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Final

Land Health Evaluation Report

Big Hollow Wash Allotment

(No. 06070)

September 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
BHW-1	Key area on the Big Hollow Wash Allotment
BLM	Bureau of Land Management
CFR	Code of Federal Regulations
DPC	Desired plant community
ESD	Ecological Site Description
F.	Degrees Fahrenheit
FEIS	Final Environmental Impact Statement
GPS	Global positioning system
HCPC	Historic climax plant communities
H.R.	House of Representatives
HUC	Hydrologic unit code
ID team	Interdisciplinary team
IPaC	Information for Planning and Conservation system
LHE	Land health evaluation
LUP	Land use plan
LPI	Line-point intercept
MLRA	Major Land Resource Area
NAD	North American Datum
NRCS	Natural Resources Conservation Service
P.L.	Public Law
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
Stat.	Statute
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
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 Big Hollow Wash Allotment No. 06070, 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 Big Hollow Wash Allotment was being considered for lease renewal was distributed via certified mail January 31, 2017. Coordination with the Big Hollow Wash 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 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 6 Rangeland Inventory and Monitoring Methodology* of this document.

2. Allotment Profile and General Description

2.1 Location

The Big Hollow Wash Allotment (No. 06070) is located in Apache County, Arizona. It is approximately 8 miles south of the town of St. Johns. The northern and western 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 Mud Springs and Wiregrass Allotments with the eastern boundary bordering a mixture of Arizona State Trust land, county owned land, and private property. US-180 runs along the east side of the Big Hollow Wash Allotment, and Lyman Lake State Park lies approximately two miles from the southeast corner of the allotment (Figure 1).

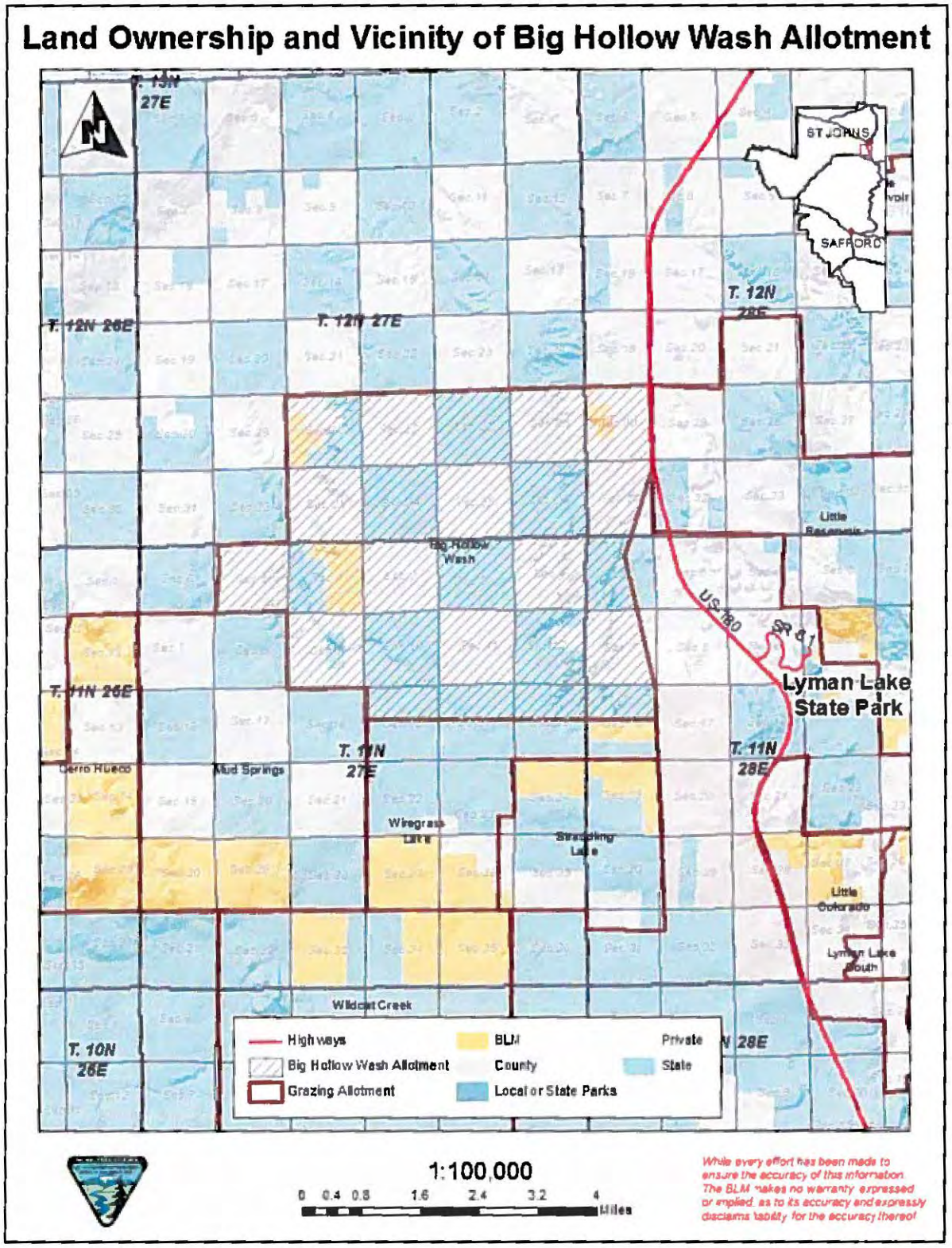

Figure 1. Land Ownership and Vicinity of Big Hollow Wash Allotment
Source: USDI-BLM 2017, ADOT 2016

2.2 Physical Description

This section describes physical characteristics within the Big Hollow Wash Allotment.

2.2.1 Surface Land Ownership

The Big Hollow Wash Allotment is comprised predominately of private property and Arizona State Trust lands. The BLM-administered portion of the allotment is 643 acres, or approximately five percent of the allotment. Land ownership apportionments are displayed in Table 1.

Table 1. Big Hollow Wash Allotment Landownership

Land Classification	Acres
BLM-administered land	643
Arizona State Trust land	6,016
Private property	7,402
Total	**14,105**

Source: BLM GIS data set

2.2.2 Precipitation

Average annual precipitation for the Big Hollow Wash Allotment ranges from 6-14 inches. The average annual rainfall on the allotment between 2007 and 2016 was 8.87 inches (Figure 2). During the evaluation period, 2009 received the least amount of precipitation with 4.73 inches while 2015 received the greatest amount measuring 13.53 inches. A majority of the precipitation arrives during the late fall, winter, and early spring. This winter season moisture originates in the Pacific Ocean and arrives as rain, or sometimes snow, during widespread frontal storms of generally low intensity. The majority of the snow falls from December through February, but rarely lasts more than a few days. The driest period is from late May to early July. Summer rains occur from July through September during brief intense local thunderstorms. The rain is sporadic in intensity and location.

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

- Latitude: 34.4114
- Longitude: -109.4250
- Elevation of 5,955 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.

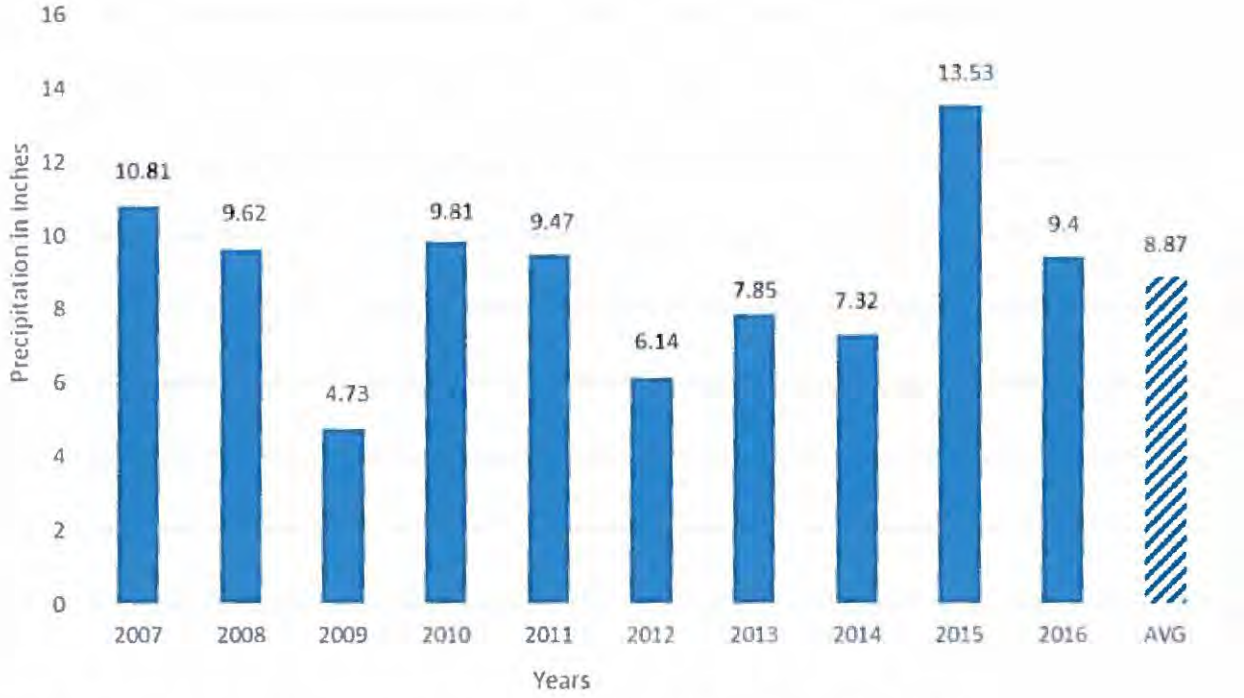

Figure 2. Average Annual Precipitation from PRISM Time Series Data 2007-2016
Source: PRISM, 2017

2.2.3 Temperature

The following table (Table 2) shows the average minimum, maximum, and overall temperature reported each month on the Big Hollow Wash Allotment between 2007 and 2016. The average temperature for the hottest month (July) is 75 degrees Fahrenheit (F), and for the coldest month (January) is 33 degrees F.

