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Safford Field Office Safford, AZ



FINAL
Land Health Evaluation Report
Ortega Sink Allotment
(No. 06136)

September 2019



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List of Acronyms

ADEQ	Arizona Department of Environmental Quality
ADOT	Arizona Department of Transportation
ADWR	Arizona Department of Water Resources
AZGFD	Arizona Game and Fish Department
AUM	Animal unit month
BLM	Bureau of Land Management
BO	Biological Opinion
CFR	Code of Federal Regulations
DPC	Desired plant community
EPA	Environmental Protection Agency
ESD	Ecological site description
ESIS	Ecological Site Information System
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
GPS	Global positioning system
HCPC	Historical climax plant communities
HUC	Hydrologic unit code
ID	Interdisciplinary
IPaC	Information for Planning and Conservation
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
RAS	Rangeland Administration System
RHA	Rangeland Health Assessment
RMP	Resource Management Plan
RPS	Range Program Summary
ROD	Record of Decision
spp.	Multiple species of the same genus
TEAMS	[USFS] Talent, Expertise, Agility, Mobility, and Simplicity Enterprise Unit
USDA	U.S. Department of Agriculture
USDI	United States 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 Ortega Sink Allotment, 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 Ortega Sink Allotment was being considered for lease renewal was distributed via certified mail January 31, 2017. A list of the recipients are provided in Appendix D. Data on special status species was obtained from the U.S. Fish and Wildlife Service (USFWS) and the Arizona Game and Fish Department (AZGFD).

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

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

Guidelines for grazing administration consider the type and level of grazing use. Guidelines for grazing management are types of methods and practices determined to be appropriate to ensure the standards can be met or that significant progress can be made toward meeting the standards. Guidelines are tools that help managers and lessees achieve standards.

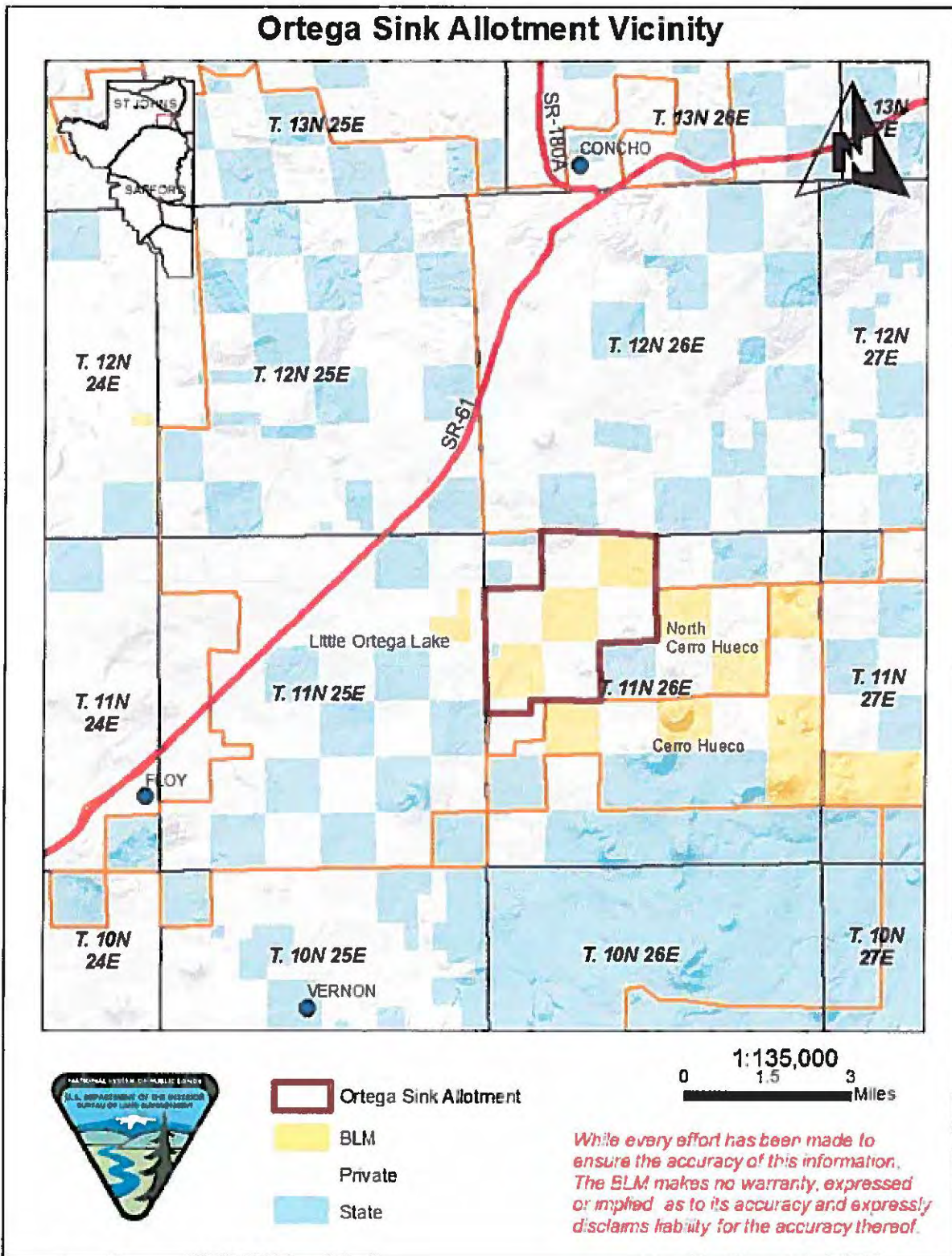
Although the process of developing standards and guidelines applies to grazing administration, present rangeland health is the result of the interaction of many factors in addition to grazing livestock. Other contributing factors may include, but are not limited to, past land uses, land use restrictions,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

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

2. Allotment Profile and General Description of Key Area

2.1 Location

The Ortega Sink Allotment (No. 06136) is located in Apache County, Arizona, approximately sixteen miles southwest of Saint Johns, Arizona. State Route 61 passes to the northwest of the allotment. The northern boundary borders a mixture of private and State Land. The western boundary borders the Little Ortega Allotment. The eastern boundary borders the North Cerro Hueco Allotment and the southern boundary is the Cerro Hueco Allotment. (Figure 1).



Source: USDI-BLM 2017, ADOT 2016
Figure 1 Ortega Sink Vicinity

2.2 Physical Description

A physical description of the Ortega Sink Allotment follows.

2.2.1 Surface Land Ownership

The Ortega Sink Allotment is comprised predominately of private property and Arizona State Trust lands. The BLM-administered portion of the allotment is 1,962 acres, or approximately 41 percent of the allotment area. Landownership apportionments are displayed in Table 1.

Table 1 Ortega Sink Allotment Landownership

Land Classification	Acres
BLM-administered land	1,962
Arizona State Trust land	42
Private property	2,773
Total Acres	4,777

Source: USDI-BLM GIS data set

2.2.2 Precipitation

Average annual precipitation for the majority of the Ortega Sink Allotment ranges from 10-14 inches, with higher elevations receiving 14-18 inches. The average annual rainfall on the Ortega Sink Allotment is 14.91 inches (Figure 2). The data show that out of 10 years, four were below average and six were above average, with two years (2009 and 2012) being well below the average for this area. Approximately 50-60 percent of the precipitation occurs during July through September.

Precipitation data from PRISM climate datasets (PRISM, 2017) were utilized by selecting a point within a mile of the BLM-administered land within the Ortega Sink Allotment as follows:

- Latitude: 34.3748
- Longitude: -109.5901
- Elevation: 6,440 feet

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

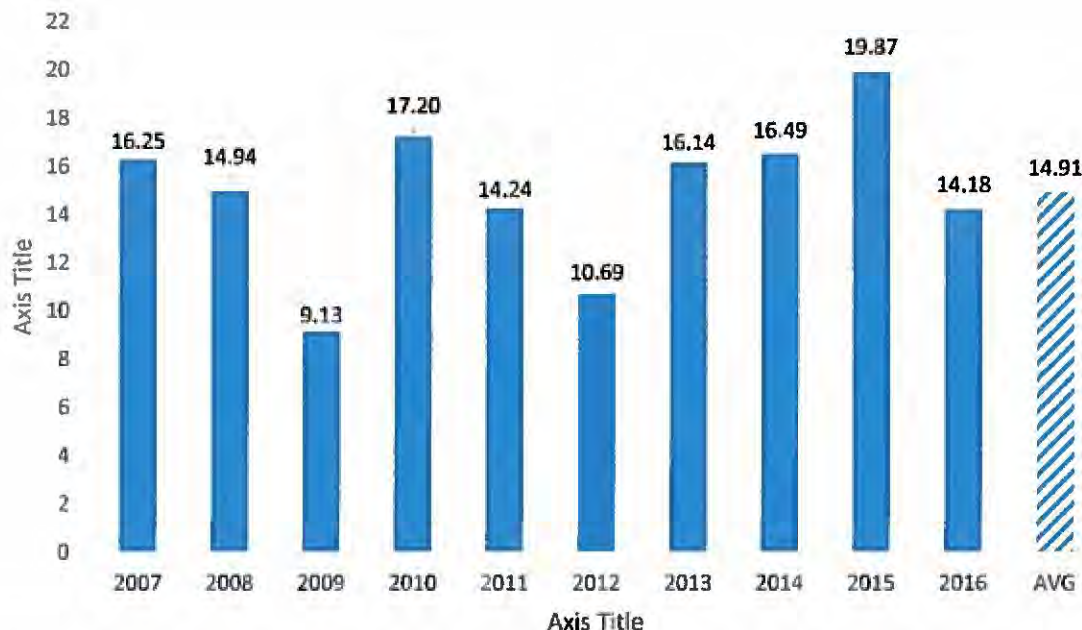


Figure 2 Average Annual Precipitation from PRISM Time Series Data 2007-2016

2.2.3 Temperatures

The following Table 2 presents the minimum, maximum, and average temperature within the Ortega Lake Allotment between 2007 and 2016.

