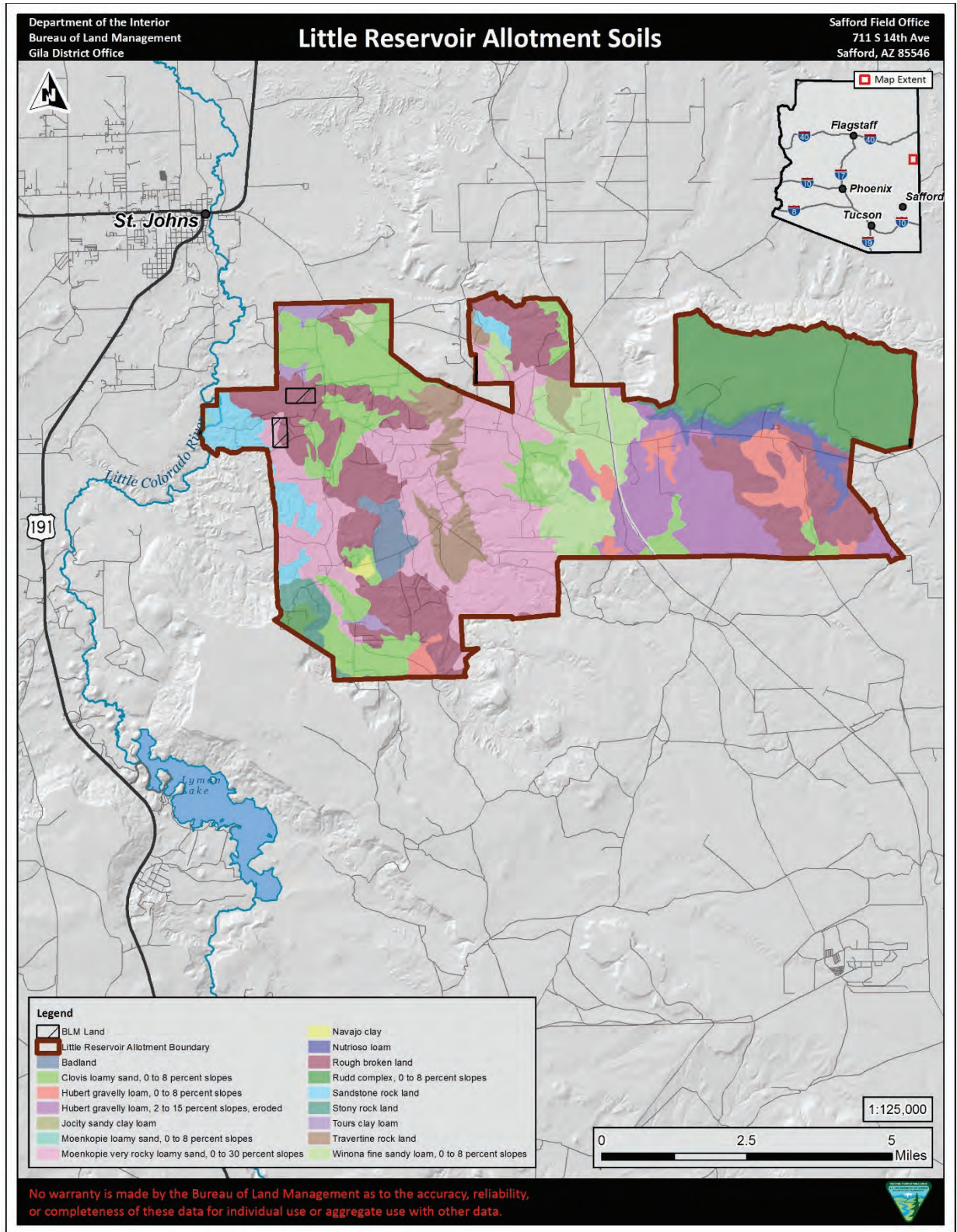
2.2.4 Soils

The soil composition on the Little Reservoir Allotment varies, as presented in Table 3 and Figure 3.

Table 3. Soil Map Units within the Little Reservoir Allotment

Soil Map Unit Name	Allotment Acres	BLM Acres	BLM Composition
Badland	473	0	0%
Clovis loamy sand, 0 to 8 percent slopes	3,951	0	0%
Hubert gravelly loam, 0 to 8 percent slopes	1,215	0	0%
Hubert gravelly loam, 2 to 15 percent slopes, eroded	2,778	0	0%
Jocity sandy clay loam	208	0	0%
Moenkopie loamy sand, 0 to 8 percent slopes	14	0	0%
Moenkopie very rocky loamy sand, 0 to 30 percent slopes	6,127	39	24%
Navajo clay	63	0	0%
Nutrioso loam	593	0	0%
Rough broken land	6,105	124	76%
Rudd complex, 0 to 8 percent slopes	4,427	0	0%
Sandstone rock land	1,070	0	0%
Stony rock land	680	0	0%
Tours clay loam	320	0	0%
Travertine rock land	1,152	0	0%
Winona fine sandy loam, 0 to 8 percent slopes	2,172	0	0%

Figure 3. Soil Complexes on Little Reservoir Allotment



Source: USDI-BLM 2020, USDA-NRCS 2015

The following soil descriptions occur on BLM-administered lands within the Little Reservoir Allotment and will be carried forward in the LHE:

- Moenkopie very rocky loamy sand, 0 to 30 percent slopes
- Rough broken land

Moenkopie very rocky loamy sand, 0 to 30 percent slopes

The Moenkopie series consists of very shallow and shallow, well drained soils that formed in alluvium from sandstone and shale. Depth to bedrock is dominantly 9 to 18 inches, but ranges from 4 to 20 inches. Moenkopie soils are on mesas, plateaus, hills, and structural benches. Slopes are 0 to 30 percent. Mean annual precipitation is about 9 inches. Mean annual air temperature is 52 to 55°F. The frost-free period is 130 to 140 days, and runoff class is high.

Rough broken land

Rough broken lands are on breaks and terraces and have slopes of 10 to 60 percent. Elevations range from 5,400 to 7,000 feet. The mean annual precipitation is 8 to 16 inches. The mean annual air temperature is 48 to 55°F. The frost-free period is 120 to 140 days. Runoff class is very high due to paralithic bedrock at 4 to 20 inches.

The following soil description does not occur on BLM-administered land; however, it corresponds with the Sandy Loam Upland 10-14 p.z. Ecological Site which was used to establish Desired Plant Community Objectives, and will be carried forward in the LHE:

- Clovis loamy sand, 0 to 8 percent slopes

Clovis loamy sand, 0 to 8 percent slopes.

The Clovis loamy sand soils occur on plains with slopes ranging from 0 to 8 percent. Elevations range from 5,400 feet to 7,000 feet. The mean annual precipitation is 12 to 16 inches. The mean annual air temperature is 52-55°F, with 130 to 140 frost-free days. The soils are well drained and the runoff class is rated as low.

2.2.5 Watersheds

The allotment lies within two watersheds, the Little Colorado River, Lyman Lake to Big Hollow Wash and the Canero Creek-Little Colorado River watersheds (HUC-10 1502000201 and 1502000104 respectively). The Little Colorado River is an intermittent stream with some reaches flowing perennially closer to its headwaters and is one of two major tributaries to the Colorado River in Arizona. The Little Colorado River drains the Little Colorado Basin (HUC-6 150200), which has a drainage area of 26,000 square miles extending into New Mexico.