Table 2. Temperature in Degrees Fahrenheit on Big Hollow Wash Allotment

Month	Average Minimum	Average Maximum	Average
January	18	48	33
February	23	54	38
March	28	63	46
April	34	69	52
May	42	76	59
June	53	89	71
July	60	89	75
August	58	86	72
September	51	81	66
October	38	72	55
November	27	60	44
December	21	48	35
Average Annual			54

Source: PRISM, 2017. Averaged 2007-2016.

2.2.4 Soils

The soil composition on the Big Hollow Wash Allotment varies, as presented in Table 3 and Figure 3.

Table 3. Soil Composition within the Big Hollow Wash Allotment

Soil Map Unit Name	Allotment Composition	BLM Composition
Claysprings clay, 1 to 5 percent slopes	0.0%	0.0%
Clovis loamy sand, 0 to 8 percent slopes	1.5%	16.2%
Hereford loam, 0 to 8 percent slopes	0.0%	0.0%
Hubert gravelly loam, 0 to 8 percent slopes	27.7%	0.3%
Hubert gravelly loam, 2 to 15 percent slopes, eroded	10.6%	0.0%
Jocity sandy clay loam	2.0%	10.3%
Moenkopie very rocky loamy sand, 0 to 30 percent slopes	5.4%	1.7%
Navajo clay	0.0%	0.0%
Navajo clay, 1 to 3 percent slopes	0.1%	0.0%
Navajo clay, saline-alkali, 0 to 1 percent slopes	0.1%	0.0%
Navajo sandy clay loam, 3 to 5 percent slopes	1.0%	0.0%
Rough broken land	12.0%	10.6%
Rudd complex, 0 to 8 percent slopes	32.1%	55.2%
Sandstone rock land	0.7%	0.0%
Stony rock land	2.9%	0.0%
Tours clay loam	3.9%	5.8%

Source: Natural Resource Conservation Service (NRCS, 2015)

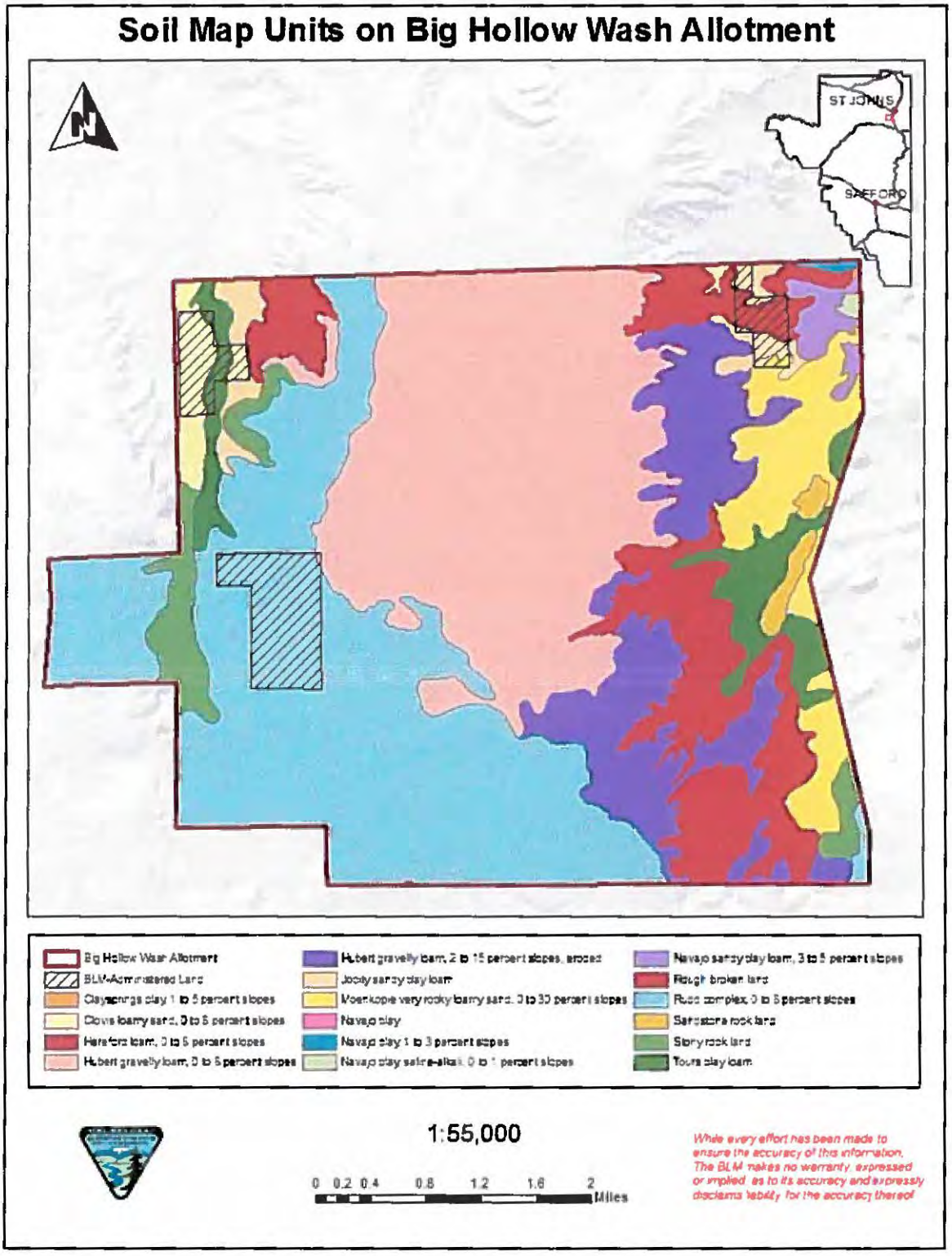

Figure 3. Soil Complexes on Big Hollow Wash Allotment
Source: USDI-BLM 2017, USDA-NRCS 2015

There are seven soils map units on BLM-administered land within the Big Hollow Wash Allotment, two of these comprise less than 2% (Table 3) of the BLM-administered land and will not be discussed here as doing so would not provide additional meaningful data to inform the LHE. The following soil descriptions occur on the remainder BLM-administered lands within the Big Hollow Wash Allotment and will thus be carried forward in this LHE:

- Clovis loamy sand, 0 to 8 percent slopes
- Jocity sandy clay loam
- Rough broken land
- Rudd complex, 0 to 8 percent slopes
- Tours clay loam.

Clovis loamy sand, 0 to 8 percent slopes

The Clovis series consists of very deep, well drained, moderately permeable soils that formed in medium and moderately fine textured sediments from quartzite gneiss, schist, sandstone, and limestone. The Clovis soils are on fan terraces, piedmont slopes, and plains. Elevations range from 4,500 to 7,200 feet. Slopes are 0 to 20 percent. The mean annual precipitation is about 11 inches. The mean annual temperature is about 53 degrees F. Well drained. Permeability is moderate or moderately slow. Runoff is negligible on slopes less than 1 percent, very low on 1 to 3 percent slopes, low on 3 to 5 percent slopes and medium on 5 to 20 percent slopes.

Jocity sandy clay loam

The Jocity series consists of very deep, well drained soils formed in stream alluvium. Jocity soils are on flood plains, and alluvial fans. Elevation is 4,400 to 6,200 feet. Slopes are 0 to 4 percent. The mean annual precipitation is about 10 inches and the mean annual air temperature is about 53 degrees F. They formed in Holocene stream alluvium from sandstone, shale and other rocks.

Rough broken land

Described in the map unit description from Web Soil Survey (USDA 2017), 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 degrees F. The frost-free period is 120 to 140 days. Runoff class is very high due to paralithic bedrock at 4 to 20 inches.