Table 2 Temperatures in Degrees Fahrenheit on Ortega Sink Allotment

Month	Average Minimum	Average Maximum	Average
January	19°F	47°F	33°F
February	23°F	52°F	37°F
March	28°F	60°F	44°F
April	33°F	73°F	50°F
May	40°F	73°F	57°F
June	50°F	86°F	68°F
July	58°F	86°F	72°F
August	56°F	83°F	70°F
September	49°F	79°F	64°F
October	38°F	70°F	54°F
November	27°F	58°F	43°F
December	21°F	47°F	34°F

Source: PRISM, 2017. Averaged 2007-2016.

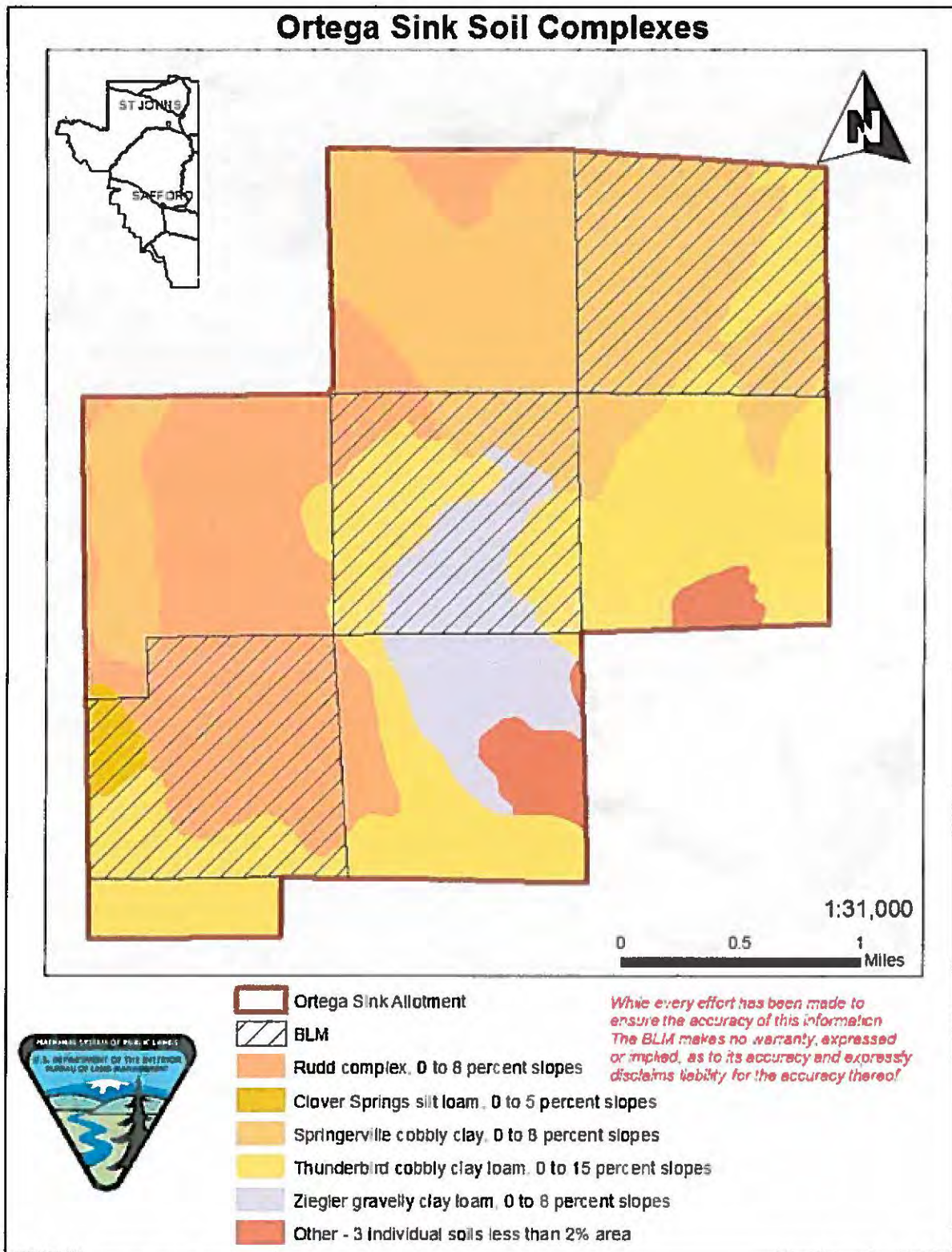
2.2.4 Soils

The soil composition on the Ortega Sink Allotment is varied as presented in Table 3 and Figure 3.

Table 3 Soil Composition within the Ortega Sink Allotment

Soil Map Unit Name	Percent Area Total Allotment	Percent Area BLM Portions
Clover Springs silt loam, 0 to 5 percent slopes	1.1%	2.7%
Rudd complex, 0 to 8 percent slopes	25.2%	24.6%
Springerville cobbly clay, 0 to 8 percent slopes	30.2%	32.5%
Thunderbird cobbly clay loam, 0 to 15 percent slopes	31.9%	30.5%
Ziegler gravelly clay loam, 0 to 15 percent slopes	8.6%	9.7%
Other – 3 individual soil types/complexes with less than 2 percent area each: <ul style="list-style-type: none"> - Bandera gravelly loam, 8 to 60 percent slopes - Rough broken land - Stony rock land 	3.0%	0%

Source: Natural Resources Conservation Service (NRCS) Web Soil Survey



Source: USDI-BLM 2017, USDA-NRCS 2015

Figure 3 Soil Complexes on Ortega Sink Allotment

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

- Rudd complex, 0 to 8 percent slopes
- Clover Springs silt loam, 0 to 5 percent slopes
- Springerville cobbly clay, 0 to 8 percent slopes
- Thunderbird cobbly clay, 0 to 15 percent slopes
- Ziegler gravelly clay loam, 0 to 8 percent slopes

Rudd complex, 0 to 8 percent slopes soils exist on plains. These soils formed in colluvium from weathered basalt. Elevations range from 6,000 to 7,500 feet. The mean annual precipitation is 11 to 13 inches. The mean annual air temperature is 48 to 52 degrees Fahrenheit. The frost free period is 130 to 140 days. This soil is well drained, has low run off, and moderate permeability.

Clover Springs silt loam soils exist on flood plains and depressions. Elevations range from 6,800 to 8,000 feet. Soil depth ranges more than 80 inches and is formed in alluvium derived from basalt, tuff and pyroclastic rock. Slopes are 0 to 5 percent. The mean annual precipitation is 16 to 24 inches and the mean annual air temperature is 43 to 46 degrees Fahrenheit. The frost free period is 80 to 90 days. This soil type is poor to moderately well drained with high run off potential and moderately slow to very slow permeability.

Springerville cobbly clay, 0 to 8 percent slopes soils exist on plains. These soils formed from residuum weathered basalt and/or cinders, with depths ranging from 28 to 70 inches. Elevations range from 6,000 to 7,400 feet. The mean annual precipitation is 16 to 20 inches and the mean annual air temperature is 47 to 49 degrees Fahrenheit. The frost free period is 120 to 140 days. This soil type is well drained and has high permeability when the soil is dry.

Thunderbird cobbly clay loam, 0 to 15 percent slopes soils exist on plains. These soils formed from residuum weathered basalt and/or cinders, with depths ranging from 23 to 25 inches. Elevations range from 6,000 to 7,500 feet. The mean annual precipitation is 16 to 20 inches. The mean annual air temperature is 47 to 49 degrees Fahrenheit. The frost free period is 130 to 140 days. This soil is well drained, has medium runoff; and can absorb most of the moisture supplied by the climate.

Ziegler gravelly clay loam, 0 to 8 percent slopes soils exist on plains and fans. These soils formed from cinders and/or volcanic ash, with depths of 24 to 62 inches. Elevations range from 6,000 to 7,500 feet. The mean annual precipitation is 16 to 20 inches and the mean annual air temperature is 47 to 49 degrees Fahrenheit. The frost free period is 80 to 90 days. This soil type is well drained, has medium run off and can absorb and hold most of the moisture supplied by the climate.