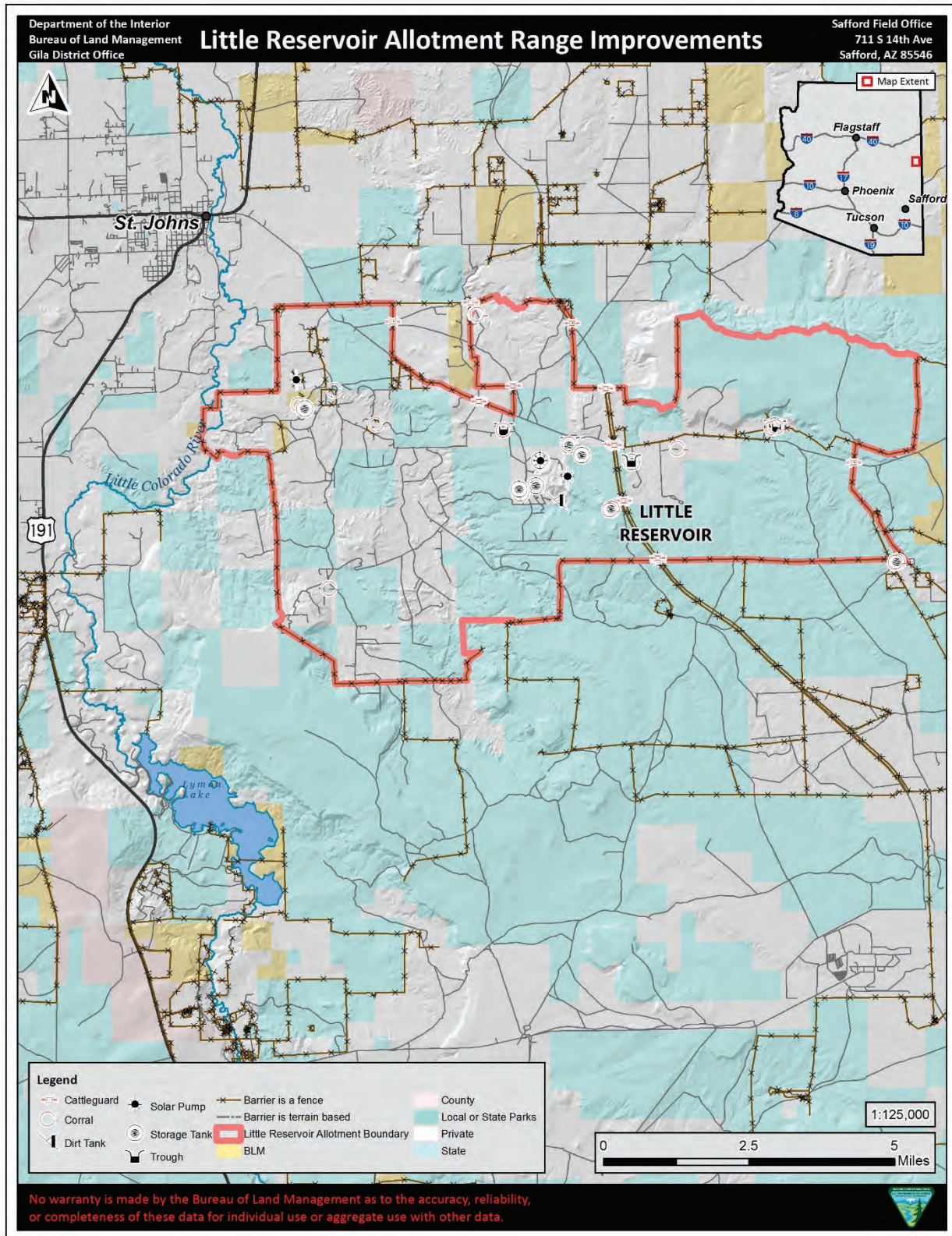
The allotment lies entirely within the “Little Colorado River Plateau” Arizona Department of Water Resources (ADWR) Groundwater Basin and is not within an ADWR Active Management Area. The groundwater basin consists of the following aquifers: unconsolidated alluvium from streams, volcanic bedrock (Lakeside-Pinetop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

The Little Colorado River flows through the western sections of the allotment, mostly through state and private land, and is approximately 0.88 miles from the nearest BLM managed land. The majority of waters on BLM-administered land within the allotment are ephemeral washes that receive flow from precipitation events such as rain and snowmelt runoff. An unnamed ephemeral stream runs through the northern section of BLM-administered land and has been developed into what United States Geological Survey (USGS) National Hydrography Dataset classifies as an artificial path with ponding capabilities. Jarvis Wash flows through private and state land on the eastern part of the allotment and is an intermittent tributary to Carrizo Wash north of the allotment. The majority of the allotment is located within a Federal Emergency Management Agency (FEMA) Zone D floodplain meaning undetermined but possible flood hazard. The Little Colorado River, the unnamed ephemeral-artificial stream, and Jarvis Wash lie within a 100-year, 1 percent chance of flooding in any single year, floodplain. Water quality is monitored and listed by Arizona Department of Environmental Quality (ADEQ) for United States Environmental Protection Agency (EPA) 303(d) waterbody impairments under the federal Clean Water Act. Lyman Lake, located upstream on the Little Colorado River, was found impaired for Mercury in fish from 2004 to 2010, with probable sources of Atmospheric Deposition and Resource Extraction of Abandoned Mine Lands.

2.2.6 Range Improvements

The Little Reservoir Allotment consists primarily of private and State Trust land. Only range improvements on BLM-administered land are considered for this evaluation. See Figure 4 for Little Reservoir Range Improvements.

Figure 4. Little Reservoir Allotment Range Improvements



Source: USDI-BLM 2020

2.3 Biological Resources

This section discusses the biological resources within the Little Reservoir 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 Little Reservoir 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 Little Reservoir 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 Little Reservoir Allotment. The ESDs on BLM-administered portions of the allotment are also summarized. Detailed NRCS reports for each ESD are stored and accessed within the Ecosystem Dynamics Interpretive Tool (EDIT) available online at <https://edit.jornada.nmsu.edu/>. The ESD reference sheets are considered provisional, meaning the ecological site has undergone quality control and quality assurance, it contains a working state and transition model with enough information to identify the ecological site.

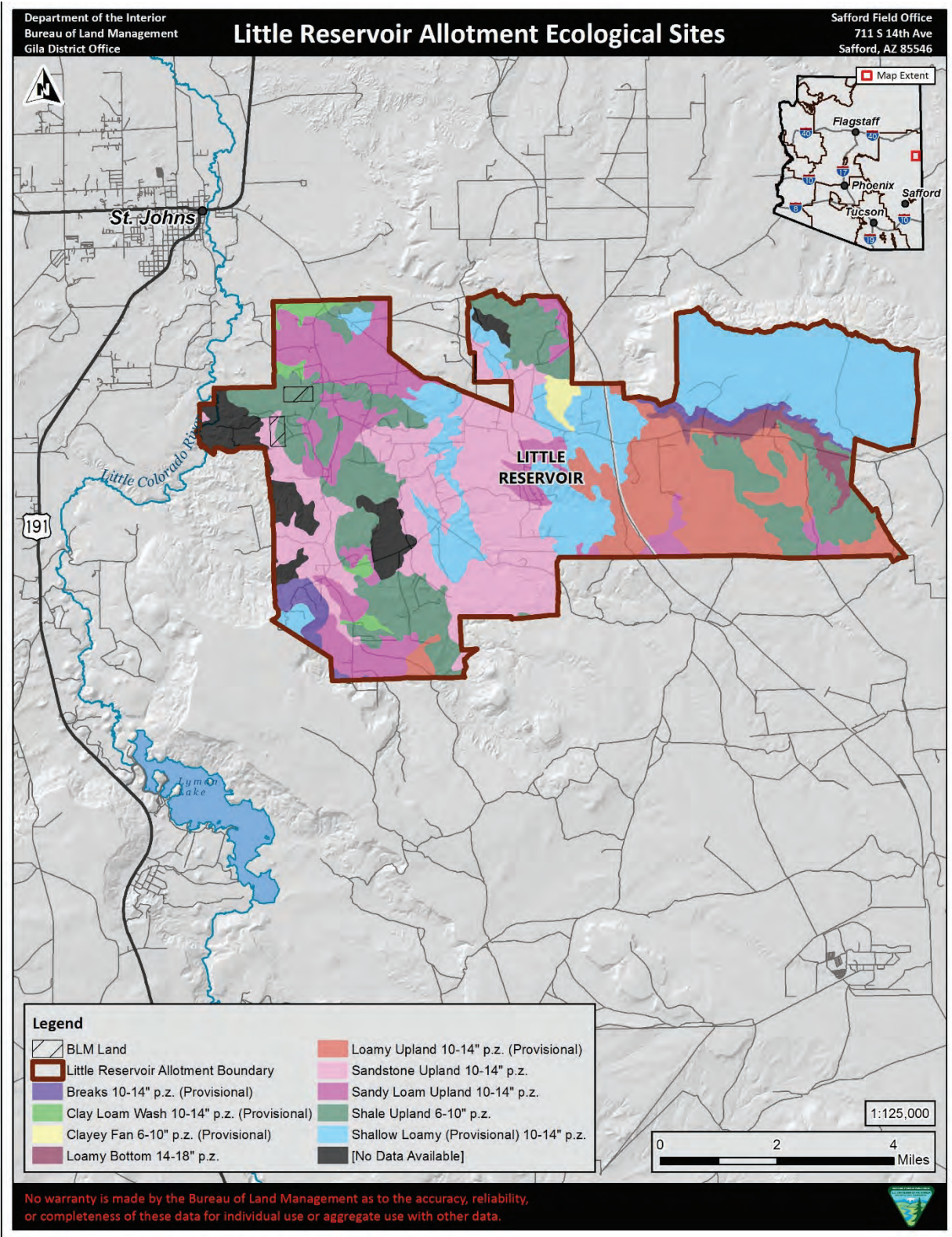
A key attribute of an ecological site is the historic climax plant community (HCPC), or reference state. The HCPC represents the natural potential plant community found on relatively undisturbed sites. The HCPC or reference state is often compared with existing range condition to determine current land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

Sandy Loam Upland 10-14" p.z. (R035XA117AZ) is not shown on BLM administered land, the ESD description is included however as it was determined that the monitoring site LR-1 reflects this ecological site, this site was used to establish DPC objectives and is discussed more in section 4.2.2 Key area Objectives.

Table 4. Ecological Sites Within the Little Reservoir Allotment

Ecological Site	Allotment Acres	BLM Acres	BLM Composition (%)
Breaks 10-14" p.z.	680	0	0
Clay Loam Wash 10-14" p.z.	383	0	0
Clayey Fan 6-10" p.z.	208	0	0
Loamy Bottom 14-18"	593	0	0
Loamy Upland 10-14" p.z.	3,993	0	0
Sandstone Upland 10-14" p.z.	6,141	39	24
Sandy Loam Upland 10-14" p.z.	3,949	0	0
Shale Upland 6-10" p.z.	6,104	124	76
Shallow Loamy 10-14" p.z.	7,754	0	0
No Data Available	1,543	0	0

Figure 5. Ecological Sites within Little Reservoir Allotment



Source: USDI-BLM 2020

Source: USDI-BLM 2020, USDA-NRCS 2015

Sandstone Upland 10-14" p.z. (R035XA115AZ)

This ecological site occurs in Common Resource Area 35.1 - the Colorado Plateau Mixed Grass Plains. It occurs in an upland position and is characterized by a sequence of flat to gently dipping sedimentary rocks eroded into plateaus, valleys and deep canyons. Sedimentary rock classes dominate the plateau with volcanic fields occurring for the most part near its margin. Slopes on rolling mesa tops are from 0 to 15 percent. On the rocky escarpments' slopes can reach up to 30 percent for short distances. It neither benefits significantly from run-in moisture nor is greatly affected by excess runoff. Precipitation in this common resource area ranges from 10 to 14 inches yearly with elevations from 4,800 to 6,300 feet. Soils are very shallow and shallow to sandstone and fractured shale bedrock.