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.

Tours clay loam

The Tours series consists of very deep, well drained, stratified soils that formed in stream alluvium. Tours clay loam soil occurs on alluvial fans and flood plains at elevations ranging from 5,400 to 7,000 feet. Slopes are from 0 to 8 percent. The mean annual precipitation is about 9 inches occurring as summer thunderstorms and winter rain and snow. The mean annual air temperature is about 52 degrees F. The frost-free period is 120 to 140 days. Soils are well drained with low run off.

2.2.5 Watersheds

The Big Hollow Wash Allotment is split by two watersheds: the Big Hollow Wash Watershed on the west half and Little Colorado River, Lyman Lake to Big Hollow Wash Watershed on the eastern (HUC-10 1502000203 and 1502000201 respectively). The Big Hollow Wash Watershed is drained by Big Hollow Wash, a tributary to the Little Colorado River and the Little Colorado River Watershed is drained by the Little Colorado River between Lyman Lake and Big Hollow Wash. The Little Colorado River is an intermittent stream, with some reaches closer to its headwaters flowing perennially and is approximately one mile east of the eastern most BLM portion of the allotment. The Little Colorado River is one of two 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)(USEPA 2017).

The nearest surface waters to the allotment are ephemeral washes, primarily having peak flows from rainfall and snowmelt. In the northwestern portion of the allotment, Big Hollow Wash flows through one BLM section, and within half a mile of the southern BLM section. The eastern portion of the allotment contains unnamed washes draining into the Little Colorado River and the Lyman Ditch, an irrigation canal. The majority of the allotment is located within a FEMA Zone D floodplain meaning undetermined but possible flood hazard. Along the western side of the allotment, Big Hollow Wash lies within a 100 year, with a one percent chance of flooding in any single year, 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. Lyman Lake lies upstream of the allotment on the Little Colorado River, 3 miles southeast of the eastern most BLM section, and was found impaired for Mercury in fish 2004-2010, with probable sources of Atmospheric Deposition and Resource Extraction of Abandoned Mine Lands.

2.2.6 Range Improvements

The Big Hollow Wash 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-administered land in the allotment. There are 3.6 miles of fencing on or bordering BLM-administered 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.

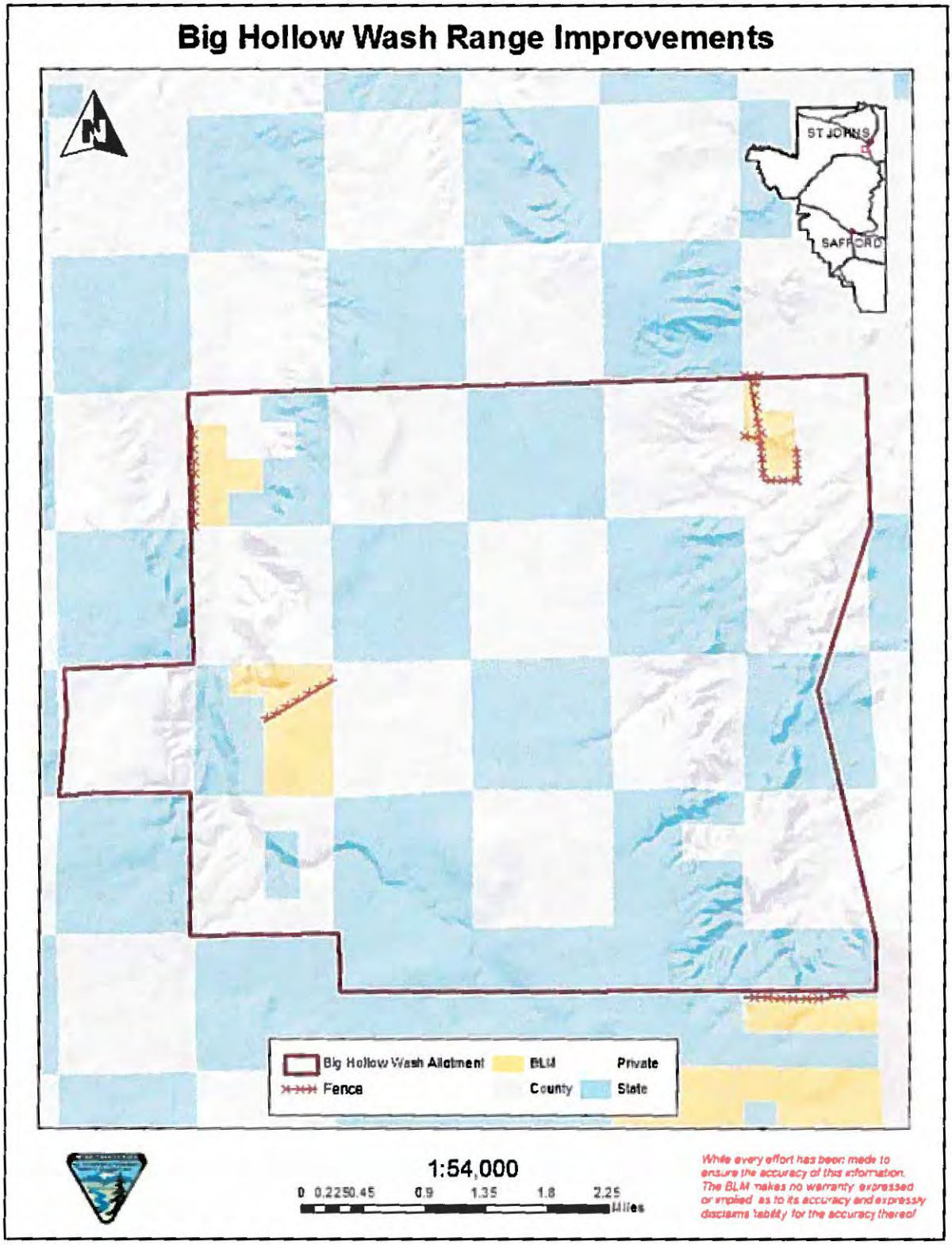

Figure 4. Range Improvements on Big Hollow Wash Allotment BLM-Administered Land
Source: USDI-BLM 2017

2.3 Biological Resources

This section discusses the biological resources within the Big Hollow Wash 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 Big Hollow Wash 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 Big Hollow Wash 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 Big Hollow Wash Allotment. The ESDs on BLM-administered portions of the allotment are also summarized. Through onsite evaluation during the land health evaluation, it was determined that a portion of the Shale Upland (R035XB220AZ) map unit was Cobbly Slopes 10-14" p.z. (R035XC328AZ). The extent of this ecological site is unknown at this time, therefore, for purposes of Table 4 and Figure 5, it will remain listed under the Shale Upland site. A description of the Cobbly Slopes ecological site is also summarized below. Detailed NRCS ESD reports for each ESD are stored and accessed within the Ecological Site Information System, which is 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 Big Hollow Wash Allotment

Ecological Site Name	ESD ID	Allotment Acres	BLM Acres	BLM Composition
Breaks 10-14" p.z.	R035XA101AZ	408.7	0	0%
Clayey Loam Wash 10-14" p.z.	R035XA104AZ	713.5	37.0	5.8%
Clayey Fan 6-10" p.z.	R035XB239AZ	278.6	65.9	10.2%
Loamy Upland 10-14" p.z.	R035XA113AZ	5413.9	0	0%
Loamy Wash 6-10" p.z. Saline	R035XB211AZ	15.2	1.7	0.3%
Rock Outcrop		98.6	0	0%
Sandstone Upland 10-14" p.z.	R035XA115AZ	755.5	11.2	1.7%
Sandy Loam Upland 10-14" p.z.	R035XA117AZ	205.8	104.1	16.2%
Shale Upland 6-10" p.z.	R035XB220AZ	1690.5	67.5	10.5%
Shallow Loamy 10-14" p.z.	R035XA119AZ	4526.7	355.5	55.3%

Source: Natural Resource Conservation Service (NRCS, 2015)