2.2.5 Watershed

The majority of the allotment lies within the Concho Creek-Little Colorado River watershed, with approximately 150 acres of BLM-administered land in the Oso Draw watershed (Hydrologic Unit Code (HUC)-10 1502000203 and 1502000204 respectively). Concho Creek

and Oso Draw are tributaries to the Little Colorado River. The Little Colorado River, approximately 10.5 miles from the nearest BLM section of the allotment, is an intermittent stream with some reaches flowing perennially closer to its headwaters. The Little Colorado River is one of two major tributaries in Arizona to the Colorado River and drains 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). Surface waters on BLM within the allotment are ephemeral washes and natural depressions, primarily having peak flows from precipitation events. An unnamed playa lies on BLM-administered land and private land in the central and eastern sections of the allotment. The playa receives flows from two unnamed ephemeral tributaries. Mineral Creek, an intermittent stream that flows into Little Ortega Lake, lies approximately 0.20 miles west of the allotment. The majority of the allotment is located within a Federal Emergency Management Agency (FEMA) Zone D floodplain meaning undetermined but possible flood hazard. The unnamed playa and an ephemeral stream on the western side of the allotment that flows into Mineral Creek have associated 100-year floodplains, with a one percent chance of flooding in any single year. Water quality is monitored and listed by Arizona Department of Environmental Quality (ADEQ) for Environmental Protection Agency (EPA) 303(d) waterbody impairments under the federal Clean Water Act. There are no impaired waters on the allotment, nor directly downstream of the allotment.

2.2.6 Range Improvements

The Ortega Sink Allotment consists primarily of private and State Trust lands. There are currently no range improvements occurring on BLM-administered land to be considered in this evaluation.

2.3 Biological Resources

This section discusses the biological resources within the Ortega Sink Allotment.

2.3.1 Major Land Resource Areas

A Major Land Resource Area (MLRA) is a broad geographic area that is characterized by a particular pattern of soils, climate, water resources, vegetation and land use. Each MLRA, in which rangeland and forestland occur can be further divided into sub-resources areas and into ecological sites. The Ortega Sink Allotment lies mostly within the MLRA 35-Colorado Plateau and one Ecological Site Description (ESD) from MLRA 39-Arizona and New Mexico Mountains. The MLRA 35-Colorado Plateau can be further divided into sub-resource area 35-1 Mixed Grass Plains which represents the BLM-administered lands of the Ortega Sink Allotment.

2.3.2 Ecological Sites within the Ortega Sink 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 and disturbances. The ESDs are developed by the Natural 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 4, below, provide a summary of the ecological sites present within the Ortega Sink Allotment. The ESDs on BLM-administered land portions of the allotment are also summarized. Detailed NRCS ESD reports are stored and accessed within the Ecological Site Information System (ESIS) available online: <https://esis.sc.egov.usda.gov>. Not all ESDs have been fully evaluated; in such cases, currently available information was used.

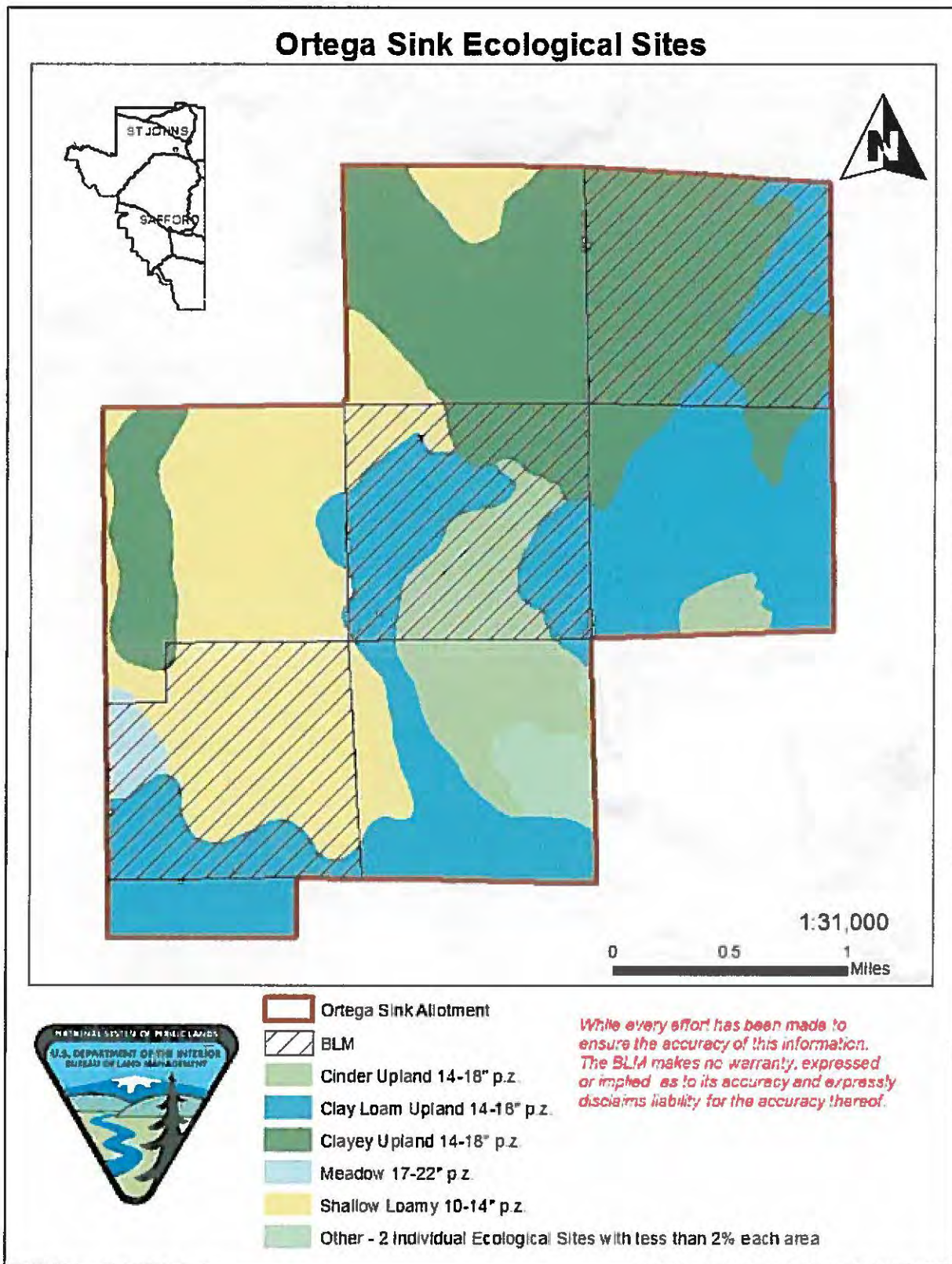
A key attribute of an ecological site is the historic climax plant community (HCPC), or reference state. The HCPC represents the natural potential plant community found on relatively undisturbed sites. The HCPC or reference state is often compared with existing range condition to determine current land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

The area selected to be evaluated was established as Shallow Loamy 10-14" Precipitation zone (p.z.) (R035XA119AZ) by the NRCS. Through the onsite evaluation it was determined that the site most closely resembled Loamy Upland 10-14" p.z. (R035XA113AZ). This determination was based on soils and vegetation at the site, and was evaluated as Loamy Upland 10-14" p.z. (R035XA113AZ). The extent of this Loamy Upland 10-14" p.z. (R035XA113AZ) ecological site is unknown at this time, so for purposes of Table 4 and Figure 4, Loamy Upland 10-14" p.z. (R035XA113AZ) will be listed under the Shallow Loamy 10-14" p.z. (R035XA119AZ). A description of the Loamy Upland and Shallow Loamy ecological sites are also summarized below.

Table 4 Ecological Sites Located within Ortega Sink Allotment

Ecological Site	Percentage of Allotment Area	Percentage of BLM Portions
Cinder Upland 14-18" p.z. (R035XG704AZ)	10%	10%
Clay Loam Upland 14-18" p.z. (R035XG707AZ)	32%	30%
Clayey Upland 14-18" p.z. (R035XG706AZ)	30%	32%
Meadow 17-22" p.z. (R039XA108AZ)	1%	3%
Shallow Loamy 10-14" p.z. (R035XA119AZ)	25%	25%
Other - 2 individual ecological sites with less than 2 percent area each: - Breaks 10-14" p.z. (R035XA101AZ) - Shale Upland 6-10" p.z. (R035XB220AZ)	2%	0%

Source: Natural Resources Conservation Service (NRCS).



Source: USDI-BLM 2017, USDA-NRCS 2015

Figure 4 Ortega Sink Allotment Ecological Sites

2.3.2.1 Cinder Upland 14-18" p.z. (R035XG704AZ)

This ecological site occurs in Common Resource Area 35.7 - the Colorado Plateau Woodland Grassland. This ecological site occurs in an upland position on fan terraces and hillsides. The climate of the land resource unit is semiarid with warm summers and cool winters. Elevations range from 5,500 to 7,000 feet and the annual precipitation averages 14 to 18 inches, but is very erratic, and can vary substantially from year to year. The majority of the precipitation falls from October through April. Soils are very shallow to moderately deep.