The HCPC on this ecological site is dominated by warm season perennial grasses. Shrubs and forbs are well represented on the site. Dominant woody species are a mix of large and low growing shrubs along with scattered trees.

Grass species found in the Sandstone Upland include but are not limited to black grama (*Bouteloua eriopoda*), blue grama (*Bouteloua gracilis*), sideoats grama (*Bouteloua curtipendula*), bush muhly (*Muhlenbergia porteri*), and galleta (*Pleuraphis jamesii*). Forb species found include sphaeralcea (*Sphaeralcea spp.*), Texas zinnia (*Zinnia grandiflora*), winged buckwheat (*Eriogonum alatum*), and Wright birdsbeak (*Cordylanthus wrightii*). Shrubs species found include Bigelow sagebrush (*Artemisia bigelovii*), ephedra (*Ephedra spp.*), Mexican cliffrose (*Purshia mexicana*), Stansbury cliffrose (*Purshia stansburiana*), and fourwing saltbush (*Atriplex canescens*). Tree species found are oneseed juniper (*Juniperus monosperma*), Utah juniper (*Juniperus osteosperma*), and Colorado pinyon (*Pinus edulis*).

Shale Upland 6-10" p.z. (R035XB220AZ)

This ecological site occurs in Common Resource Area 35.1 - the Colorado Plateau Mixed Grass Plains. Elevations range from 3,800 to 5,800 feet and precipitation averages 6 to 10 inches per year. A slight majority of the precipitation arrives during the late fall, winter, and early spring. Physiographic features are characterized by a sequence of flat to gently dipping sedimentary rocks eroded into plateaus, valleys and deep canyons. Sedimentary rocks classes dominate the plateau with volcanic fields occurring for the most part near its margin.

Dominant grasses common to Shale Upland sites include Indian ricegrass (*Achnatherum hymenoides*), squirreltail (*Elymus elymoides*), galleta (*Pleuraphis jamesii*), and sixweeks grama (*Bouteloua barbata*). Forbs may include annual forbs, mealy goosefoot (*Chenopodium incanum*), springparsley (*Cymopterus spp.*), and nodding buckwheat (*Eriogonum cernuum*). Dominant shrubs may include shadscale saltbush (*Atriplex confertifolia*), mound saltbush (*Atriplex obovate*), whipple chollo (*Cylindropuntia whipplei*), and broom snakeweed (*Gutierrezia sarothrae*).

Sandy Loam Upland 10-14" p.z. (R035XA117AZ)

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. Most of the moisture falls as rain between July and September and is the most effective moisture for plant growth. This site occurs in an upland position on gently sloping plains or

alluvial fans. It neither benefits significantly from run-in nor experiences excessive runoff moisture.

The HCPC is made up primarily of warm season mid-grasses and short grasses with a small percentage of cool season grasses and half-shrubs.

Dominant grasses to the Sandy Loam Upland site include black grama (*Bouteloua eriopoda*), blue grama (*Bouteloua gracilis*), galleta (*Pleuraphis jamesii*), and alkali sacaton (*Sporobolus airoides*). Forbs may include annual and perennial forbs. Dominant Shrubs include Bigelow sagebrush (*Artemisia bigelovii*), fourwing saltbush (*Atriplex canescens*), Ephedra (*Ephedra spp.*), and winterfat (*Krascheninnikovia lanata*).

2.3.3 Wildlife Resources

This section discusses the wildlife resources in and around the Little Reservoir Allotment, including threatened and endangered species (T&E), BLM special status species, and species of economic and recreational importance. Refer to Appendix A for a complete list of species.

Threatened and Endangered Species

The grazing program for the BLM Gila District, including grazing activities within the Little Reservoir Allotment, was assessed pursuant to Section 7 of the Endangered Species Act (ESA) 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 USFWS rendered a Biological Opinion (BO) on the Gila District Livestock Grazing Program #22410-2006-F-0414 (2012). Additionally, on April 27, 2020, a generated report using the USFWS Information for Planning and Conservation (IPaC; N.d.) website indicated a total of eight Federally listed or proposed species were known or expected to occur within the allotment: Mexican gray wolf, yellow-billed cuckoo, northern Mexican gartersnake, little Colorado spinedace, and Zuni bluehead sucker. A species report generated on April 28, 2020 from the AZGFD Environmental Online Review Tool (AZGFD, N.d.) indicated that an additional three Federally listed species have the potential to occur within 5 miles of the allotment boundary and/or within the allotment: jaguar, Mexican spotted owl and the black-footed ferret.

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 an absence of forested habitat on the BLM-administered portions of the allotment, the Mexican spotted owl and Mexican gray wolf are expected to be absent within the jurisdiction of the BLM. Overall, the BLM-administered portions of the allotment lack suitable forested habitat to support Mexican gray wolves but is located within a Mexican wolf experimental population area and may be used by wolves for movement between blocks of suitable habitat.

The allotment lacks the basic components that define jaguar habitat based on the description provided by the U.S. Department of the Interior (USDI) USFWS (2013) Federal Register Notice for designating critical habitat. The jaguar is most commonly found in warm, tropical climates that are usually associated with water. Jaguars are rarely found in extensive arid areas and generally avoid open country like grasslands and Desertscrub as they prefer closed vegetative structures of nearly every tropical forest type. Due to the Little Reservoir Allotment's biotic communities consisting primarily of Colorado Plateau Mixed Grass Plains, jaguars are expected to be absent from the allotment.

The black-footed ferret is associated with native grassland communities and relies solely on prairie dog burrows for shelter and suitable dens to raise their young (USDI USFWS 2017). They are highly specialized predators that rely on prairie dogs for survival, which make up more than 90 percent of their diet (USDI USFWS 2017). Gunnison prairie dogs were noted in the AZGFD report as having the potential to occur in this area based on predicted range models; however, no prairie dogs have been observed on the allotment. Based on the ESDs of this allotment and the results of monitoring data, as described below in Section 6, BLM-administered portions of the allotment contain suitable habitat to support this species if it was present. Due to the lack of their primary prey species and source for burrows, this species is expected to be absent from the allotment.

The yellow-billed cuckoo is a riparian obligate species that utilizes 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 during times of migration. The northern Mexican gartersnake is known to be found in both lotic and lentic habitats including Cienegas, stock tanks, and river habitats including pools and backwaters (USDI USFWS 2014). There are no recorded observations of the northern Mexican gartersnake being present within the allotment. The little Colorado spinedace and Zuni bluehead sucker are expected to be absent from the BLM-administered portions of the allotment due to the absence of perennial water. See section 7.2 below for further discussion on riparian-wetland sites. Overall, due to the lack of perennial water sources and riparian habitat, the yellow-billed cuckoo, northern Mexican gartersnake, little Colorado spinedace, and Zuni bluehead sucker are expected to be absent from the allotment.

BLM 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 bald eagle (wintering only), golden eagle, ferruginous hawk, northern goshawk, western burrowing owl, American peregrine falcon, pinyon jay, Arizona myotis, spotted bat, pale Townsend's big-eared bat, Gunnison's prairie dog, northern leopard frog (low potential), little Colorado sucker, and speckled dace.

A total of five USFWS Birds of Conservation Concern (USDI USFWS, 2008) not already addressed as BLM sensitive species have the potential to occur within the allotment and are included in Appendix A. The Birds of Conservation Concern 2008 list considers bird species that are nongame species, gamebirds without a hunting season, subsistence-hunted nongame birds in Alaska, and ESA candidate, proposed, and recently delisted species (USDI USFWS 2008). Data derived from the AZGFD Environmental Online Review Tool (AZGFD, N.d.) was used for the migratory bird analysis.

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 several raptor species (i.e. hawks, eagles, owls) and a variety of passerine species. No surveys have been conducted specifically within this allotment for this LHE to determine presence, but these species have the potential of occurring if habitat is available. Bird species utilize the grassland and open shrub habitat for hunting prey. The Gunnison prairie dog utilizes grasslands and open shrub habitat for burrowing and foraging. Bat species may occur on the allotment if roosting habitat is available. Generally, the composition, structure, and distribution of habitat for

all classifications of sensitive species are intact and would be suitable for use if the species were present.

Species of Economic and Recreational Importance

Game species within the Little Reservoir Allotment include America pronghorn, mule deer, mountain lion, scaled quail and the mourning dove. Mountain lions occur in limited numbers or only occasionally on the allotment as resources meet their needs. Grasslands with dispersed shrub thickets and cacti, as well as grasslands associated with juniper woodlands, offer forage and cover habitat for the pronghorn, mule deer, scaled quail and mourning dove. Livestock waters allow game species to occupy habitat that would otherwise only be available ephemerally as precipitation allowed.