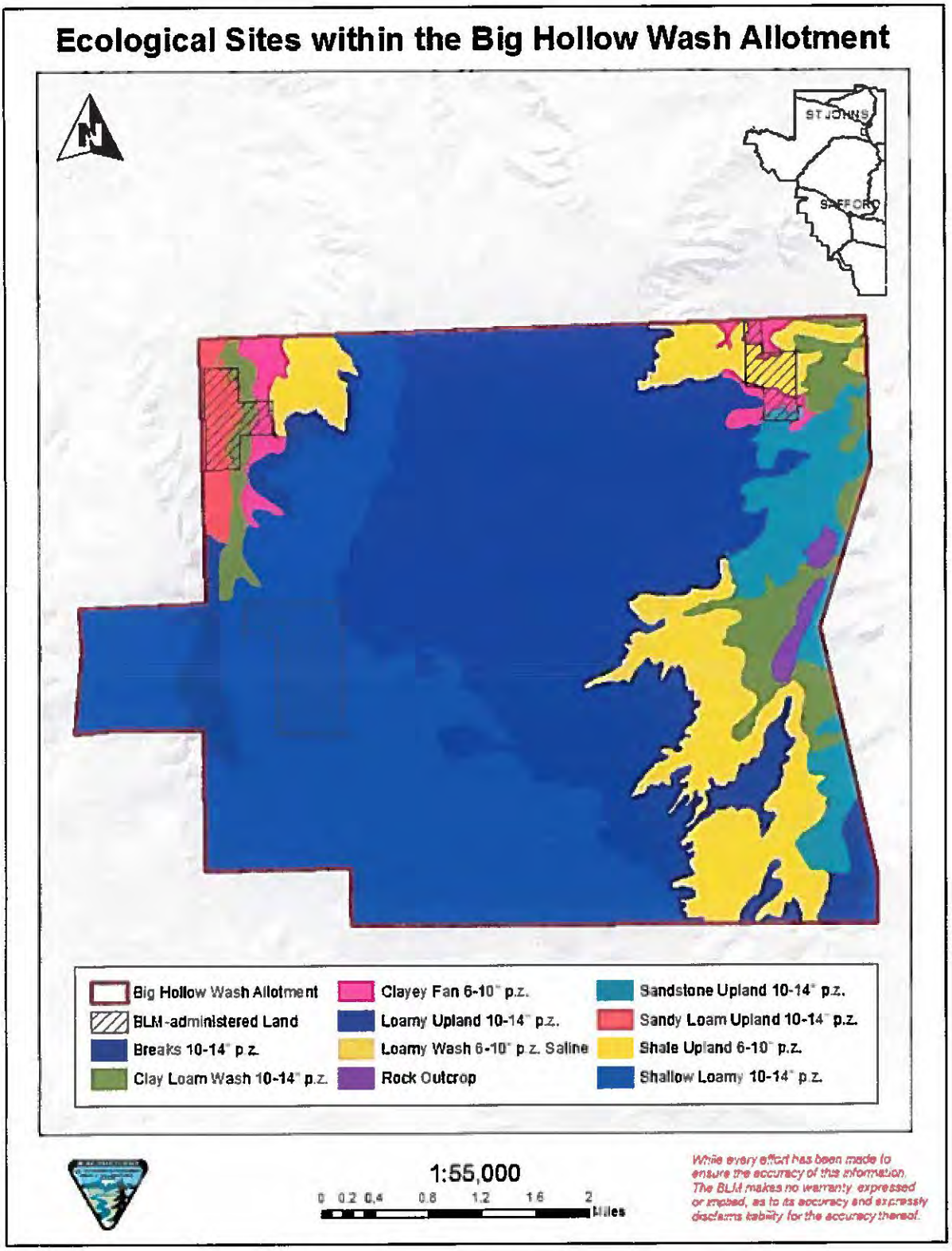

Figure 5. Ecological Sites within the Big Hollow Wash Allotment
Source: USDI-BLM 2017, USDA-NRCS 2015

Clay Loam Wash 10-14" p.z. (R035XA104AZ)

This ecological site occurs in Common Resource Area 35.1 - the Colorado Plateau Mixed Grass Plains. Elevations range from 5300 to 6500 feet and precipitation averages 10 to 14 inches per year. This unit 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. 50-60% of moisture falls as rain Jul-Sep and is the most effective moisture for plant growth. The remaining moisture comes as snow during the winter. Long periods with little or no effective moisture are relatively common.

The HCPC is approximately 70 to 80% grasses, 5 to 10% forbs, and 10 to 20% shrubs based on air dry weight. Alkali sacaton dominates the plant community, making up to 40% of the total annual production of the site. Western wheatgrass is the subdominant. blue grama, James' galleta, vine mesquite, sideoats grama grass, fourwing saltbush and winterfat are important indigenous components.

Dominant grasses include blue grama (*Bouteloua gracilis*), vine mesquite (*Panicum obtusum*), western wheatgrass (*Pascopyrum smithii*), James' galleta (*Pleuraphis jamesii*), and alkali sacaton (*Sporobolus airoides*). Other grasses may include, Indian ricegrass (*Achnatherum hymenoides*), three awn (*Aristida spp*), sideoats grama (*Bouteloua curtipendula*), squirreltail (*Elymus elymoides*), mat muhly (*Muhlenbergia richardsonis*), ring muhly (*Muhlenbergia torreyi*), spike muhly (*Muhlenbergia wrightii*), burrograss (*Scleropogon brevifolius*), tumblegrass (*Schedonnardus paniculatus*), spike dropseed (*Sporobolus contractus*), and sand dropseed (*Sporobolus cryptandrus*). Common forbs may include Rocky Mountain beeplant (*Cleome serrulata*), western tansymustard (*Descurainia pinnata*), common sunflower (*Helianthus annuus*), woolly Indianwheat (*Plantago patagonica*), and mallows (*Sphaeralcea spp*). The dominant shrub is fourwing saltbush (*Atriplex canescens*), with other shrubs being prairie sagewort (*Artemisia frigida*), shadscale saltbush (*Atriplex confertifolia*), Greene rabbitbrush (*Chrysothamnus greenei*), Douglas rabbitbrush (*Chrysothamnus viscidiflorus*), Whipple cholla (*Cylindropuntia whipplei*), rubber rabbitbrush (*Ericameria nauseosa*), broom snakeweed (*Gutierrezia sarothrae*), winterfat (*Krascheninnikovia lanata*), pale wolfberry (*Lycium pallidum*), rough menodora (*Menodora scabra*), and cactus (*Opuntia spp*).

Clayey Fan 6-10" p.z. (R035XB239AZ)

This ecological site ranges in elevation from 4800 to 6100 feet. The area has a very dry and windy climate that is hot in the summer and cold in the winter. Average annual precipitation is from 6 to 10 inches. A slight majority of the precipitation arrives during the late fall, winter, and early spring. this winter season moisture originates in the Pacific Ocean and arrives as rain, or sometimes snow, during widespread frontal storms of generally low intensity. The majority of the snow falls from December through February, but rarely lasts more than a few days. The driest period is from late May to early July. Summer rains occur from July through September during brief intense local thunderstorms. The rain is sporadic in intensity and location. Windy conditions are common year round with the strongest most frequently in the spring.

The HCPC for this range site has a community of mid and short grasses with shrubs and a relatively small percentage of forbs. Species most likely to increase or invade are broom snakeweed, rabbitbrush, cacti and annuals.

Common grasses include Indian ricegrass (*Achnatherum hymenoides*), black grama (*Bouteloua eriopoda*), blue grama (*Bouteloua gracilis*), squirreltail (*Elymus elymoides*), western wheatgrass (*Pascopyrum smithii*), James' galleta (*Pleuraphis jamesii*), alkali sacaton (*Sporobolus airoides*), and sand dropseed (*Sporobolus cryptandrus*). Few forbs may be present. Common shrubs may include fourwing saltbush (*Atriplex canescens*), shadscale saltbush (*Atriplex confertifolia*), mound saltbush (*Atriplex obovata*), Greene rabbitbrush (*Chrysothamnus greenei*), broom snakeweed (*Gutierrezia sarothrae*), winterfat (*Krascheninnikovia lanata*), and black greasewood (*Sarcobatus vermiculatus*).

Cobbly Slopes 10-14" p.z. (R035XC328AZ)

This site occurs in Common Resource area 35.3 – Colorado Plateau Sagebrush – Grasslands. Elevations range from 4800 to 6700 feet and precipitation averages 10 to 14 inches per year. Late spring is usually the driest period, and early fall moisture can be sporadic. Summer rains often fall as brief, intense thunderstorms. October through May tends to falls in widespread storms with longer duration and lower intensity. Summer daytime temperatures are commonly 95 - 100 degrees F and on occasion exceed 105 degrees F. Winter air temperatures can regularly go below 10 degrees F and have been recorded below - 20 degrees F.

The reference state plant community is a grassland with minor amounts of shrubs, perennial forbs and scattered trees. With disturbance perennial grass species will decrease and shrubs will increase. Non-native annual species may be present in minor amounts.

Grasses include Indian ricegrass (*Achnatherum hymenoides*), squirreltail (*Elymus elymoides*), needle-and-thread (*Hesperostipa comata*), New Mexico feathergrass (*Hesperostipa neomexicana*), Fendler threeawn (*Aristida purpurea*), black grama (*Bouteloua eriopoda*), blue grama (*Bouteloua gracilis*), James' galleta (*Pleuraphis jamesii*), and alkali sacaton (*Sporobolus cryptandrus*). Forbs are expected on the site. Common shrubs may include Bigelow sagebrush (*Artemisia bigelovii*), Wyoming big sagebrush (*Artemisia tridentata*), fourwing saltbush (*Atriplex canescens*), shadscale saltbush (*Atriplex confertifolia*), broom snakeweed (*Gutierrezia sarothrae*), plains pricklypear (*Opuntia polyacantha*), narrowleaf yucca (*Yucca angustissima*). Trees may include Utah juniper (*Juniperus osteosperma*) and Colorado pinyon (*Pinus edulis*).