The HCPC has a mixed plant community made up of junipers and pinyon pine and an understory of mid and short grasses, shrubs, and a relatively small percentage of forbs. In the HCPC there is a mixture of both cool and warm season grasses. Plants most likely to invade or increase when this site deteriorates are broom snakeweed, annuals, cacti, rabbitbrush, groundsel and juniper. Even aged stands of juniper increases are common on the site. The increases of juniper correspond to wet cycle weather patterns. Once established, these juniper stands strongly resemble climax woodland sites.

Grass species common in the Cinder Uplands include: black grama (*Bouteloua eriopoda*), squirreltail (*Elymus elymoides*), needle and thread (*Hesperostipa comata*), muttongrass (*Poa fendleriana*), Aristida (*Aristida* spp.), sand dropseed (*Sporobolus cryptandrus*), and little bluestem (*Schizachyrium scoparium*). Forb species include: Aster (*Aster* spp.), Eriogonum (*Eriogonum* spp.), and Sphaeralcea (*Sphaeralcea* spp.). Shrub/vine species include: algerita barberry (*Mahonia trifoliolata*), Mexican cliffrose (*Purshia mexicana*), Ephedra (*Ephedra* spp.), skunkbush sumac (*Rhus trilobata*), wax currant (*Ribes cereum*), shrubby buckwheat (*Eriogonum wrightii*), Mammillaria (*Mammillaria* spp.), Yucca (*Yucca* spp.), Chrysothamnus (*Chrysothamnus* spp.), broom snakeweed (*Gutierrezia sarothrae*), and Apache plume (*Fallugia paradoxa*). Tree species include: juniper species (*Juniperus* spp.), Colorado pine (*Pinus edulis*), and ponderosa pine (*Pinus ponderosa*).

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

This ecological site occurs in Common Resource Area 35.1 - Colorado Plateau Mixed Grass Plains. Clay Loam Upland 14-18" p.z. occurs in an upland position on gently sloping to steep mesas and hills, cinder cones, and plains. It occurs on all exposures. Precipitation in this common resource area ranges from 14 to 18 inches yearly with elevations from 5,500 to 7,000 feet. About 50 percent of precipitation falls during July - September and is the most effective, dependable moisture. Soils are formed on basalt, volcanic debris, and cinders, and are moderately deep to deep.

The plant communities found on an ecological site are naturally variable. Composition and production will vary with yearly conditions, location, aspect, and the natural variability of the soils. The HCPC on this ecological site is a mixed plant community made up of junipers and pinyon pine and an understory of mid and short grasses, shrubs, and a relatively small percentage of forbs. In the HCPC, there is a mixture of both cool and warm season grasses.

Grass species found in the Clay Loam Upland 14-18" p.z. include, but are not limited to: blue grama (*Bouteloua gracilis*), western wheatgrass (*Pascopyrum smithii*), and James' galleta (*Pleuraphis jamesii*). Forb species found include: Sphaeralcea (*Sphaeralcea* spp.) and

Eriogonum (*Eriogonum spp.*). Shrub/vine species include: winterfat (*Krascheninnikovia lanata*), Ephedra (*Ephedra spp.*), fourwing saltbush (*Atriplex canescens*), Mexican cliffrose (*Purshia mexicana*), woolly groundsel (*Packera cana*), rubber rabbitbrush (*Ericameria nauseosa*), Greene's rabbitbrush (*Chrysothamnus greenii*), narrowleaf yucca (*Yucca angustissima*), broom snakeweed (*Gutierrezia sarothrae*), gray horsebrush (*Tetradymia canescens*), Opuntia (*Opuntia spp.*), Fremont barberry (*Mahonia fremontii*), skunkbush sumac (*Rhus trilobata*), and Utah juniper (*Juniperus osteosperma*). Common tree species include oneseed juniper (*Juniperus monosperma*). Other common shrub/vine species include: alligator juniper (*Juniperus deppeana*) and Colorado pinyon (*Pinus edulis*).

2.3.2.3 Clayey Upland 14-18" p.z. (R035XG706AZ)

This ecological site occurs within the Common Resource Area 35 - Colorado Plateau. Clayey Upland 14-18" p.z. occurs in an upland position on nearly level to steep mesa tops, fans and plains, with elevations ranging from 5,500 to 7,000 feet.. Precipitation ranges from 14 to 18 inches, but is very erratic, often varying substantially from year to year. The majority of the precipitation is received from October through April. This precipitation comes as gentle rain or snow. The remaining precipitation, approximately 40 percent, is received from July through September as spotty, unreliable and sometimes violent thunderstorms. Soils have characteristics of being moderately deep or deeper to any plant root restricting layers.

The HCPC on this site has a plant community made up primarily of rhizomatous cool season grasses, warm season sod and bunch grasses, cool season bunch grasses, annual and perennial forbs and a small percentage of shrubs and trees.

Grass species found in the Clayey Upland 14-18" p.z. include: western wheatgrass (*Pascopyrum smithii*), common wolfstail (*Lycurus phleoides*), blue grama (*Bouteloua gracilis*), and sideoats grama (*Bouteloua curtipendula*). Forb species include: Aster, Eriogonum, and Sphaeralcea species. Shrub/vine species include: Fremont barberry (*Mahonia fremontii*), skunkbush sumac (*Rhus trilobata*), Yucca (*Yucca spp.*), Chrysothamnus (*Chrysothamnus spp.*), broom snakeweed (*Gutierrezia sarothrae*), and woolly groundsel (*Packera cana*). Tree species found include: juniper species (*Juniperus spp.*), and Colorado pinyon (*Pinus edulis*).

2.3.2.4 Loamy Upland 10-14" p.z. (R035XA113AZ)

This ecological site occurs within the Common Resource Area 35.1 - Colorado Plateau Mixed Grass Plains province of northeastern Arizona. Loamy Upland 10-14" p.z. occurs in an upland position as gently rolling plains, fans and terraces and is characterized by a sequence of flat to gently dipping sedimentary rocks eroded into plateaus, valleys and deep canyons. Precipitation ranges from 10 to 14 inches annually, with elevations ranging from 4,800 to 6,300 feet. Long periods with little or no effective moisture are relatively common. Soil moisture on this site is from rainfall between the months of July through September, and the remaining moisture comes as snow during winter. Soils have characteristics of being moderately deep or deeper to any plant root restricting layers.

The plant communities found on this ecological site are naturally variable. Composition and production will vary with yearly conditions, location, aspect, and the natural variability of the soils. The HCPC on this ecological site has a plant community made up primarily of perennial

native grassland with warm season and cool season grasses and half shrubs.

Grass species found in the Loamy Upland 10-14" p.z. include, but are not limited to: sideoats grama (*Bouteloua curtipendula*), black grama (*Bouteloua eriopoda*), blue grama (*Bouteloua gracilis*), James' galleta (*Pleuraphis jamesii*) and needle and thread (*Hesperostipa comata*). Shrubs species found include: winterfat (*Krascheninnikovia lanтана*), Greene's rabbitbrush (*Chrysothamnus greenii*), broom snakeweed (*Gutierrezia sarothrae*) and fourwing saltbush (*Atriplex canescens*). Tree species found include: oneseed juniper (*Juniperus monosperma*), and Fremont barberry (*Mahonia fremontii*).

2.3.2.5 Meadow 17-22" p.z. (R039XA108AZ)

This area of the allotment has been mapped as Meadow 17-22" p.z. (R039XA108AZ), however it has the characteristics of an ephemeral draw. Because this information belongs to the NRCS and is mapped as such site, it will be carried forward as Meadow 17-22" p.z. (R039XA108AZ) in this LHE.

This ecological site occurs in Common Resource Area 39 – Arizona and New Mexico Mountains. Meadow 17-22" p.z. occurs as depressions on flood plains. It does benefit from run in moisture from adjacent areas. Soils have characteristics of being moderately deep or deep, and are poorly to moderately well drained. Precipitation ranges from 17 to 22 inches annually, with elevations ranging from 6,500 to 9,500 feet.

The HCPC on this ecological site is dominated by mid grasses and grass like plants with few forbs and shrubs. Fluctuations in the water table may allow some normally upland grasses to become established on the site.

Grass or grass like species found in the Meadow 17-22" p.z. include: water bentgrass (*Agrostis gigantea*), Carex (*Carex spp.*), Juncus (*Juncus spp.*), and muttongrass (*Poa fendleriana*). Forb species found include but are not limited to: Achillea (*Achillea spp.*), and Cirsium (*Cirsium spp.*). Shrub species found include: Salix (*Salix spp.*), Woods' rose (*Rosa woodsia var woodsii*), and shrubby cinquefoil (*Dasiphora fruticose subsp. floribunda*). Tree species are not found within this ecological site.