2.4 Special Management Areas

No Special Management Areas occur within the Little Reservoir Allotment.

2.5 Recreation Resources

Dispersed recreation activities that may occur on the Little Reservoir Allotment include small and big game hunting, target shooting, hiking, and off-highway vehicle operation. The allotment is comprised of mostly State Trust land, with some private land.

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 review was completed on 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 Little Reservoir Allotment.

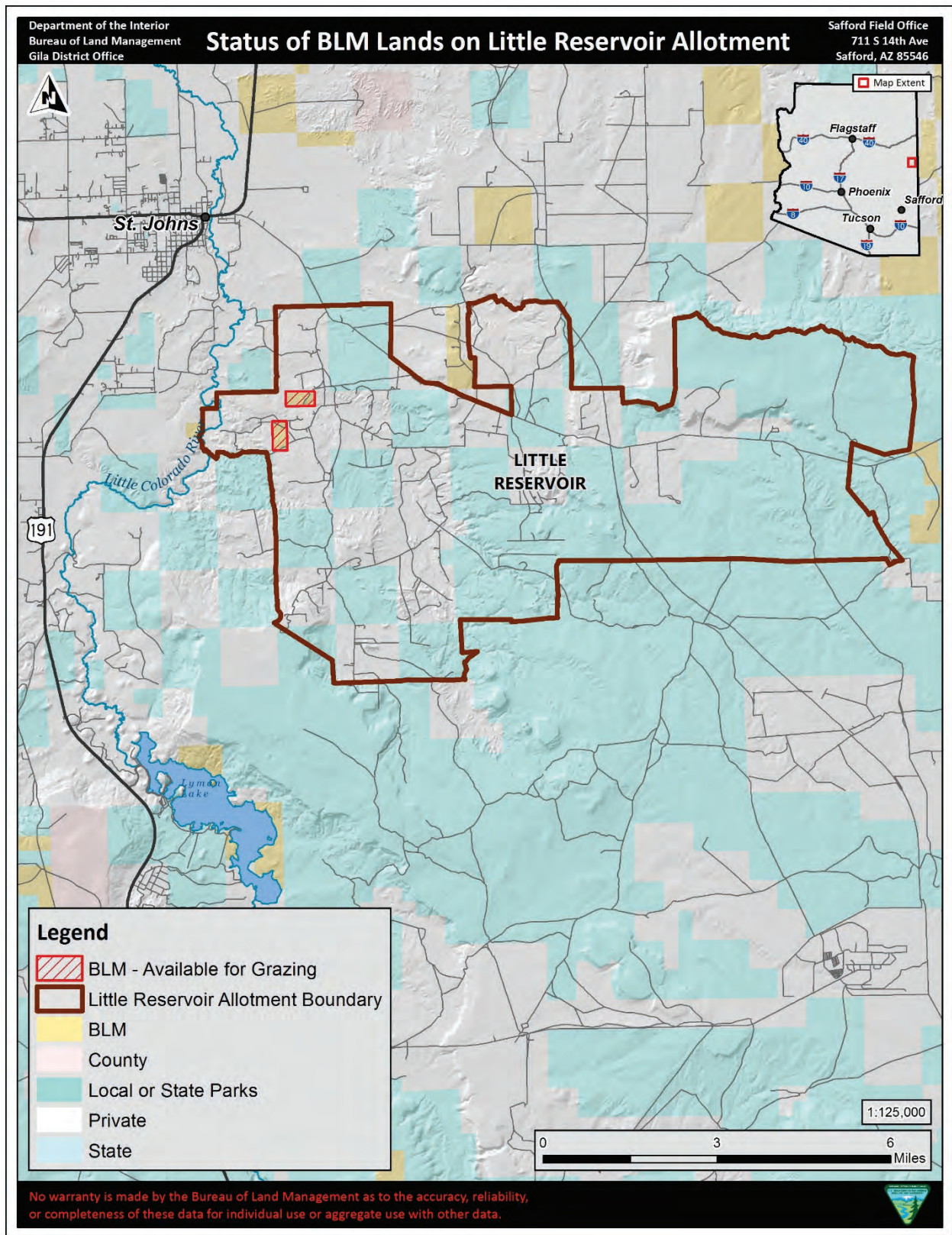
3.1 Grazing History

The BLM grazing lease for the Little Reservoir Allotment allows for one cattle year-round for a total of 6 animal unit months (AUMs) on BLM-administered land within the allotment. There are approximately 163 acres of BLM-administered land within the allotment authorized for grazing. The Little Reservoir Allotment has had many land exchanges throughout the years. Prior to this LHE the allotment boundary incorporated BLM-administered land near Lyman Lake Reservoir. These lands were leased to Lyman Lake State Park in 1984 under the Recreation and Public Purpose Act, a portion of the lands were relinquished back to the BLM but remained unauthorized for grazing. In the Arizona Grazing Environmental Impact Statement (EIS) dated

September 30, 1987 it stated that any presently unleased lands for livestock use would remain unleased, with vegetation reserved for wildlife and non-consumptive use. As these lands are not authorized for grazing, the allotment boundary for the Little Reservoir Allotment was updated for this LHE to accurately show the BLM-administered lands that are being evaluated.

Grazing management on the Little Reservoir Allotment consists of grazing on private land, State Trust land, and BLM-administered land. For allotments such as Little Reservoir, 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. Figure 6 shows the land status within the Little Reservoir Allotment.

Figure 6. Status of BLM Lands on Little Reservoir Allotment



Source: USDI-BLM 2020

3.2 Terms and Conditions for Permitted Use

Grazing use on the Little Reservoir 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 Little Reservoir Allotment Lease

Allotment Name/ Number	Livestock Number/Kind	Grazing Period Begin End	% Public Land	Active Use (AUM)
Little Reservoir (No. 06159)	1 Cattle	3/1 - 2/28 Yearlong	100	6

Source: BLM, Rangeland Administration System

Existing Other Terms and Conditions

- In accordance with Sec. 325, Title III, H.R. 2691, Department of the Interior and related agencies Appropriations Act, 2004 (P.L. 108-108), which was enacted on November 10, 2003, this grazing permit or lease is renewed under section 402 of the Federal Land Policy and Management Act of 1976, as amended (43 U.S.C. 1752), Title III of the Bankhead-Jones Farm Tenant Act (7 U.S.C. 1010 ET SEQ.), or, if applicable, section 510 of the California Desert Protection Act (16 U.S.C. 410AAA-50). In accordance with Public Law 108-108 the terms and conditions contained in the expired or transferred permit or lease *shall continue in effect under the renewed permit or lease until* such time as the Secretary of the Interior completes processing of this permit or lease in compliance with all applicable laws and regulations, at which time this permit or lease may be canceled, suspended, or modified, in whole or in part, to meet the requirements of such applicable laws and regulations.
- In order to improve livestock distribution on the public lands, all salt blocks and/or mineral supplements shall not be placed within 1/4 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 Code of Federal Regulations (CFR) 4130.3-2 (C).
- 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; 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.
- 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 Sec.

4140.1 (B) (1) and shall result in action by the authorized officer under 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 Little Reservoir Allotment per the Phoenix Resource Management Plan (RMP) (USDI 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, the Federal Land Policy and Management Act of 1976 (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 Little Reservoir 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 can 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, and watershed area. 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 BLM/USDA USFS, 1996).

The Key area LR-1 falls within the Shale Upland 6-10” p.z. as shown in Figure 7, however the DPC objectives were established using the Sandy Loam Upland 10-14” p.z. Ecological Site Description. The Shale Upland Site has a relatively low annual production rate and does not mention a juniper component in the state and transition model, the site clearly shows a strong juniper component and much more vegetation as can be seen from both the monitoring (Appendix B) and site photos (Section 6.2) than that described in the Shale Upland Site. It is also worth noting that the Sandy Loam Upland site is within 560 meters of the Key Area monitoring site, this was verified using Web Soil Survey available online at <https://websoilsurvey.sc.egov.usda.gov/>. This was discussed and verified internally with the Assistant Field Manager, Natural Resource Specialist, Hydrologist, and Rangeland Management Specialist and all agreed that the Sandy Loam Upland 10-14” p.z. ecological site would be the most appropriate ESD to use for the interpreting indicators or rangeland health and establishing DPC objectives.