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 4800 to 6300 feet and precipitation averages 10 to 14 inches per year. 50-60% of moisture falls as rain from July through September and is the most effective moisture for plant growth. The remaining moisture comes as snow during the winter. Mean temperatures for the hottest month (July) is 72 degrees F; for the coldest month (January) is 32 degrees F. Extreme temperatures of 105 degrees F and -26 degrees F have been recorded. Long periods with little or no effective moisture are relatively common. Cool season plants begin growth in early spring and mature in the early summer. Warm season plants take advantage of summer rains and grow from July through September.

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 black grama (*Bouteloua eriopoda*), blue grama (*Bouteloua gracilis*), James' galleta (*Pleuraphis jamesii*), and alkali sacaton (*Sporobolus airoides*). Other grasses may include Indian ricegrass (*Achnatherum hymenoides*), squirreltail (*Elymus elymoides*), needle-and-thread (*Hesperostipa comata*), mat muhly (*Muhlenbergia richardsonis*), ring muhly (*Muhlenbergia torreyi*), spike dropseed (*Sporobolus contractus*), sand dropseed (*Sporobolus cryptandrus*), and mesa dropseed (*Sporobolus flexuosus*). Forbs may include Astralagus species, rose heath (*Chaetopappa ericoides*), Esteve's pincushion (*Chaenactis stevioides*), Cryptantha species, shortstem lupine (*Lupinus brevicaulis*), threadleaf groundsel (*Senecio flaccidus*), and western aster (*Symphyotrichum ascendens*). Dominant shrubs may include Bigelow sagebrush (*Artemisia bigelovii*), fourwing saltbush (*Atriplex canescens*), Ephedra (*Ephedra spp*), and winterfat (*Krascheninnikovia lanata*). Other shrubs may include Chrysothamnus species, rubber rabbitbrush (*Ericameria nauseosa*), and snakeweed (*Gutierrezia spp*). Common trees include Juniper (*Juniperus spp*) and Colorado pinyon (*Pinus edulis*).

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

This ecological site occurs in Common Resource Area 35.2 - the Colorado Plateau Shrub – Grasslands. Elevations range from 3800-5800 feet. This area has a very dry and windy climate that is hot in the summer and cold in the winter. Average annual precipitation is from 6 to 10 inches. A slight majority of the precipitation arrives during the late fall, winter, and early spring. this winter season moisture originates in the Pacific Ocean and arrives as rain, or sometimes snow, during widespread frontal storms of generally low intensity. The majority of the snow falls from December through February, but rarely lasts more than a few days. The driest period is from late May to early July. Summer rains occur from July through September during brief intense local thunderstorms. The rain is sporadic in intensity and location. Windy conditions are common year round with the strongest most frequently in the spring.

The HCPC for this ecological site is made up of primarily mid and short grasses with a significant percentage of cold desert shrubs and a few forbs. In the original plant community there is a mixture of both cool and warm season grasses. Plant species most likely to invade or increase on this site when it deteriorates are saltbushes, broom snakeweed and annuals.

Common grasses in this site include Indian ricegrass (*Achnatherum hymenoides*), squirreltail (*Elymus elymoides*), needle-and-thread (*Hesperostipa comata*), James' galleta (*Pleuraphis jamesii*), alkali sacaton (*Sporobolus airoides*), sixweeks grama (*Bouteloua barbata*), and Madagascar dropseed (*Sporobolus pyramidatus*). Forbs include mealy goosefoot (*Chenopodium incanum*), springparsley (*Cymopterus*), touristplant spectaclepod (*Dimorphocarpa wislizeni*), nodding buckwheat *(Eriogonum cernuum*), divergent buckwheat (*Eriogonum divaricatum*), and mallows (*Sphaeralcea spp*). Shrub/Vines may include shadscale saltbush (*Atriplex confertifolia*), mound saltbush (*Atriplex obovata*), Whipple cholla (*Cylindropuntia whipplei*), Torrey Mormon tea (*Ephedra torreyana*), and broom snakeweed (*Gutierrezia sarothrae*).

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 James' galleta (*Pleuraphis jamesii*). Forbs may include sego lily (*Calochortus nuttallii*), whitemargin spurge (*Chamaesyce albomarginata*), rose heath (*Chaetopappa ericoides*), Eriogonum (Eriogonum spp.), whitestem stickleaf (*Mentzelia albicaulis*), notchleaf scorpionweed (*Phacelia crenulata*), common purslane (*Portulaca oleracea*), and mallow (*Sphaeralcea spp*). 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 species, 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 Big Hollow Wash 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 Big Hollow Wash 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 August 22, 2018, of the USFWS Information for Planning and Conservation (IPaC; USDI 2018) website identified seven species listed as threatened, endangered, or proposed species for consideration within the allotment.

The IPaC query indicated the following species as being potentially present within the allotment: gray wolf (*Canis lupus*), Mexican spotted owl (*Strix occidentalis lucida*), yellow-billed cuckoo (*Coccyzus americanus*), northern Mexican garter snake (*Thamnophis eques megalops*), Chiricauhua leopard frog (*Rana chiricauhuensis vittata*), Little Colorado spinedace (*Lepidomeda vittata*), and Zuni bluehead sucker (*Catostomus discobolus yarrow*). The correct common name of the local subspecies of *Canis lupus* is *Canis lupus baileyi* or "Mexican wolf" 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 garter snake 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, bald eagle (wintering only), golden eagle, western burrowing owl, pinyon jay, Gunnison's prairie dog, Arizona myotis, spotted bat, peregrine falcon, and Townsend's big-eared bat.

Five USFWS Birds of Conservation Concern (USDI, 2008) were indicated by the IPaC query as having 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 black throated sparrow, rufous hummingbird, and Virginia's warbler. 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 Big Hollow Wash 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 Big Hollow Wash Allotment.

2.5 Recreation Resources

There are no developed recreation sites within the allotment. A road leads to public lands in T. 12 N., R. 28 E., Sec. 30, but there is no vehicle access to the public land parcels in T. 11 N., R. 27 E., sec 4 and T. 12 N., R. 27 E., Sec. 28. 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 Big Hollow Wash Allotment.

3.1 Grazing History

The BLM grazing lease for the Big Hollow Wash Allotment allows for 7 cattle year-round for a total of 84 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 Big Hollow Wash Allotment consists of grazing on private land, State Trust land, and BLM-administered land. For allotments such as Big Hollow Wash, 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 Big Hollow Wash 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 Big Hollow Wash Allotment Lease

Allotment Name/ Number	Livestock Number/Kind	Grazing Period Begin End	% Public Land	Active Use (AUM)
Big Hollow Wash (No. 06070)	7 Cattle	3/1 - 2/28 Yearlong	100	84

Source: BLM, Rangeland Administration System

Existing 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 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 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 CRF 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.
- 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.

4. Objectives

This section provides an overview of the Safford Field Office management objectives that are associated with the Big Hollow Wash 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 Big Hollow Wash 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 Big Hollow Wash Allotment was established in what the NRCS ecological site maps show as the Shale Upland 6-10" p.z. (R035XB220AZ) ecological site. Through onsite evaluation during the land health evaluation, it was determined that the location of the key area was the Cobbly Slopes 10-14" p.z. (R035XC328AZ) ecological site. Precipitation data for this key area appears less than expected for the ecological site. This could be due to local variation in precipitation modeling used for this report, or it could be due to drought. This key area is approximately a mile from water, which is expected to adequately represent livestock utilization for the whole allotment. This location was chosen because it is representative of the vegetation composition, soils, and vegetative production on BLM-administered land for the allotment. Assessments of the other ecological sites present on the Big Hollow Wash Allotment have not been undertaken as doing so would not provide additional meaningful data to inform the LHE.