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

This ecological site occurs in Common Resource Area 35.1 - Colorado Plateau Mixed Grass Plains. Shallow Loamy 10-14" p.z. occurs in an upland position on structural benches, mesas and ridges. Slopes generally range from 0 to 15 percent with occasional steeper slopes. Sedimentary rock classes dominate the plateau with volcanic fields occurring for the most part near its margin. Precipitation ranges from 10 to 14 inches annually, with elevations ranging from 4,800 to 6,300 feet.

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

Grass species found in the Shallow Loamy 10-14" p.z. include: needle and thread (*Hesperostipa comata*), New Mexico feather grass (*Hesperostipa neomexicana*), sideoats grama (*Bouteloua*

curtipendula), black grama (*Bouteloua eriopoda*), and blue grama (*Bouteloua gracilis*). Forb species found include but are not limited to: sego lily (*Calochortus nuttallii*), whitemargin spurge (*Chamaesyce albomarginata*), and rose heath (*Chaetopappa ericoides*). Shrub species found include: Bigelow sage (*Artemisia bigelovii*), fourwing saltbush (*Atriplex canescens*), and Ephedra (*Ephedra sp.*). Tree species found 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 Ortega Sink Allotment, including threatened and endangered species, other special status species, and game species. Refer to Appendix A for a list of species.

2.3.3.1 Threatened and Endangered Species

The grazing program for the BLM Gila District, including grazing activities within the Ortega Sink Allotment, was assessed pursuant to Section 7 of the Endangered Species Act to determine whether the program would jeopardize the continued existence of an endangered or threatened species and/or their designated or proposed critical habitat. The U.S. Fish and Wildlife Service rendered Biological Opinion (BO) on the Gila District Livestock Grazing Program #22410-2006-F-0414 (2012). Additionally, a query conducted on June 28, 2018 and updated August 1, 2019, of the USFWS Information for Planning and Conservation (IPaC; USDI 2016) website identified a total of six species listed as threatened, endangered, or proposed species for consideration within the allotment (Appendix A).

The IPaC query indicated the gray wolf as being potentially present within the allotment; however, “Mexican wolf” is the correct common name of *Canis lupus baileyi*, which is the regional subspecies of gray wolf, and will be referred to as Mexican wolf in this document. Other species indicated in the IPaC were: Mexican spotted owl, yellow-billed cuckoo, northern Mexican gartersnake, Chiricahua leopard frog, and Zuni bluehead sucker.

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

2.3.3.2 Other Special Status Species

The BLM sensitive species that have suitable habitat present and are known to exist or have the potential to exist within this allotment are the northern leopard frog (low potential), bald eagle (wintering only), ferruginous hawk, golden eagle, pinyon jay, Arizona myotis, spotted bat, and Townsend’s big-eared bat. The USFWS Birds of Conservation Concern (USDI, 2008) not

already addressed as BLM sensitive species have the potential to occur within the allotment (Appendix A), although the IPaC query yielded zero results for this category of wildlife. Data derived from adjacent allotments was used for the migratory bird analysis. The allotment offers an array of habitats for migratory birds, providing valuable food and cover. Migratory species of concern that have the highest potential to occur on the allotment include several hawk species, and a variety of passerine species. 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 all classifications of sensitive species are intact and would be suitable for use if the species were present.

2.3.3.3 Game Species

Game species within the Ortega Sink 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.

2.4 Special Management Areas

There are no special management areas within the Ortega Sink Allotment.

2.5 Recreation Resources

There are no developed recreation sites within the allotment. Dispersed recreation activities that may occur on the Ortega Sink Allotment, include small and big game hunting, target shooting, hiking, and off-highway vehicle operation. The allotment is comprised of mostly private lands, on which there are various homes, home plots, and adjoining roads. These features present increased accessibility, which may lead to increased recreation on all lands within the Ortega Sink Allotment.

2.6 Cultural Resources

Guideline 3-7 of 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 BLM Safford Field Office Archaeologist. 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, authorized use, and terms and conditions of the current lease for the Ortega Sink Allotment.

3.1 Grazing History

The BLM grazing lease allows for 30 cattle year-round for a total of 360 animal unit months (AUM) on the BLM-administered land within the allotment. No changes have been made to the use in AUMs during the evaluation period. Grazing management on the Ortega Sink Allotment consists of grazing on private land, State Trust land, and BLM-administered land. For allotments such as Ortega Sink, 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 Ortega Sink Allotment is in accordance with the terms and conditions of the term lease. Table 5 below, provides a summary of the current authorized use for the allotment.

Table 5 Mandatory Terms and Conditions of the Ortega Sink Allotment Lease

Allotment	Number and Kind of Livestock	Season of Use	Percent Public Land	Number of Animal Unit Months (AUM)
Ortega Sink No. 06136	30 Cattle	March 1- February 28	100	360

Source: BLM – Rangeland Administration System (RAS)

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).
- In accordance with 43 CFR 4130.8-1 (F): Failure to pay grazing bills within 15 days of the due date specified in the bill shall result in a late fee assessment of \$25.00 or 10 percent of the grazing bill, whichever is greater, but not to exceed \$250.00. Payment made later than 15 days after the due date, shall include the appropriate late fee assessment. Failure to make payment within 30 days may be a violation of 43 CFR Sec. 4140.1 (B) (1) and shall result in action by the authorized officer under 43 CFR Secs. 4150.1 and 4160.1-2.

4. Objectives

This section provides an overview of the Safford Field Office management objectives that are associated with the Ortega Sink 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, [Federal Land Policy and Management Act of 1976] FLPMA, and the Public Rangelands Improvement Act of 1978. [Phoenix] RMP page 14-15.
- GM-03 Management of rangeland resources is guided by the Range Program Summary (RPS) Record of Decision (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 Ortega Sink Allotment is subject to the following land health objectives as established in the Arizona Standards for Rangeland Health.

4.2.1 Land Health Standards

Standard 1 - Upland Sites

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

Standard 2 - Riparian-Wetland Site

Riparian-wetland areas are in proper functioning condition.

Standard 3 - Desired Resource Conditions

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 reflect what is occurring on a larger area as a result of on-the-ground management actions.

In 2016, the key area monitoring was conducted by U.S. Forest Service (USFS) Talent, Expertise, Agility, Mobility, and Simplicity Enterprise Unit (TEAMS). The ecological site that was selected to be evaluated as the key area, was established by NRCS as Shallow Loamy 10-14" p.z. (R035XA119AZ) ecological site. TEAMS evaluated and determined that the key area location occurred within a site that most closely resembled Loamy Upland 10-14" p.z. (R035XA113AZ) ecological site. This key area occurs on BLM-administered land and is approximately one mile from water, which is expected to adequately represent livestock utilization for the majority of the allotment due to the distance cattle travel from water. This distance from water is appropriate for indicating vegetation changes that would be tied to livestock management.