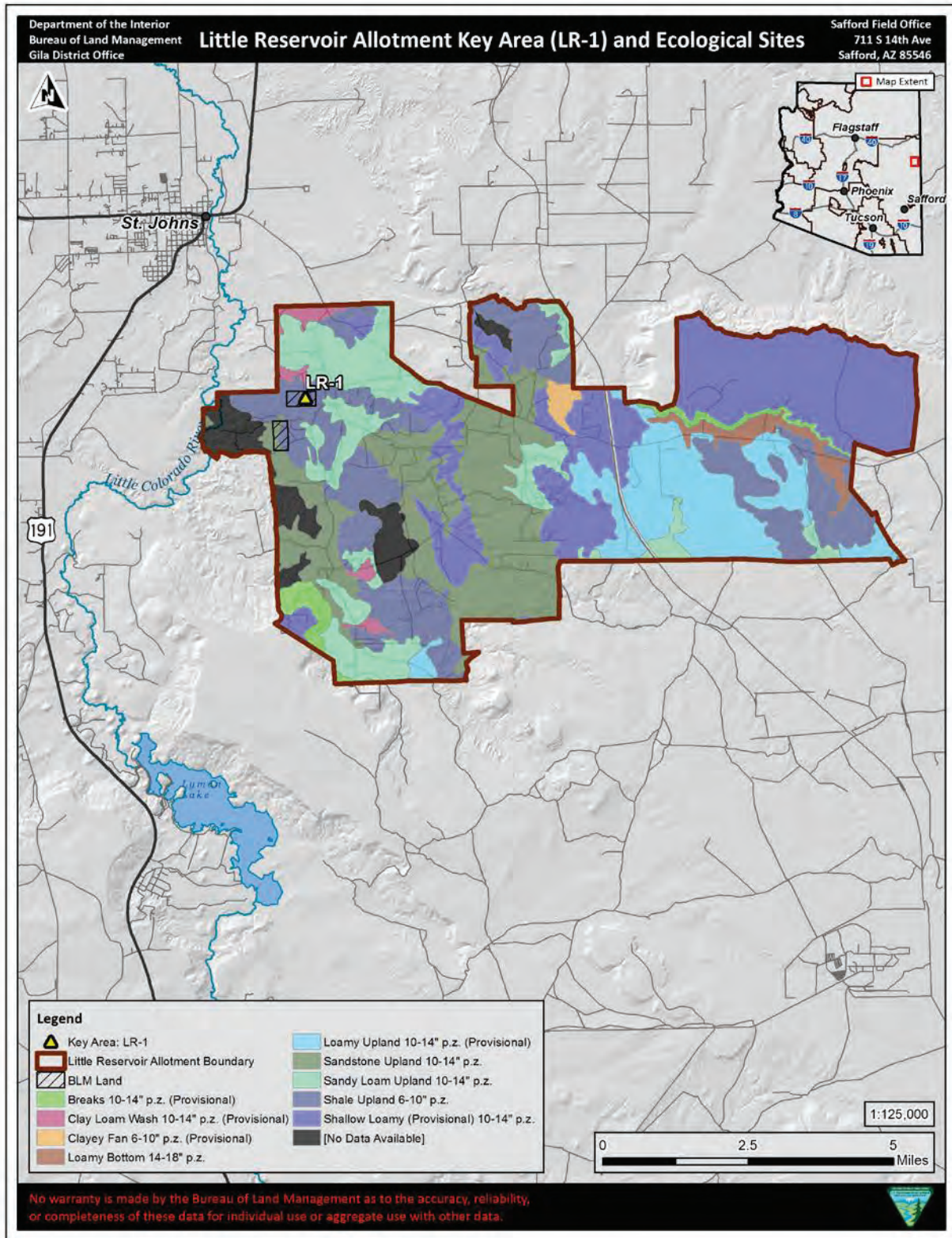
Refer to Table 6 and Figure 7 for the location of the key area on the Little Reservoir Allotment. Addressed in this LHE report are the results from the key area monitored by the U.S. Forest Service (USFS) TEAMS in 2016 (Appendix B).

The key area objective for the Little Reservoir 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 Little Reservoir Allotment Key Area

Key Area	Ecological Site	Ecological Site ID	GPS Coordinates (NAD83 CONUS)
LR-1	Sandy Loam Upland 10-14” p.z.	R035XA117AZ	12S UTM 653290 m E 3814426 m N

Figure 7. Little Reservoir Allotment Key Area (LR-1) and Ecological Site



Source: USDI-BLM 2020, 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 rated 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**. There are no riparian-wetland habitats on BLM-administered lands.

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. The DPC objectives are typically specific to the ecological sites within the allotment. Therefore, the BLM interdisciplinary (ID) team established DPC objectives based on the ESD reference sheet for Sandy Loam Upland 10-14" p.z. (R035XA117AZ).

Desired resource conditions are based upon the following DPC objectives:

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

The ESD reference sheet for Sandy Loam Upland 10-14" p.z. (R035XA117AZ) defines the reference state as follows:

The reference state plant community is composed primarily of warm season mid grasses and short grasses with a small percentage of cool season grasses and half-shrubs. Dominant grasses include blue grama, black grama, sand dropseed and galleta. Dominant shrubs include fourwing saltbush and Greene's rabbitbrush. Natural climatic variation result in changes in the amount of and ratio of both individual plants and warm season versus cool season plants, especially grasses.

The full ESD report is available at <https://edit.jornada.nmsu.edu/>.

Appendix C presents a detailed methodology for deriving the DPC objectives for the Sandy Loam Upland 10-14" p.z. (R035XA117AZ) ecological site.

Canopy/Basal Cover

The sites' reference sheet indicates a desired range of canopy cover as follows.

- 37 to 67 percent canopy cover
- 15 to 35 percent basal cover

Plant Community Composition

The sites' reference sheet indicates a desired range of plant community composition as follows:

- 54 to 84 percent grasses
- 12 to 40 percent shrubs
- 3 to 9 percent forbs
- 0 to 3 percent trees

Bare Ground

The sites' reference sheet indicates a desired range of bare ground as follows:

- 35 to 45 percent bare ground

Litter Cover

The sites' reference sheet indicates a desired range of litter cover as:

- 25 to 40 percent litter cover

Summary

In summary, the Little Reservoir Allotment DPC objectives for key area LR-1, based on the Sandy Loam Upland 10-14" p.z. (R035XA117AZ) ecological site, are presented as the following evaluation area DPC objectives:

- Maintain an average canopy cover of 37 to 67 percent, and an average basal cover between 15 to 35 percent.
- Maintain an average plant composition of 54 to 84 percent grasses, 12 to 40 percent shrubs, 3 to 9 percent forbs, and 0 to 3 percent trees.
- Maintain average bare ground between 35 to 45 percent.
- Maintain an average litter cover of 25 to 40 percent.

The recommended levels of canopy cover and basal cover will provide enough cover for wildlife species 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 Little Reservoir Allotment while continuing to achieve land health standards.

The BLM-administered land is less than one percent of the overall Little Reservoir Allotment, which is intermingled in checkerboard fashion with state and private 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. Rangeland Inventory and Monitoring Methodology

The Arizona standards for rangeland health were assessed for the Little Reservoir Allotment by a U.S. Forest Service ID team on May 12, 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 (USDA NRCS, 2015), Ecosystem Dynamics Interpretive Tool (EDIT, 2008), 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.

5.1 Monitoring Protocols

Monitoring occurred on the Little Reservoir Allotment at key area LR-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 Sandy Loam Upland 10-14" p.z. (R035XA117AZ). 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. The LPI method is rapid and accurate 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.

5.1.1 Indicators of Rangeland Health

The five steps for Interpreting Indicators of Rangeland Health (IIRH) 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 IIRH 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 IIRH 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

6. Management Evaluation and Summary of Studies Data

The following information is the evaluation and summary of the 2016 inventory and monitoring that has been conducted on the Little Reservoir Allotment.

6.1 Actual Use

Full permitted AUMs have been implemented on the allotment during the evaluation period years (2007-2016) totaling 1 head of cattle or 6 AUMs each year.

Livestock grazing for the Little Reservoir 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.

6.2 Interpreting Indicators of Rangeland Health

The IIRH assessment of the three rangeland attributes was completed at key area LR-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 LHE is provided in Appendix B. A summary of the IIRH conducted at key area LR-1 on the Little Reservoir Allotment is presented in Table 7 below.

Table 7. Summary of Range Health Assessment Ratings

Key Area	Ecological Site	Range Health Attributes – Degree of Departure		
		Soil	Hydrology	Biotic Integrity
LR-1	Sandy Loam Upland 10-14” p.z.	None to Slight	None to Slight	None to Slight

17 Indicators: Key Area LR-1 (Sandy Loam Upland 10-14” p.z. [R035XA117AZ])

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

- 1. Number and Extent of Rills:** None present on this site. Some minor rills on slopes greater than five percent may form due to moderate permeability and moderate runoff characteristics of the soils.
- 2. Presence of Water Flow Patterns:** Some water flow patterns may occur on soils that have sandy clay loam or clay loam subsurface textures, if these textures are close to the surface. These soils have moderate permeability and moderate runoff. Water flow patterns on these soils are commonly less than 4 feet long, but may be longer on steeper slopes, generally occupying less than ten percent of the ground cover.