Refer to Table 6 and Figure 6 for the location of the key area on the Big Hollow Wash 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 Big Hollow Wash 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 Big Hollow Wash Allotment Key Area

Key Area	Ecological Site	Ecological Site ID	GPS Coordinates (NAD83 CONUS)
BHW-1	Cobbly Slopes 10-14" p.z.	R035XC328AZ	12S UTM 0644753 m East 3808894 m North

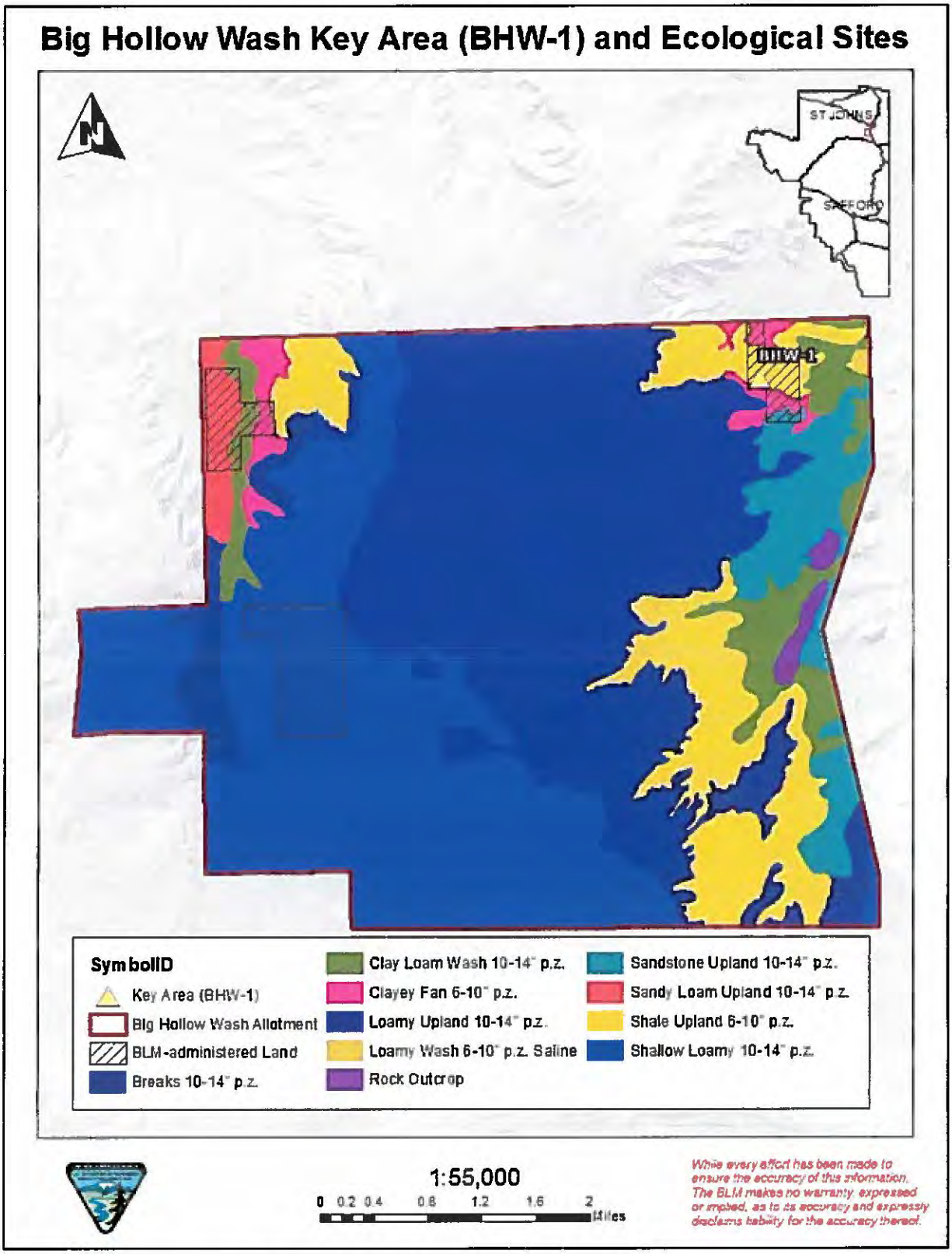

Figure 6. Ecological Sites within Big Hollow Wash Allotment and Key Area
Source: USDI-BLM 2017, USDA-NRCS 2015, USDA-USFS TEAMS

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 Big Hollow Wash 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 specific to the Cobbly Slopes 10-14" p.z. (R035XC328AZ) ecological site containing the key area within the allotment (NRCS 2007).

Desired resource conditions are based upon the following DPC objectives:

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

Canopy Cover

The ESD for Cobbly Slopes 10-14" p.z. (R035XC328AZ) characterizes the site as a grassland with minor amounts of shrubs and scattered trees. The ESD indicates an expected range of 5-28 percent vegetative cover. The DPC objective for the key area is 5-28 percent canopy cover.

Plant Community Composition

The ESD reference sheet for Cobbly Slopes 10-14" p.z. (R035XC328AZ) characterized the site as a scattered plant community that is predominated by grasses (75-85 percent) with a mixture of shrubs (5-10 percent) and minor amounts of trees and forbs (up to 5 percent for each).

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 plant community composition of 50-85 percent grasses, 0-20 percent forbs, 0-10 percent shrubs, and 0-5 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 Cobbly Slopes 10-14" p.z. (R035XC328AZ) describes the site as having 15-30 percent bare ground. Rock, litter, standing dead, lichen, moss, plant canopy are not bare ground. The DPC objective for bare ground is 15-30 percent and is deemed sufficient for preventing accelerated erosion on the Cobbly Slopes site.

Litter Cover

The reference sheet for Cobbly Slopes 10-14" p.z. (R035XC328AZ) describes litter cover to be 10-20 percent. Most litter will accumulate below plant canopies or near plant bases. The DPC objective for litter cover is 10-20 percent.

Summary

In summary, the Big Hollow Wash Allotment desired resource conditions, based on the Cobbly Slopes 10-14" p.z. (R035XC328AZ) ecological site, are presented as the following evaluation area DPC objectives:

- Maintain an average canopy cover of 5-28 percent.
- Maintain an average plant community composition of 50-85 percent grasses, 0-20 percent forbs, 0-10 percent shrubs, and 0-5 percent trees.
- Maintain average bare ground between 15 and 30 percent.
- Maintain an average litter cover of 10-20 percent.

The recommended levels of canopy 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 Big Hollow Wash Allotment while continuing to achieve land health standards.

BLM-administered land is approximately 18 percent of the overall Big Hollow Wash 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, Cobbly Slopes 10-14" p.z. (R035XC328AZ), located within the Big Hollow Wash Allotment. This ecological site has the capability of producing a large array of species. The specific plant species listed are important as they serve as indicators of change and may or may not be forage species.

Table 7. Plant Species

Scientific Name	Common Name	Plant Symbol
Grasses		
Achnatherum hymenoides	Indian ricegrass	ACHY
Aristida purpurea var. fendleriana	Fendler threeawn	ARPUF
Bouteloua eriopoda	Black grama	BOER4
Bouteloua gracilis	Blue grama	BOGR2
Dasyochloa pulchella	Low woollygrass	DAPU7
Elymus elymoides subsp. elymoides	Squirreltail	ELELE
Hesperostipa comata subsp. comata	Needle-and-thread	HECOC8
Hesperostipa neomexicana	New Mexico feathergrass	HENE5
Pleuraphis jamesii	James' galleta	PLJA
Sporobolus airoides	Alkali sacaton	SPAI
Sporobolus cryptandrus	Sand dropseed	SPCR
Shrubs		
Artemisia bigelovii	Bigelow sagebrush	ARBI3
Artemisia tridentata subsp. wyomingensis	Wyoming big sagebrush	ARTRW8
Atriplex canescens	Fourwing saltbush	ATCA2
Atriplex confertifolia	Shadscale saltbush	ATCO
Gutierrezia sarothrae	Broom snakeweed	GUSA2
Opuntia polyacantha	Plains pricklypear	OPPO
Yucca angustissima	Narrowleaf yucca	YUAN2
Trees		
Juniperus monosperma	Oneseed juniper	JUMO
Juniperus osteosperma	Utah juniper	JUOS
Pinus edulis	Colorado pinyon	PIED

Source: Ecological Site Description for Cobbly Slopes 10-14" p.z. (R035XC328AZ) (USDA, 2007), and monitoring data.

6. Rangeland Inventory and Monitoring Methodology

The Arizona standards for rangeland health were assessed for the Big Hollow Wash Allotment by a U.S. Forest Service Interdisciplinary (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 (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 Big Hollow Wash Allotment at key area BHW-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 Cobbly Slopes 10-14" p.z. (R035XC328AZ). 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.

6.1.1 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.

6.1.2 Rangeland Health Assessment

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

6.1.3 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. Table 8 shows utilization classes for herbaceous vegetation as determined by utilization of current year's growth.

Table 8. Herbaceous (grasses and forbs) Utilization Classes

Rating	Description
No Use (0-5%)	The rangeland shows no evidence of grazing use or negligible use.
Slight Use (6-20%)	The key species has the appearance of very light grazing. Plants may be topped or slightly used. Current seedstalks and young plants are little disturbed.
Light Use (21-40%)	The key species may be topped, skimmed, or grazed in patches. Between 60 and 80 percent of current seedstalks remain intact. Most young plants are undamaged.
Moderate Use (41-60%)	Half of the available forage (by weight) on key species appears to have been utilized. 15 to 25 percent of current seedstalks remain intact.
Heavy Use (61-80%)	More than half of the available forage on key species appears to have been utilized. Less than 10 percent of the current seedstalks remain. Shoots of rhizomatous grasses are missing.
Severe Use (81-94%)	The key species appears to have been heavily utilized and there are indications of repeated use. There is no evidence of reproduction or current seedstalks.
Severe Use (95-100%)	The key species appears to have been completely utilized. The remaining stubble is utilized to the soil surface.