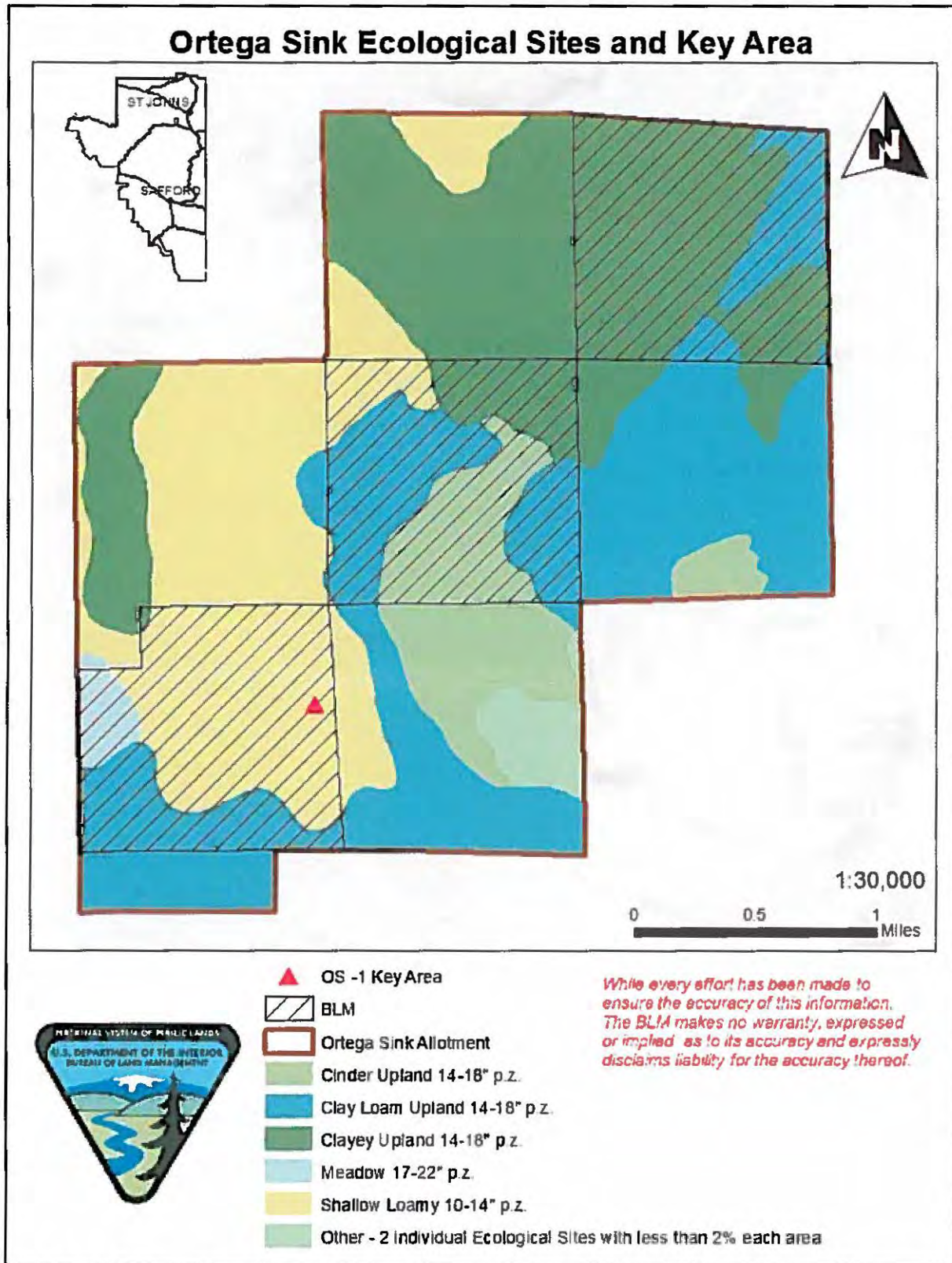
Although there are five ecological sites on BLM-administered lands within the allotment, only one key area was established. Key areas are indicator areas that are able to reflect what is happening on a larger area as a result of on-the-ground management actions. A key area should be a representative sample of a large stratum, such as a pasture, grazing allotment, wildlife habitat area, herd management area, watershed area, etc., depending on the management objectives being addressed by the study (USDI-BLM et al., 1996). This key area (OS-1) was a representative sample of the majority of the grazing allotment. This location was chosen because it is representative of the vegetation composition, soils, and vegetative production on BLM-administered land for the allotment. Therefore, assessments of the other ecological sites present on BLM-administered land within the Ortega Sink Allotment have not been undertaken, as they would not provide additional meaningful data to inform the LHE.

Addressed in this LHE report are the results from the key area monitoring conducted by TEAMS (Appendix B). Information for key area OS-1 on the Ortega Sink Allotment is presented in Table 6 and Figure 5 below.

Table 6 Location of the Ortega Sink Allotment Key Area

Key Area	Ecological Site	Ecological Site ID	GPS Coordinates (NAD 83 CONUS)
OS-1	Loamy Upland 10-14" p.z.	R035XA113AZ	UTM 12S 626627 m East 3802188 m North

Source: USDA-NRCS 2015, USDA-USFS TEAMS



Source: USDI-BLM 2017, USDA-NRCS 2015

Figure 5 Ortega Lake Allotment Ecological Sites and Key Area

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

Standard 3 - Desired Resource Conditions

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

Desired plant community (DPC) objectives are criteria established to evaluate a site's capability of achieving desired resource conditions. DPC objectives are typically specific to the ecological site within the allotment. This type of plant community is moderately effective at capturing and storing precipitation thus reducing runoff.

Desired resource conditions are based upon the following DPC objectives:

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

The following are the DPC Objectives developed by the BLM interdisciplinary (ID) team for the Loamy Upland 10-14" p.z. (R035XA113AZ) ESD. See Appendix C for rationale and calculations related to the below DPC objectives.

Canopy/Basal Cover

The ESD reference sheet for Loamy Upland 10-14" p.z. (R035XA113AZ) characterizes the site as exhibiting relatively uniform distribution of mostly grasses with some shrubs and a few forbs. Both canopy and basal cover values decrease during prolonged drought.

This sites' reference sheet indicates a desired range of canopy and basal cover. Canopy cover averages 30-40 percent and basal cover averages 10-20 percent.

Plant Community Composition

The ESD reference sheet for Loamy Upland 10-14" p.z. (R035XA113AZ) characterizes the site as relatively even distribution of grasses with some shrubs followed by lesser amounts of forbs. This type of plant community is moderately effective at capturing and storing precipitation thus

reducing runoff.

This site's reference sheet indicates an objective for plant community composition to maintain an average canopy cover of 25-30 percent grasses, 5-10 percent shrubs, and 2-5 percent forbs. This equates to a composition of 71-86 percent grasses, 14-29 percent shrubs, and 6-14 percent forbs.

Pronghorn on Western Rangelands (Yoakum, 1996) and Pronghorn Management Guide 2006 (Autenrieth, 2006) establish that grassland requirements for pronghorn include plant compositions of 50-80 percent grasses, less than five percent shrubs and 10-20 percent forbs.

Therefore, DPC objectives for plant community composition are to maintain grasses at 50-86 percent, shrubs at 0-29 percent, and forbs at 6-20 percent. This plant community composition objective is considered adequate for providing necessary forage types for wildlife and livestock. Refer to Appendix C for the calculations of the DPC objectives.

Bare Ground

The ESD reference sheet for Loamy Upland 10-14" p.z. (R035XA113AZ) characterizes the site as having a varying composition and production, due to the yearly conditions, location, aspect, and the natural variability of the soils.

This site's reference sheet indicates that bare ground has an acceptable average range of 30-50 percent. Bare ground may increase when drought conditions occur.

Litter Cover

The ESD reference sheet for Loamy Upland 10-14" p.z. (R035XA113AZ) characterizes litter cover as mostly herbaceous and fine woody litter. This type of fine litter will be transported by wind and in short water flow pathways, while a small percentage stays in place and heavier, coarse woody litter and duff will accumulate under shrub and tree canopies. This site's reference sheet indicates that the acceptable litter average is 20-40 percent.

Summary

In summary, the Ortega Sink Allotment desired resource conditions, are presented as the following evaluation area DPC objectives:

- Maintain an average canopy cover between 30-40 percent and an average basal cover between 10-20 percent.
- Maintain a plant community composition of 50-86 percent grasses, 0-29 percent shrubs, 6-20 percent forbs.
- Maintain bare ground between 30 and 50 percent.
- Maintain litter cover between 20 and 40 percent.

The recommended levels of canopy and basal vegetative cover will provide sufficient cover for wildlife species, such as antelope and small game (Yoakum, 1996) (Autenrieth, 2006), and will prevent accelerated erosion and provide site stabilization. In addition, maintaining the DPC objective for plant community composition for grasses shrubs, and forbs, will provide important nesting and escape cover for birds, as well as provide adequate forage for wildlife and livestock

on the Ortega Sink Allotment while continuing to achieve land health standards.

BLM-administered land is 41 percent of the overall Ortega Sink Allotment, which is generally 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. Rangeland Inventory and Monitoring Methodology

The Arizona standards for rangeland health were assessed for the Ortega Sink Allotment by a USFS ID team on May 13, 2016. The ID team consisted of a rangeland management specialist and a wildlife biologist. Documents and publications used in the assessment process include the Web Soil Survey (NRCS, 2017), ESDs located within MLRA 35 and 39 (NRCS, 2009), Interpreting Indicators of Rangeland Health Technical Reference 1734-6 (USDI-BLM et al., 2005, Sampling Vegetation Attributes (USDI-BLM et al., 1996), and the National Range and Allotment Handbook (USDA-NRCS, 2003). A complete list of references is included at the end of this document. All are available for public review in the BLM Safford Field Office. The ID team used rangeland monitoring data and professional observations to assess conformance with the Arizona standards for rangeland health.

5.1 Monitoring Protocols

Monitoring occurred on the Ortega Sink Allotment at key area OS-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 Loamy Upland 10-14" p.z. (R035XA113AZ). The existing conditions were compared to site specific reference conditions established by the NRCS, which are considered to be representative of relatively undisturbed sites 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 with a global positioning system (GPS) unit using a projection of North American Datum (NAD) 83. Inventory and monitoring data are provided in Appendix B.

5.1.1 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.

5.1.2 Indicators of Rangeland Health

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

- Step 1. Identify the Key Area; Determine the Soil and Ecological Site
- Step 2. Obtain or Develop the Reference Sheet and the Corresponding Evaluation Matrix
- Step 3. Collect Supplementary Information
- Step 4. Rate the 17 Indicators on the Evaluation Sheet

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

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

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

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

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

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

6. 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 Ortega Sink Allotment.

6.1 Actual Use

Full permitted AUMs have been implemented on the allotment during the evaluation period years (2007-2016) totaling 30 head of cattle or 360 AUMs each year.

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

6.2 Rangeland Health Assessments

A RHA of the three rangeland attributes was completed at key area OS-1 (refer to Figure 6).



Figure 6 OS-1 looking South in May 2016

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 OS-1 on the Ortega Sink Allotment is presented in Table 7 below.