3. **Number and Height and of Erosional Pedestals or Terracettes:** Pedestals may be common, but short in height (1/2 inch). Terracettes are uncommon. Both may be more developed and especially common during drought, due to high wind erosion hazard of the soils. The moderate permeability and moderate runoff conditions could lead to a few pedestals and terracettes being formed by water erosion.
4. **Bare Ground from Ecological or other Studies:** Bare ground averages 35 to 45 percent in normal years. Some sites may have biological crusts ranging from zero to five percent. Drought may lead to an increase in bare ground.
5. **Number of Gullies and Erosion Associated with Gullies:** None.
6. **Extent of Wind Scoured, Blowouts and/or Depositional Areas:** None. High wind erosion hazard occurs on soils with a surface texture of sandy loam
7. **Amount of Litter Movement:** Most herbaceous and fine woody litter will be transported by wind and in water flow pathways, while a small percentage stays in place. Coarse woody litter and duff accumulate under shrub and tree canopies.
8. **Soil Surface (top few mm) Resistance to Erosion:** Soil aggregate stability ranges from four to five under canopy and two to three in the plant interspaces. A few soils have gravelly surfaces, but most soils do not have any rock fragments. When well vegetated, these soils have a moderate to high resistance to water erosion, but only a low resistance to wind erosion.
9. **Soil Surface Structure and SOM Content:** Surface structure is mostly granular (weak to moderate, fine to medium), but some soil surfaces are platy (weak to moderate, medium to thick). Surface thickness mostly ranges from 3 to 6 inches but can range from between 2 to 10 inches. Color is variable depending on parent material.
10. **Effect on Plant Community Composition (relative proportion of different functional groups) and Spatial Distribution on Infiltration and Runoff:** This site is dominated by perennial grasses with 20 to 40 percent cover, then by evergreen shrubs 15 to 20 percent cover, 1 to 5 percent cover in forbs, and 1 to 2 percent cover in trees in some locations. Both canopy and basal cover values of grasses and some shrubs decrease during prolonged drought. This site is moderately effective at capturing and storing precipitation because of soil textures, slope and vegetative composition.
11. **Presence and Thickness of Compaction Layer:** None. These soils are not easily compacted. Many of the soils have a weak granular structure.
12. **Functional/Structural Group:** Dominant: warm season colonizing grasses (20 to 30 percent)>shrubs, Sub-dominant: shrubs (15 to 20)> cool season bunch grasses (5 to 15 percent)> warm season bunch grasses (5 to 10 percent), Other: forbs (1 to 5 percent)>trees (<2 percent).
13. **Amount of Plant Mortality and Decadence:** In a normal year up to ten percent of grasses and shrubs die off. During and after drought years there can be from 10 to 20 percent die off of shrubs and grasses. Severe winter droughts affect shrubs, trees and cool season grasses the most. Severe summer droughts affect the warm season grasses the most.
14. **Average Percent Litter Cover:** Average percent litter cover 25 to 40 percent and depth

1/8 inches. Within plant interspaces litter ranges from 10 to 20 percent cover with depths up to 1/8 inch, while under shrub and tree canopies it ranges from 50 to 75 percent cover with depths from 1/8 to 1/2 inches thick.

15. Expected Annual Production: Average annual production on this site is expected to be 700 to 800 lbs/acre. In a year of average annual precipitation.

16. Potential Invasive Species: Broom snakeweed (*Gutierrezia sarothrae*), Rabbitbrush (*Chrysothamnus spp.*), false buffalograss (*Munroa squarrosa*) and sixweeks fecue (*Vulpia octoflora*) are native to the site, but they have the potential to increase and dominate the site after unmanaged grazing. Utah juniper (*Juniperus osteosperma*), oneseed juniper (*Juniperus monosperma*), and Colorado pinyon (*Pinus edulis*) are native to the site but have the potential to increase and dominate the site after disturbance and/or fire exclusion. Cheatgrass (*Bromus tectorum*) is an exotic grass that has the potential to invade and dominate the site, with or without disturbance. Lambsquarters (*Chenopodium album*) and Russian thistle (*Salsola tragus*) are annual exoctic forbs that have the potential to invade and dominate the site after disturbance, especially if the site is near farm fields or disturbed lands.

17. Perennial Plant Reproductive Capability: All plants native to this site are adapted to the climate and are capable of producing seeds, stolons and rhizomes except during the most severe droughts.

Figure 8. Little Reservoir Key Area Monitoring Photo 1



Source: USFS TEAMS 2016

Figure 9. Little Reservoir Key Area Monitoring Photo 2



Source: USFS TEAMS, 2016

Figure 10. Little Reservoir Key Area Monitoring Photo 3

Source: USFS TEAMS, 2016

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, pedestals and/or terracettes were not observed and were rated None to Slight. Bare ground was measured at 7 percent and the site had 62 percent canopy cover and was rated at None to Slight. There was no evidence of wind-scouring observed 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 None to Slight, the soil is naturally armored by gravel. Soil surface loss or degradation was rated None to Slight as soil remained intact. No compaction layers were observed and was rated None to Slight.

Ten indicators for soil and site stability were rated None to Slight. Therefore, the overall rating for the soil and site stability attribute is 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, pedestals and/or terracettes were not observed and were rated None to Slight. Bare ground was measured at 7 percent and the site had 62 percent canopy cover 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 None to Slight, the soil is

naturally armored by gravel. Soil surface loss or degradation was rated None to Slight as soil remained intact. Plant community composition was within ESD parameters and the dominate vegetation classes were as expected, infiltration would not be negatively impacted with this plant community and was rated None to Slight. No compaction layers were observed and was rated None to Slight. Litter amount was measured at 38 percent and fell within the ESD parameters and was rated None to Slight.

Ten indicators for hydrologic function were rated None to Slight. Therefore, the overall rating for the hydrologic function attribute was rated None to Slight.

Rangeland Health Attribute 3: Biotic Integrity

Soil surface resistance to erosion was rated None to Slight, soils were naturally armored by gravel. Soil surface loss or degradation was rated None to Slight as soils remained intact. Plant composition and functional structure groups were rated None to Slight, warm season grasses dominated the site followed by shrubs and forbs. The composition of trees was higher than expected but the function of the ecological site was not impacted. Plant mortality and decadence was rated None to Slight because there was an even distribution of age classes amongst the vegetation. Litter was measured at 38 percent and fell within the ESD parameters, it was rated None to Slight. Annual production was rated None to Slight. Invasive plants were not observed and was rated None to Slight. Reproductive capability of perineal plants was rated None to Slight because the native plants are adapted to the climate and capable of reproducing except during the most severe droughts.

Nine indicators for Biotic Function were rated as None to Slight. Therefore, the overall rating for the biotic function attribute is None to Slight.

7. 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 landform.

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 Little Reservoir 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 on BLM managed land within the Little Reservoir 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 Little Reservoir 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 IIRH assessment 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 indicate that the site is achieving the objectives for canopy cover, plant community composition, bare ground, and litter cover. The vegetation composition and density are 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 37 to 67 percent, and an average basal cover of 15 to 35 percent.

LR-1: Canopy cover was measured at 62 percent, and basal cover at 4 percent. Canopy cover was within the range of acceptability and is meeting the standard. Basal cover was slightly below the DPC objective, however due to the relation of basal cover with canopy cover and the high amount observed it was determined the DPC objectives basal cover on the Little Reservoir Allotment are being achieved.

The DPC objectives for plant community compositions are established as follows: maintain an average of 54 to 84 percent grasses, 12 to 40 percent shrubs, 3 to 9 percent forbs, and 0 to 3 percent trees. The following data was collected for the LHE:

LR-1: Plant community composition was derived from the LPI data, see Appendix B. The dominant vegetation type is grasses at 70 percent composition. Shrubs were at 14 percent, forbs were at 5 percent composition, and trees were at 11 percent.

The data from the LPI indicates that the dominant functional groups are as expected from the ESD reference sheet. All vegetation groups met the DPC objectives except for the composition of trees. In the ESD reference sheet, the state and transition model depicts the different communities observed within the ecological site. Community phase 3.1 is a mixed understory with juniper overstory, this community can be observed dependent on grazing intensity, fire regimes, and climate fluctuations. There is a natural range of variability within any ecological site and given that the other functional structural groups are as expected it was determined that overall DPC objectives for plant community compositions on the Little Reservoir Allotment is being achieved.

The DPC objective is to maintain bare ground between 35 and 45 percent and was deemed sufficient for preventing accelerated erosion. The data collected for the LHE indicates:

LR-1: Bare ground was measured at 7 percent. The percentage of bare ground exceeds the objective for this site. The site had 93 percent presence of rock fragments and or 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 Little Reservoir Allotment is being achieved.

The DPC objective for litter is a range of 25 to 40 percent. Data collected for the LHE indicates:

LR-1: Litter was measured at 38 percent, falling within the range of acceptability. Overall, the DPC objectives for litter cover on the Little Reservoir Allotment is being achieved.

8. Recommended Management Actions

8.1 Terms and Conditions

Based on the determinations in *Section 7 Determinations of Land Health Standards*, the following management actions are recommended:

1. Grazing management on the Little Reservoir 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)
Little Reservoir (No. 06159)	1 Cattle	3/1 2/28 Yearlong	100	6

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 deleted as it is a duplicate of the Standard Terms and Conditions associated with this BLM lease:
- 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.
 - 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; 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.
4. 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.
 - Lessee shall provide reasonable administrative access across private and leased lands to the BLM for the orderly management and protection of the public lands.

9. List of Preparers

BLM Staff

Amelia Taylor, Assistant Field Manager - Renewable Resources

Brandon Church, Rangeland Management Specialist

Clara Gauna, Technical Writer-Editor

Dan McGrew, Cultural Resource Specialist

Bob Wells, Outdoor Recreation Planner

Shelby Leachet, GIS Specialist

Amanda Eavenson, Hydrologist

Emily Burke, Natural Resource Specialist (Wildlife) and Pesticide Use Coordinator

USFS TEAMS Participants

Doug Middlebrook, Wildlife Biologist

Troy Grooms, Rangeland Management Specialist

10. Consultation

Arizona Game and Fish Department
USFWS, Arizona Ecological Services
Nicoll Brothers, Little Reservoir Allotment Lessee


11. Authorized Officer Concurrence

I have reviewed the determinations presented in *Section 7 Determinations of Land Health Standards* and the grazing and other management actions identified in *Section 8 Recommended Management Actions*.

- I concur with the conclusions and recommendations as written.
- I do not concur.
- I concur, but with the following modifications.