Source: USDI-BLM et al., 1996

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 Big Hollow Wash Allotment.

7.1 Actual Use

Full permitted AUMs have been implemented on the allotment during the evaluation period years (2007-2016) totaling 7 head of cattle or 84 AUMs each year.

Livestock grazing for the Big Hollow Wash 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 (USDI-BLM et al., 1996).

U.S. Forest Service TEAMS completed LPI monitoring in May 2016. The evaluation sheet noted livestock sign in the area with light to moderate utilization. Utilization of the key species needle-and-thread grass was conducted. Average utilization showed "Light Use" at 38 percent (Appendix B).

7.3 Rangeland Health Assessments

A rangeland health assessment (RHA) of the three rangeland attributes was completed at key area BHW-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. A summary of the assessment conducted at key area BHW-1 on the Big Hollow Wash Allotment is presented in Table 9 below.

Table 9. Summary of Range Health Assessment Ratings

Key Area	Ecological Site	Range Health Attributes – Degree of Departure		
		Soil	Hydrology	Biotic Integrity
BHW-1	Cobbly Slopes 10-14" p.z.	None to Slight	None to Slight	None to Slight

17 Indicators: Key Area BHW-1 (Cobbly Slopes 10-14" p.z. [R035XC328AZ])

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

1. Rills formation is slight and infrequent across the site. Most rills are mostly found on exposed areas on steep slopes. Moderate permeability and abundance of surface rock fragments would mask rill formation.
2. Water flow patterns are scattered on this site and plant distribution and exposed rock cover will depict where they will be present.
3. There will be some slight pedestaling or terracettes in association with water flow patterns. Slight mounding will occur around the bases of long lived perennial plants and should not be considered pedestals.
4. Bare ground varies from 15-30 percent.
5. No gullies or erosion should be present.
6. No wind scoured blowouts should be present.
7. Most herbaceous and fine woody litter will remain in place, but fine litter (<1/4 inch diameter) will be transported by wind and water movement in flow paths and rills.

Coarse woody litter and duff will accumulate under shrub and tree canopies.

8. The soil surface is protected by a wide range of rock fragments (15-60 percent) and by an average litter amount of 10 percent . Soil stability will be 1.5 to 3.0 in open areas and 3.0 to 5.0 under plant canopies.
9. The A horizon varies in depth from 2 to 6 inches and is generally gravelly soils with pebbles, gravels, cobbles and stones. Textures are mostly gravelly fine sandy loam and very cobbly fine sandy loam, with a weak medium platy structure parting to a moderate fine granular consistency. Please note, that the soil survey for the area you are at should be referenced to get more specific information about the soil you are assessing.
10. This is a scattered plant community that is predominated by grasses (75-85 percent) with a mixture of shrubs (5-10 percent) and minor amounts of trees and forbs (up to 5 percent for each). This in combination with the rock fragments in the soil profile help promote infiltration and reduce runoff. The average distance the nearest perennial plant (fetch) ranges from 13-16 inches.
11. Compaction layer not expected on this site due to loamy textures and high rock fragment content.
12. Functional/Structural Groups in order of descending dominance by above-ground weight:
    - Dominant: Cool season grasses > warm season grasses
    - Sub-dominant: Large shrubs > half-shrubs
    - Other: Forbs > Trees > succulents
13. In average years plant mortality is expected to be low (1-5 percent) in grasses and shrubs. During and after drought years there can be from 5-20 percent die off of shrubs, grasses and trees. 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 (10-20 percent) and depth (.50 inch): Most litter will accumulate below plant canopies or near plant bases.
15. Average annual production on this site is expected to be 450-550 lbs./ac. in a year of average annual precipitation.
16. Species that can invade are cheatgrass, broom snakeweed, Russian thistle, Utah juniper and can increase with time.
17. 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.

The HCPC plant community is a grassland with minor amounts of shrubs, perennial forbs and scattered trees. With disturbance perennial grass species will decrease and shrubs will increase. Non-native annual species may be present in minor amounts.

Rangeland Health Attribute 1: Soil and Site Stability

There were no rills or gullies observed, with a note that there were natural ravines in the area. These indicators were rated None to Slight. Water flow patterns were rated None to Slight with a note that there were sandy soils. Pedestals and/or Terracettes were rated as None to Slight because there were none observed on the site. Bare ground was measured at nine 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 and

was rated None to Slight. All litter remained in place with litter dams 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 61 percent of the soil surface. Plants were able to grow thought these fragments and provided a canopy cover measured at 71 percent and eight percent basal cover at BHW-1 (Appendix B). Soil surface loss and degradation were None to Slight as soils are stable and there was a strong gravel component on the site. 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, with a note that there were natural ravines in the area. These indicators were rated None to Slight. Water flow patterns were rated None to Slight with a note that there were sandy soils. Pedestals and/or Terracettes were rated as None to Slight because there were none observed on the site. Bare ground was measured at nine 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 the heavy gravel and rock component. Rock and gravel fragments covered 61 percent of the soil surface. Plants were able to grow thought these fragments and provided a canopy cover measured at 71 percent and eight percent basal cover at BHW-1 (Appendix B). Soil surface loss and degradation were None to Slight as soils are stable and there was a strong gravel component on the site. Compaction layers were not present and not restricting water infiltration or root penetration and was rated None to Slight. Litter amounts were measured at 44 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 grasses with a mixture of shrubs and minor amounts of forbs. Tree cover is higher than expected in this ecological site. Vegetative cover in combination with the rock fragments in the soil profile help promote infiltration and reduce runoff.

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 due to the area being naturally armored by the heavy gravel and rock component. Rock and gravel fragments covered 61 percent of the soil surface. Plants were able to grow thought these fragments and provided a canopy cover measured at 71 percent and eight percent basal cover at BHW-1 (Appendix B). Soil surface loss and degradation were None to Slight as soils are stable and there was a strong gravel component on the site. 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 trees, shrubs, and forbs. Trees cover was higher than expected on the site showing some departure from that as described for HCPC. Overall, 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 44 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. Broom snakeweed and juniper were observed on the site. These species are native and have the ability to increase over time. They currently comprise 20 percent of canopy cover which is higher than expected for this site which is considered slight departure. 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, 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 BHW-1 looking North 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 Big Hollow Wash 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 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 Big Hollow Wash 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 Big Hollow Wash 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 5-28 percent.

> BHW-1: Canopy cover was measured at 71 percent. Canopy cover measurement is within, or exceeds, the range of acceptability for the objective. Exceeding the canopy cover objective provides better cover for wildlife species, more efficiently prevents accelerated erosion, and provides increased site stabilization. The DPC objective for canopy cover on the Big Hollow Wash Allotment is being achieved.

The DPC objectives for plant community compositions are established as follows: maintain an average of 50-85 percent grasses, 0-20 percent forbs, 0-10 percent shrubs, and 0-5 percent trees. The data collected for the RHA are:

> BHW-1: Plant community composition was derived from the canopy cover LPI data, see Appendix B. The dominant vegetation type is grasses at 70.4 percent composition. Shrubs were a minor component at 7.4 percent, and forbs on the site were a trace component at one percent. Trees were a sub-dominant component measured at 20.1 percent composition data collection on BHW-1 key area LPI monitoring.
>
> There is a higher composition of trees than expected on the site. The Cobbly Slopes 10-14" p.z. (T035XC328AZ) ecological site state-and-transition model shows two communities within the Reference State (Figure 8). The 1.1 native grassland plant community phase can transition to the 1.2 shrubland, perennial grasses and annuals community phase through unmanaged grazing, exclusion of fire, and/or drought. Range utilization monitoring showed light use of key grass species at 38 percent utilization. This indicates that exclusion of fire and/or drought would likely be the primary cause of the shift. The description states that a potential native invasive species is juniper which increases over time. The perennial grass cover present at the time of monitoring shows that the abundance of trees has not detrimentally impacted the desired abundance of grasses or other shrubs, but woody species control could be considered for changing this community back to the 1.1 native grassland plant community. Overall, the DPC objective for composition on the Big Hollow Wash Allotment is being achieved.