Table 7 Summary of Range Health Assessment Ratings

Key Area	Ecological Site	Range Health Attributes – Degree of Departure		
		Soil and Site Stability	Hydrologic Function	Biotic Integrity
OS-1	Loamy Upland 10-14" p.z. (R035XA113AZ)	None to Slight	None to Slight	None to Slight

17 Indicators: Key Area OS-1 (Loamy Upland 10-14" p.z. [R035XA113AZ])

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

1. No rills expected. A few minor rills may form on slopes greater than 5 percent due to moderate permeability and moderate runoff.
2. Water flow patterns are infrequent, short (1-2 meters) and poorly developed with less than 10 percent coverage. They may become more common on steeper slopes due to slow to moderate permeability and medium runoff characteristics of the soils.
3. Pedestals less than 1" may be common and often associated with water flow patterns. Terracettes are infrequent, but they should be short. Both may be more developed and common during a drought, due to moderate wind erosion hazard of the soils. Moderate wind erosion hazard occurs on the soils with a coarse-loamy surface textures. Pedestals and terracettes may be more common, especially on steeper slopes, but they should be short.
4. The site has an average available water capacity of seven inches, so it has a moderate to high potential for the production of plant cover. Drought may cause an increase in bare ground.
5. No gullies or erosion should be present.
6. No blowouts are present on this site. Some small mounding around long-lived perennial plant bases is common, especially during droughts, due to low to moderate wind erosion hazard of the soil.
7. Most herbaceous and fine woody litter will be transported by wind and in short water flow pathways, while a small percentage stays in place. Coarse woody litter and duff will accumulate under shrub and tree canopies.
8. Soil aggregate stability ratings should average 4-5 (range 3 to 6) under plant canopies and 2-3 (range 1 to 3) within the interspaces. There is usually less than 5 percent cover of rock fragments on the surface. When well vegetated, soils have a moderate resistance to water erosion and moderate to high resistance to wind erosion.
9. Soil structure is mostly granular (weak to moderate, very fine and fine) with some platy (weak, thin and medium) and sub angular blocky (weak, fine to medium). Surface thickness typically ranges from 2-8 inches, but is mostly 2-4 inches. Color is typically reddish brown to brown, but can vary depending on parent material.
10. This site is characterized by a relatively even distribution of mostly grasses with some shrubs and a few forbs. This type of plant community is moderately effective at capturing and storing precipitation thus reducing runoff. Cover averages 30-40 percent (25-30 percent grasses, 5-10 percent shrubs, 2-5 percent forbs). Basal plant cover averages 10-20 percent (15 percent grasses, 2 percent shrubs, 1 percent forbs). Both cover values decrease during a prolonged drought.
11. The occurrence of compaction layers should be rare to none. Soils with sandy clay loam and clay loam textures, can be easily compacted when wet, if there are no rock fragments in surface horizons. Some surface horizons are naturally platy.
12. Dominant: warm season bunchgrasses >warm season colonizing grasses>shrubs>cool season bunchgrasses, with a minor group: forbs =cacti= trees (trace).
13. All plant functional groups are adapted to survival in all years except during the most

- severe droughts. Severe winter drought affects trees and shrubs most. Severe summer drought affects grasses the most.
14. This site is comprised mostly of fine herbaceous litter with some woody litter. Litter amounts increase during the first few years of drought, then decrease in later years. Average percent litter cover ranges from 20-40 percent and 1/8 inch depth. Within plant interspaces, litter ranges from 5 to 20 percent cover, while under shrub and tree canopies litter can range up to 50 percent cover with depths from 1/8 to 1/4 inch thick.
 15. Expected annual production is 300-375 lbs/ac (dry weight) in drought years; 572-725 lbs/ac in average years; 725-800 lbs/ac in wet years.
 16. Mormon tea (EPVI), broom snakeweed (GUSA2), Greene's rabbitbrush (CHGR6), prickly pear (OPPO), Whipple cholla cactus (CYWH) and false buffalo grass (MUSQ) are all native to the site, but have the ability to increase and dominate the area after unmanaged grazing. Oneseed juniper (JUMO) is native to the site, but has the ability to increase and dominate the site after unmanaged grazing and/or fire exclusion. Russian thistle (SATR12) is an exotic forb that has the ability to increase and dominate the site after heavy grazing and/or ground disturbance.
 17. All plants native to the site are adapted to the climate and are capable of producing seeds, stolons, and rhizomes in most years except during the most severe droughts.

The HCPC plant community is a perennial native grassland with warm season and cool season grasses and shrubs. Natural climatic variation can result in changes in the amount of and ratio of both individual plants and warm season versus cool season plants, particularly grasses.

Rangeland Health Attribute 1: Soil and Site Stability

There were no rills or gullies observed, these indicators were rated None to Slight. Water flow patterns, pedestals and/or terracettes were not observed and were rated None to Slight. Bare ground was measured at five percent, indicating the site has moderate to high plant cover and was rated None to Slight and within ESD parameters. There was no evidence of wind-scouring observed and was rated None to Slight. All litter size classes remained at the base of plants with little to no movement, no litter dams detected and rated None to Slight. Soil surface resistance to erosion was rated None to Slight. The soil surface is naturally armored by moderate gravel and canopy cover. Rock or rock fragments greater than 1/4 and less than or equal to three inches covered 61 percent, while fragments greater than three inches covered 16 percent of the soil surface. Canopy cover was measured at 56 percent and 14 percent basal cover. Soil surface loss or degradation was None to Slight as soils are stable and in place. Compaction layers were not present and not restricting water infiltration or root penetration and was rated None to Slight.

The overall rating for the soil and site stability attribute was None to Slight. Ten indicators for soil and site stability were rated None to Slight.

Rangeland Health Attribute 2: Hydrologic Function

There were no rills or gullies observed, these indicators were rated None to Slight. Water flow patterns, pedestals and/or terracettes were not observed and were rated None to Slight. Bare ground was measured at five percent, indicating the site has moderate to high plant cover and was rated None to Slight. There was no evidence of wind-scouring observed and was rated None

to Slight. All litter size classes remained at the base of plants with little to no movement, no litter dams detected and rated None to Slight. Soil surface resistance to erosion was rated None to Slight. Soil surface is naturally armored by moderate gravel and canopy cover. Rock or rock fragments greater than 1/4 and less than or equal to three inches covered 61 percent, while fragments greater than three inches covered 16 percent of the soil surface. Canopy cover was measured at 56 percent and 14 percent basal cover. Soil surface loss or degradation was None to Slight as soils are stable and in place. Compaction layers were not present and not restricting water infiltration or root penetration and was rated None to Slight.

Litter was measured at 25 percent, therefore rated None to Slight. Plant community composition and distribution relative to infiltration was rated None to Slight. Vegetative cover is comprised of primarily perennial grasses and shrubs. This vegetation composition is effective at soil stability due to the basal area cover and root systems that are not restricted by a compaction layer. This type of plant community is moderately to highly effective at capturing and storing precipitation.

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

Rangeland Health Attribute 3: Biotic Integrity

Soil surface resistance to erosion was rated None to Slight. Soil surface is naturally armored by moderate gravel and canopy cover. Rock or rock fragments greater than 1/4 and less than or equal to three inches covered 61 percent, while fragments greater than three inches covered 16 percent of the soil surface. Canopy cover was measured at 56 percent and 14 percent basal cover. Soil surface loss or degradation was None to Slight as soils are stable and in place. Compaction layers were not present and not restricting water infiltration or root penetration and was rated None to Slight.

Functional structural groups was rated None to Slight. Functional structural groups were as described in the ESD, with relatively even distribution of mostly grasses with some shrubs and a few forbs. With warm season bunchgrasses being sub-dominant, they are followed in dominance by warm season colonizing grasses, shrubs, and cool season bunchgrasses. Minor group consists of equal amounts of forbs and cacti, with a trace of trees. Plant mortality/decadence was rated None to Slight, as all age classes were evenly represented. The ESD describes the current functional group as being adapted to survival in all years, except during the most severe droughts. Litter was measured at 25 percent, 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 was present, but not in large amounts. This species is native and has the ability to increase after heavy grazing. Reproductive capability of perennial plants was rated None to Slight, as the native plants are adapted to the climate and are capable of producing seeds, stolons, and rhizomes except during the most severe droughts.

The overall rating for the biotic function attribute was None to Slight. Nine indicators for biotic function were rated as None to Slight.

7. Determinations of Land Health Standards

Standard 1: Upland Sites

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

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 Ortega Sink Allotment are productive, stable, and in a sustainable condition. The key area monitoring data reflects the conditions described in the ESD’s reference sheet and are acceptable for meeting the upland sites standard. 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 sign of erosion was observed at the site. There were no rills or gullies present, and was rated None to Slight. Pedestals and/or terracettes were rated None to Slight and were not observed. 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 Ortega Sink Allotment. The U.S. Fish and Wildlife Service rendered Biological Opinion (BO) on the Gila District Livestock Grazing Program #22410-2006-F-0414 (2012). Although Table 3 of the BO shows that the Ortega Sink Allotment contained 320 acres of “not yet evaluated” riparian habitat, it also acknowledges in Table 1 that the Ortega Sink Allotment contained no riparian habitat. It has been determined through site visits, review by the Safford Field Office Hydrologist and analysis in section 2.2.5 of this document that there is no riparian habitat on the allotment. 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 Ortega Sink 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 and site stability, hydrologic function, and biotic integrity attributes 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. The grass, 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 between 30-40 percent, and an average basal cover between 10-20 percent.