SCOTT COOKE

Scott C. Cooke
Field Manager

 Digitally signed by SCOTT COOKE
Date: 2020.07.28 06:46:45 -07'00'

Date

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Appendix A: Federally Listed, BLM Special Status, and General Wildlife Species

Federally Listed Species			
Species	Federal Status	Critical Habitat	Comments
Mexican spotted owl <i>Strix occidentalis lucida</i>	Threatened	Designated	This species occurs in the oak woodland and mixed conifer forests of mountainous areas of Arizona. There is no suitable habitat on the Little Reservoir Allotment to support Mexican spotted owl and there is no critical habitat within the allotment.
Yellow-billed cuckoo (distinct population segment) <i>Coccyzus americanus</i>	Threatened	Proposed	Yellow-billed cuckoos primarily occur in cottonwood-willow gallery forests of riparian zones of Arizona. The Little Reservoir 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.
Jaguar <i>Panthera onca</i>	Endangered	Designated	The Little Reservoir Allotment is not within the designated critical habitat. The USFWS issued a letter of concurrence (USDI USFWS 2013) for the determination of “may affect, not likely to adversely affect” regarding the Gila District Grazing Program’s actions. Conservation measures will continue to be followed and implemented.
Black-footed ferret <i>Mustela nigripes</i>	Endangered	No Designation	The black-footed ferret relies solely on native grasslands and the presence of prairie dogs for their prey source and for providing burrows to use for shelter and nesting. The BLM-administered portions of the Little Reservoir Allotment provide suitable grassland habitat to support this species; however, no prairie dogs are known to occur within the allotment. Due to the absence of the key prey source this species is expected to be absent from the allotment.
Mexican wolf <i>Canis lupus baileyi</i>	Endangered, experimental	No Designation	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.

Northern Mexican gartersnake <i>Thamnophis eques megalops</i>	Threatened	Proposed	The northern Mexican garter snake is a riparian obligate species; there is no suitable habitat on the Little Reservoir Allotment.
Zuni bluehead sucker <i>Catostomus discobolus yarrowi</i>	Endangered	Designated	No perennial water or suitable aquatic habitat exist on the Little Reservoir Allotment.

Migratory Birds, Birds of Conservation Concern ^{1, 2}	
Species	Comments
American peregrine falcon <i>Falco peregrinus anatum</i>	Addressed as BLM Sensitive Species in table below.
Bald eagle <i>Haliaeetus leucocephalus</i>	Addressed as BLM Sensitive Species in table below.
Bendire's thrasher <i>Toxostoma bendirei</i>	Found in desert habitats including arid grasslands, shrublands, and agricultural habitats. Prefers more open areas with shorter vegetation. The allotment provides adequate habitat to support this species if present. Low-to-moderate potential for this species to occur.
Chestnut-collared longspur <i>Calcarius ornatus</i>	Found in shortgrass prairies, rangelands, and desert grasslands. Eastern Arizona contains wintering habitat for this species. The allotment provides a minimal amount of potentially suitable wintering habitat to support this species. Low potential for this species to occur.
Ferruginous hawk <i>Buteo regalis</i>	Addressed as BLM Sensitive Species in table below.
Golden eagle <i>Aquila chrysaetos</i>	Addressed as BLM Sensitive Species in table below.
Gray vireo <i>Vireo vicinior</i>	Found in pinyon-pine/juniper, mesquite scrub, oak scrub, and chaparral habitats. They prefer hot, arid habitats that usually have dense brush from near the ground to six feet high. There is a low potential for this species to occur on the allotment.
Juniper titmouse <i>Baeolophus ridgwayi</i>	Found mainly in dry, open pinyon-pine/juniper woodlands of the Great Basin and Upper Sonoran Zone. The species occurs with sagebrush, Joshua tree, and other understory shrub species. Older pinyon-pine/juniper trees are needed for nesting cavities. This allotment provides a minimal amount of low-quality pinyon-pine/juniper habitat to support this species. Low potential for this species to occur.
Northern goshawk <i>Accipiter gentilis</i>	Addressed as BLM Sensitive Species in table below.
Pinyon jay <i>Gymnorhinus cyanocephalus</i>	Addressed as BLM Sensitive Species in table below.
Prairie falcon <i>Falco mexicanus</i>	Found near bluffs and cliffs for nesting, including in alpine habitat. Breeding habitats include grasslands, shrub steppe desert, areas of mixed shrubs and grasslands, or alpine tundra that supports their prey base. Foraging sometimes occurs in agricultural fields. The

¹The 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>

Migratory Birds, Birds of Conservation Concern ^{1, 2}	
	allotment lacks the majority of their required habitat for nesting and breeding but may be used for opportunistic foraging. Low potential for this species to occur.
Western burrowing owl <i>Athene cunicularia hypugaea</i>	Addressed as BLM Sensitive Species in table below.

BLM Sensitive Species	
Species	Comments
Amphibians	
Northern leopard frog <i>Lithobates pipiens</i>	No perennial water or suitable aquatic habitat exist on the Little Reservoir Allotment. Low potential of occurrence.
Birds	
American peregrine falcon <i>Falco peregrinus anatum</i>	Found near cliffs for nesting and in any open habitat that is near large open bodies of water. This allotment could be used for foraging but would not support breeding or wintering individuals. Low potential for this species to occur.
Bald eagle (wintering) <i>Haliaeetus leucocephalus</i>	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 <i>Buteo regalis</i>	Ferruginous hawk nest in grasslands, shrublands and forest lands. Suitable nesting habitat occurs on the Little Reservoir Allotment. There are no known impacts of livestock on ferruginous hawks.
Golden eagle <i>Aquila chrysaetos</i>	There is no suitable nesting habitat for golden eagles on the Little Reservoir Allotment. Golden eagles may fly and hunt over the areas of the allotment. There are no known impacts of livestock on golden eagles.
Northern goshawk <i>Accipiter gentilis</i>	Throughout their range, whether at sea level or in alpine settings, Northern Goshawks nest in mature and old-growth forests with more than 60% closed canopy. Goshawks hunt in the forest, along riparian corridors, and in more open habitat, such as the sagebrush steppes of Nevada, where their broad, powerful wings can quickly generate speed to ambush prey. The BLM-administered portions of this allotment, and the adjacent areas, lack the suitable habitat to support this species.
Pinyon jay <i>Gymnorhinus cyanocephalus</i>	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.
Western burrowing owl <i>Athene cunicularia hypugaea</i>	Can be found in open, treeless areas with low, sparse vegetation, usually on gently sloping terrain. Often associated with grasslands, deserts, and steppe environments as well as golf courses, pastures, agricultural field, airport medians, and road embankments. They are often associated with burrowing mammals such as prairie dogs and ground squirrels. This allotment provides suitable wintering habitat but lacks the presence of burrowing animals.
Fish	
Little Colorado sucker <i>Catostomus sp. 3</i>	No perennial water or suitable aquatic habitat exist on the BLM-administered portions of the Little Reservoir Allotment.
Speckled dace <i>Rhinichthys osculus</i>	No perennial water or suitable aquatic habitat exist on the BLM-administered portions of the Little Reservoir Allotment.

BLM Sensitive Species	
Species	Comments
Invertebrates	
There are no BLM sensitive invertebrates known to occur in the BLM-administered portions of the Little Reservoir Allotment.	
Mammals	
Arizona myotis <i>Myotis occultus</i>	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.
Gunnison's prairie dog <i>Cynomys gunnisoni</i>	Gunnison's prairie dog is not known to be present on the allotment, however suitable habitat does exist and may be colonized if the species becomes more abundant in the surrounding area.
Pale Townsend's big-eared bat <i>Corynorhinus townsendii</i>	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.
Spotted bat <i>Euderma maculatum</i>	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.
Reptiles	
There are no BLM sensitive reptiles known to occur in the BLM-administered portions of the Little Reservoir Allotment.	
Plants	
There are no BLM sensitive plants known to occur in the BLM-administered portions of the Little Reservoir Allotment.	

Species of Economic and Recreational Importance	
Common Name	Scientific Name
America pronghorn	<i>Antilocapra americana</i>
Mule deer	<i>Odocoileus hemionus</i>
Mountain lion	<i>Puma concolor</i>
Mourning dove	<i>Zenaida macroura</i>
Scaled quail	<i>Callipepla squamata</i>