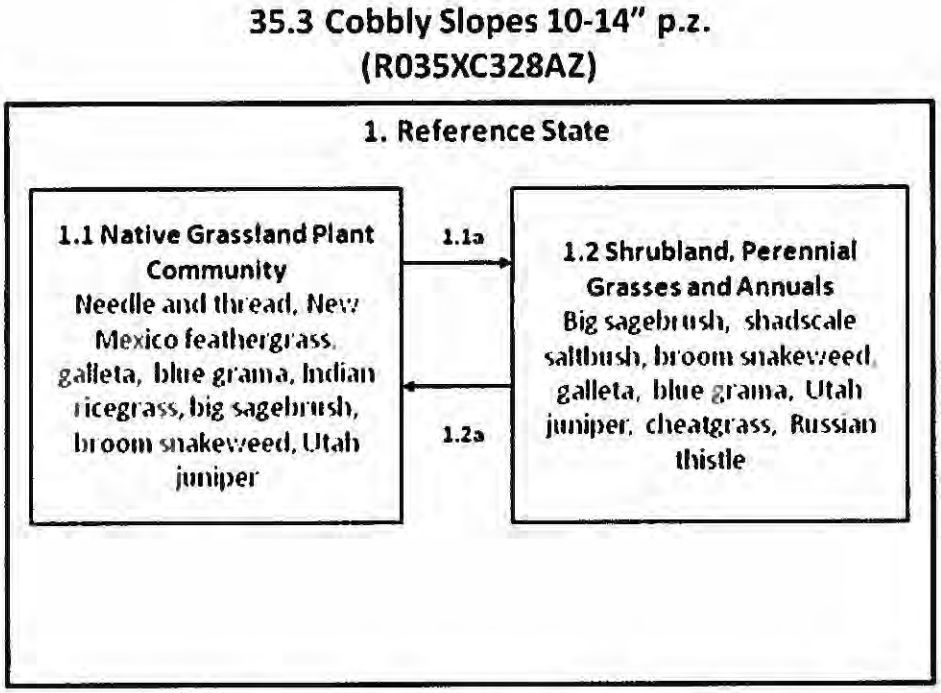

Figure 8. State-and-Transition Model for Cobbly Slopes 10-14" p.z. (R035XC328AZ)
Source: USDA-NRCS 2018

The DPC objective is to maintain bare ground between 15 and 30 percent and was deemed sufficient for preventing accelerated erosion. The data collected for the RHA indicates:

> BHW-1: Bare ground was measured at nine percent. The percentage of bare ground exceeds the objective for this site. The site had 61 percent presence of rock fragments and 71 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 Big Hollow Wash Allotment is being achieved.

The DPC objective for litter is a range of 10-20 percent. Data collected for the RHA indicates:

> BHW-1: Litter was measured at 44 percent. The percentage of litter cover exceeds the objective for this site. The higher percentage of litter reflects the higher vegetative cover for the site. Overall, the DPC objective for litter on the Big Hollow Wash 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 Big Hollow Wash 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)
Big Hollow Wash (No. 06070)	7 Cattle	3/1 2/28 Yearlong	100	84

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 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 CRF 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.

   - 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.

10. List of Preparers

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11. Consultation

Arizona Game and Fish Department
USFWS, Arizona Ecological Services
Platt Cattle Company, Big Hollow Wash 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.

Scott C. Cooke 11/7/18

Scott C. Cooke
Field Manager

Date

13. References

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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 Big Hollow Wash 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 Big Hollow Wash 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 Big Hollow Wash 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 Big Hollow Wash 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 Big Hollow Wash Allotment. No effect.
Zuni bluehead sucker *Catostomus discobolus yarrowi*	Endangered	No perennial water or suitable aquatic habitat exist on the Big Hollow Wash Allotment. No effect.

Migratory Birds, Birds of Conservation Concern [1, 2]	
Species	**Comments**
Bald eagle *Haliaeetus leucocephalus*	Addressed as BLM Sensitive in table below.
Black-throated sparrow *Spizella atrogularis*	Black-throated 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.
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.
Virginia's warbler *Cardellina rubrifrons*	Virginia's warbler occurs in montane fir, pine, and pine-oak woodland. Little of this habitat exists on this allotment. The species will not be impacted.
Rufous hummingbird *Selasphorus rufus*	Rufous Hummingbirds are found in mountain meadows up to 12,600 feet elevation. Little of this habitat exists on the allotment. Rufous hummingbirds may utilize the allotment during times of migration. Due to the lack of stopover habitat and short duration of potential presence, no impacts to this species are anticipated.

BLM Sensitive Species	
Species	**Comments**
Amphibians	
Northern leopard frog *Lithobates pipiens*	No perennial water or suitable aquatic habitat exist on the Big Hollow Wash 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 Big Hollow Wash 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 Big Hollow Wash Allotment. Golden eagles may fly and hunt over the areas of the allotment. There are no known impacts of livestock on golden eagles.
Peregrine falcon *Falco peregrinus*	Peregrine Falcons generally utilize open habitats for foraging and cliff habitat for breeding. Suitable habitat does exist on the allotment however there are no known impacts to peregrine falcons due to grazing. No impacts to this species are anticipated.

[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**
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.
Western burrowing owl *Athene cunicularia*	Burrowing Owls prefer habitats within deserts, grasslands, and shrub-steppe, and utilize well-drained, level to gently sloping areas characterized by sparse vegetation and bare ground such as moderately or heavily grazed pasture. This habitat exists on the allotment. This species may be impacted, however localized impacts are likely to be somewhat beneficial and not impactful on a population level (Dechant et al. 1999).
Fish	
No perennial water or suitable aquatic habitat exist on the Big Hollow Wash Allotment.	
Invertebrates	
Succinctid snails, all species in the family	No perennial water or suitable aquatic habitat exist on the Big Hollow Wash Allotment.
Mammals	
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.
Gunnison's prairie dog *Cynomys gunnisoni*	Gunnison's prairie dog are 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.
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 Big Hollow Wash Allotment.	
Plants	
There are no BLM sensitive plants known to occur in the Big Hollow Wash Allotment.	

Appendix B: USFS TEAMS Monitoring Data 2016

Summary of BHW-1 Line Point Intercept Data.

Key Area Information	Common Name	Scientific Name	LPI cover at BHW-1	
			Canopy Cover %	Basal Cover %
Big Hollow Wash Allotment	Threeawn	*Aristida L.*	5	2
	Big sagebrush	*Artemisia tridentata*	3	0
Ecological Site Name:	Blue grama	*Bouteloua gracilis*	29	1
Cobbly Slopes 10-14" p.z.	Low woollygrass	*Dasyochloa pulchella.*	4	1
	Broom snakeweed	*Gutierrezia sarothrae*	3	0
Ecological Site ID:	Needle-and-thread	*Hesperostipa comata*	4	0
R035XC328AZ	Oneseed juniper	*Juniperus monosperma*	17	0
12S UTM	James' galleta	*Pleuraphis jamesii*	6	1
0644753 m E	Perennial forb		1	0
3808894 m N	Alkali sacaton	*Sporobolus airoides*	9	3

Cover Type	Cover Percent
Bare Ground	9%
Basal Cover	8%
Canopy Cover	71%
Litter	44%
Surface Fragments > ¼" & <= 3"	38%
Surface Fragments > 3"	23%

Summary of BHW-1 Utilization Data.

Use Rating of Current Years Growth	Key Species: Needle-and-thread grass		
	Class Interval Midpoint (x)	Frequency (f)	(x) * (f)
Slight Use (1-20%)	10	1	10
Light Use (21-40%)	30	4	120
Moderate Use (41-60%)	50	5	250
Total		10	380
Average Utilization = [Sum ((f)*(x))/Sum (f)]			**38%**

Desired plant Community Compared to Species Composition.

DPC Objectives for Plant Community Composition	Species Composition BM-1
Grasses 50-80% Composition	Alkali sacaton – 11.1% Blue grama – 35.8% James' galleta – 7.4% Low woollygrass – 4.9% Needle-and-thread – 4.9% Threeawn – 6.2%
	Total – 70.4%
Forbs 0-20% Composition	Perennial forb - 1.2%
	Total - 1.2%
Trees 0-25% Composition	Oneseed juniper – 21.0%
	Total – 21.0%
Shrubs 0-10% Composition	Big sagebrush – 3.7% Broom snakeweed – 3.7%
	Total - 7.4%

Functional/structural plant group ranking at BHW-1.

Ranking	Species List for Functional/Structural Groups at BHW-1
Dominant - Grasses	Threeawn – 6.2% Blue grama – 35.8% Low woollygrass – 4.9% Needle-and-thread – 4.9% James' galleta – 7.4% Alkali sacaton – 11.1%
	Total – 70.4%
Sub-dominant - Trees	Oneseed juniper – 21.0%
	Total – 21.0%
Minor - Shrubs	Big sagebrush – 3.7% Broom snakeweed – 3.7%
	Total - 7.4%
Trace - Forbs	Perennial forb - 1.2%
	Total - 1.2%

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

Appendix C: Interested Public

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

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

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

Platt Cattle Company
P.O. Box 426
St. Johns, AZ 85936

Western Watersheds Project
c/o Greta Anderson
738 North 5th Avenue, Suite 200
Tucson, AZ 85705

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