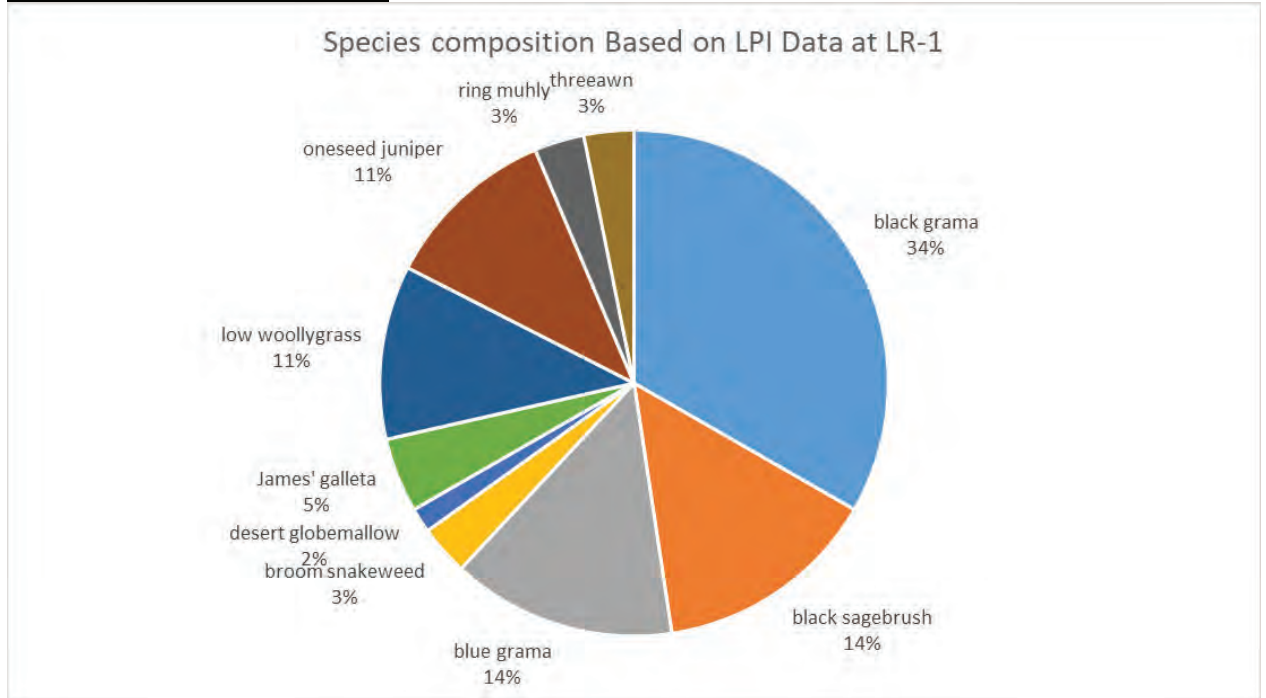
Appendix B: USFS TEAMS Monitoring Data 2016

Summary of LR-1 Line Point Intercept Data.

Key Area Information	Species	Line point intercept cover at LR-1	
		Canopy	Basal
Little Reservoir Allotment	Black grama (<i>Bouteloua eripoda</i>)	21%	1%
Ecological Site ID: R035XA117AZ	Black sagebrush (<i>Artemisia nova</i>)	9%	1%
UTM 653290 E – 3814426 N	Blue Grama (<i>Boutelous gracilis</i>)	9%	0%
	Broom snakeweed (<i>Gutierrezia sarothrae</i>)	2%	0%
	Desert globemallow (<i>Sphaeraclea ambigua</i>)	1%	1%
	James’ galleta (<i>Pleuraphis jamesii</i>)	3%	0%
	Low woollygrass (<i>Dasyochloa pulchella</i>)	7%	1%
	Oneseed juniper (<i>Juniperus monosperma</i>)	7%	0%
	Ring Muhly (<i>Muhlenbergia torreyi</i>)	2%	0%
	Threeawn (<i>Aristida</i>)	2%	0%
Cover/Litter/Bare Ground			
Bare Ground	7%		
Basal Cover	4%		
Canopy Cover	63%		
Litter	38%		
Surface Fragments > ¼” & ≤ 3”	53%		
Surface Fragments > 3”	20%		

Desired plant Community Compared to Species Composition From LPI Data.

DPC Objectives for Plant Community Composition	Species Composition LR-1
Grasses 54-84% Composition	black grama - 34% blue grama -14% low woollygrass 11% threeawn - 3% ring muhly - 3% James' galleta – 5%
	Total – 70%
Forbs 3-9% Composition	Globemallow - 2% broom snakeweed – 3%
	Total - 5%
Shrubs 12-40% Composition	black sagebrush – 14%
	Total – 14%
Trees 0-3% Composition	oneseed juniper – 11%
	Total – 11 %



Appendix C: Desired Plant Community Objectives and Methodology

Basal Cover:

Sandy Loam Upland 10-14" p.z. (R035XA117AZ)

Basal cover was calculated from table 6 of the ESD reference sheet (pictured below), the highlighted sections are the range for basal cover. The percentages were summed up giving a basal cover range of 15-35% basal cover. The ESD reference sheet was accessed through <https://edit.jornada.nmsu.edu/catalogs/esd/035X/DX035X01I117>

ESD Reference sheet Table 6:

The reference state plant community is composed primarily of warm season mid-grasses and short grasses with a small percentage of cool season grasses and half-shrubs. Dominant grasses include blue grama, black grama, sand dropseed and galleta. Dominant shrubs include fourwing saltbush and Greene's rabbitbrush. Natural climatic variation result in changes in the amount of and ratio of both individual plants and warm season versus cool season plants, especially grasses.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	245	560	805
Shrub/Vine	50	120	175
Forb	25	60	85
Tree	5	20	30
Total	325	760	1095

Table 6. Soil surface cover

Tree basal cover	0%
Shrub/vine/liana basal cover	0-5%
Grass/grasslike basal cover	15-25%
Forb basal cover	0-5%
Non-vascular plants	0-1%
Biological crusts	0-15%

Canopy Cover:

Canopy cover was taken from Indicator 10 of the Sandy Loam Upland 10-14” p.z. (R035XA117AZ) ecological site, the canopy cover by each vegetation type is listed and provides a low and high value. these numbers were added up and resulted in a canopy cover range of 37% to 67%.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** This site is dominated by perennial grasses with 20 to 40% cover, then by evergreen shrubs 15 to 20% cover, 1 to 5% cover in forbs, and 1 to 2% cover in trees in some locations. Both canopy and basal cover values of grasses and some shrubs decrease during prolonged drought. Due to soil textures, slope and vegetative composition, this site is moderately effective at capturing and storing precipitation.

Desired Plant Community Composition:

The table below presents the process used for establishing Desired Plant Community Composition for the Sandy Loam Upland 10-14” p.z. Ecological Site. Step 1 demonstrates the process of calculation species composition using canopy cover data, this data was taken directly from indicator ten of the ESD sheet. Step 2 uses the same process but is calculated using annual production by plant type, obtained from table 8 of the ESD sheet. Step 3 of the table are the combined results based on the calculations done in Step 1 and Step 2.

Desired Plant Community Composition Methodology		
ESD = Ecological Site Description for Sandy Loam Upland 10-14” p.z. (R035XA117AZ)		
Step 1: DPC Composition Averages based on Canopy Cover from Indicator 10		
Methodology: Composition % by vegetation type = vegetation type divided by total Avg of all vegetation for both low and high values (Note all values rounded to the nearest percent)		
Total Range of Canopy Cover for All Vegetation		
<i>(* Note this is the sum of all values as provided from Indicator 10)</i>		
37% - 67%		
Vegetation Type	Low Cover Values	High Cover Values
Grasses	$20/37*100 = 54\%$	$40/67*100 = 59\%$
Shrubs	$15/37*100 = 40\%$	$20/67*100 = 29\%$
Forbs	$1/37*100 = 3\%$	$2/67*100 = 7\%$

Trees	$1/37 * 100 = 3\%$	$2/67 * 100 = 3\%$
<p>Step 2: DPC Composition based on Annual Production by Plant Type Provided by ESD Reference Sheet</p> <p>Methodology: Species Composition = Vegetation type production / Total production for both low and high values</p>		
<p align="center">Total Annual Production for All Vegetation</p> <p align="center"><i>(* Note this is the sum of all values as provided in Table 8 of the ESD Reference Sheet)</i></p> <p align="center">860 – 2,453 lbs. per acre</p>		
Vegetation Type	Low Production Values	High Production Values
Grasses	$725/860 * 100 = 84\%$	$1,762/2,453 * 100 = 70\%$
Shrubs	$105/860 * 100 = 12\%$	$447/2,453 * 100 = 18\%$
Forbs	$30/860 * 100 = 3\%$	$210/2,453 * 100 = 9\%$
Trees	$0/860 * 100 = 0\%$	$70/2,453 * 100 = 3\%$
<p align="center">Step 3: Desired Plant Community Composition Objectives for Sandy Loam Upland 10-14" p.z. (R035XA117A)</p> <p>Methodology: The DPC objectives were established using the percentages calculated from both canopy cover (Step 1) and annual production (Step 2). The two were compared and the low and high percentages were used to establish a range of acceptable plant composition by vegetation type, the DPC objectives are presented below.</p>		
Vegetation Type	Range of Acceptable Composition	
Grasses	54-84%	
Shrubs	12-40%	
Forbs	3-9%	
Trees	0-3%	

Appendix D: Interested Public

Arizona Cattle Growers
1811 S. Alma School Rd. #255,
Mesa, AZ 85210

Arizona Game and Fish Department
WMHB – Project Evaluation Program
5000 West Carefree Highway
Phoenix, AZ 85086-5000

Arizona Game and Fish Department
Region I – Pinetop
c/o James Eddy
2878 East White Mountain Boulevard.
Pinetop, AZ 85935

Arizona State Land Department
c/o Ronnie Tsosie
1616 West Adams
Phoenix, AZ 85007

Ghost Lake Corporation
P.O.Box 277
Springerville AZ, 85938

Larry Humphrey
P. O. Box 894
Pima, AZ 85543

Natural Resource Conservation Service
c/o Thomas Vanzant
P.O. Box 329
Springerville, AZ 85938-0329

Western Watersheds Project
Cyndi Tuell and/or Greta Anderson
738 North 5th Avenue, Suite 206
Tucson, AZ 85705

William K. Brandau
P.O. Box 127
Solomon, AZ 85551-0127