OS-1: Canopy cover was measured at 56 percent, and basal cover at 14 percent. Both of these measurements are within or exceed the range of acceptability for the objective. Exceeding the canopy cover objective better provides cover for wildlife species, will more efficiently prevent accelerated erosion, and provides site stabilization. The DPC objectives for canopy cover on the Ortega Sink Allotment are being achieved.

The DPC objectives for plant community compositions are established as follows: Maintain an average composition of 50-86 percent grasses, 0-29 percent shrubs, and 6-20 percent forbs. The data collected for the RHA are:

OS-1: There is a distribution of vegetation types including mostly grasses with some shrubs and a few forbs. Grasses are the dominant vegetation type at 96 percent composition. Shrubs measured four percent, occurring within the acceptable average range of 0-29 percent. Forbs were not detected at the time of the monitoring.

Although grass composition was higher than the DPC objective, and forbs were lower, the objective is still considered as meeting or exceeding the range of acceptability. The ESD for Loamy Upland 10-14" (R035XA113AZ) states that the plant communities found on site are naturally variable. Composition and production will vary with yearly conditions, location, aspect, and the natural variability of the soils. The composition provides necessary forage types for many wildlife species, efficiently prevents accelerated erosion and will be moderately to highly effective at capturing and storing precipitation. Overall, the DPC objective for plant community composition on the Ortega Sink Allotment is being achieved.

The DPC objective is to maintain bare ground between 30-50 percent and was deemed sufficient for preventing accelerated erosion. The data collected for the RHA:

OS-1: Bare ground was measured at five percent.

Although five percent is lower than what is to be expected for bare ground, this is due to the high percentage of rock fragments on the site (77%). Having lower percentage of bare ground is desirable as this provides protection from soil erosion and enhances water infiltration. The DPC objective for bare ground on the Ortega Sink Allotment is being achieved and exceeded.

The DPC objective for litter is a range of 20-40 percent. Data collected for the RHA indicates:

OS-1: Litter was measured at 25 percent. Overall, the DPC objective for litter on the Ortega Sink Allotment is being achieved.

8. Recommended Management Actions

8.1 Terms and Conditions

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

1. Grazing management on the Ortega Sink Allotment to continue in accordance with the mandatory terms and conditions of the term lease, as follows:

Allotment Name/ Number	Livestock Number/Kind	Grazing Period Begin - End	% Public Land	Active Use (AUM)
Ortega Sink (No. 06136)	30 Cattle	3/1 - 2/28 Yearlong	100	360

Source: BLM – Rangeland Administration System (RAS)

2. Continue with the current 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 [Code of Federal Regulations] CFR 4130.3-2(C).
3. Add to the current Other Terms and Conditions:
 - 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 upon request 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:
 - In accordance with 43 CFR 4130.8-1 (F): Failure to pay grazing bills within 15 days of the due date specified in the bill shall result in a late fee assessment of \$25.00 or 10 percent of the grazing bill, whichever is greater, but not to exceed \$250.00. Payment made later than 15 days after the due date, shall include the appropriate late fee assessment. Failure to make payment within 30 days may be a violation of 43 CFR Sec. 4140.1 (B) (1) and shall result in action by the authorized officer under 43 CFR Secs. 4150.1 and 4160.1-2.

9. List of Preparers

BLM Staff

Amelia Taylor, Assistant Field Manager-Renewables
Dan McGrew, Cultural Resource Specialist
Derek Eysenbach, Planning & Environmental Specialist
Evan Darrah, GIS Specialist
Laura Opall, Hydrologist
Amanda Eavenson, Hydrologist
Mark McCabe, Wildlife Biologist
Rebecca Dees, Rangeland Management Specialist
Robert Wells, Outdoor Recreation Planner
Thomas Schnell, Assistant Field Manager-Non Renewables

Other Field Participants

Troy Grooms Rangeland Management Specialist, USFS TEAMS
Doug Middlebrook, Wildlife Biologist, USFS TEAMS

10. Consultation

Arizona Game and Fish Department
USFWS, Arizona Ecological Services
Cody Nicoll Weagant, Ortega Sink Allotment lessee


11. Authorized Officer Concurrence

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

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



Scott C. Cooke
Field Manager



Date

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Appendix A. Special Status Species

Federally Listed Species		
Species	Federal Status	Comments
Chiricahua leopard frog <i>Rana chiricahuensis</i>	Threatened	Chiricahua leopard frog occurs in wetlands of the sky island regions of central and southeast Arizona. There are no natural wetlands on the allotment and no known populations of the species at the man-made water source. No effect.
Mexican spotted owl <i>Strix occidentalis lucida</i>	Threatened	This species occurs in the oak woodland and mixed conifer forests of mountainous areas of Arizona. There is no suitable habitat on Ortega Sink Allotment to support Mexican spotted owl and there is no critical habitat within the allotment. No effect.
Yellow-billed cuckoo (distinct population segment) <i>Coccyzus americanus</i>	Threatened	Yellow-billed cuckoos primarily occur in cottonwood-willow gallery forests of riparian zones of Arizona. The Ortega Sink 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.
Mexican wolf <i>Canis lupus baileyi</i>	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 gartersnake <i>Thamnophis eques megalops</i>	Threatened	The northern Mexican gartersnake is a riparian obligate species; there is no suitable habitat on the Ortega Sink Allotment. No effect.
Zuni blunthead sucker <i>Catostomus discobolus yarrowi</i>	Endangered	No perennial water or suitable aquatic habitat exist on the Ortega Sink Allotment. No effect.

Migratory Birds, Birds of Conservation Concern ^{1,2}	
Species	Comments
Bald eagle <i>Haliaeetus leucocephalus</i>	Addressed as BLM Sensitive Species in table below.
Common Black Hawk <i>Buteogallus anthracinus</i>	Common black hawk are known to occur and nest along the riparian gallery forests which do not occur on the Ortega Sink Allotment.
Golden eagle <i>Aquila chrysaetos</i>	Addressed as BLM Sensitive Species in table below.
Grace's warbler <i>Setophaga graciae</i>	Grace's warbler is found in open pine forest, pine-oak association, and pine savanna. Little of this habitat exists on this allotment. The species will not be impacted.
Lewis's woodpecker <i>Melanerpes lewis</i>	Lewis's woodpecker occurs in mature and burned pine forest and cottonwood. Little of this habitat exists on this allotment. The species will not be impacted.
Phainopepla <i>Phainopepla nitens</i>	Phainopepla are strongly associated with mesquite. Mesquite species are not found on the Ortega Sink Allotment. There will be no impact to the species.
Pinyon jay <i>Gymnorhinus cyanocephalus</i>	Addressed as BLM Sensitive Species in table below.
Rufous hummingbird <i>Selasphorus rufus</i>	Rufous hummingbird habitat is found in Arizona only during times of migration. Due to the short duration of presence and lack of stop over habitat, no impacts are anticipated for this species.

¹The migratory birds species listed are species of particular conservation concern (e.g. Birds of Conservation Concern) that may occur on or near the allotment. It is not a list of every bird species that may be found in this location, nor a guarantee that all of the bird species on this list will be found on or near this location. This list was compiled from data provided for multiple allotments in the region, including this allotment.

² Habitat information and determinations compiled from species profiles found on USFWS website. <https://ecos.fws.gov>

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

Appendix B. USFS TEAMS Monitoring Data 2016

Summary of OS-1 Line Point Intercept Data.

Line Point Intercept Data for OS-1				
Plant Species	Cover by Species		Site Cover/Bare Ground	
	Canopy	Basal	Bare Ground	5%
Blue grama (<i>Bouteloua gracilis</i>)	54%	14%	Basal Cover	14%
Needle and thread (<i>Hesperostipa comata</i>)	1%	0%	Canopy Cover	56%
Broom snakeweed (<i>Gutierrezia sarothrae</i>)	1%	0%	Litter Cover	25%
Rabbitbrush (<i>Chrysothamnus Greenei</i>)	1%	0%	Surface Fragments > ¼" & ≤ 3"	61%
			Surface Fragments > 3"	16%

Desired Plant Community with species composition and Functional/Structural Plant Group ranking at OS-1.

DPC Objectives for Plant Community Composition for Loamy Upland 10-14 p.z. (R035XA113AZ)	Species Composition OS-1	Functional/Structural Group Ranking ¹
Grasses 50-86% Composition	Blue grama – 94% Needle and thread – 2%	Dominant
	Total – 96%	
Shrubs 0-29% Composition	Rabbitbrush – 2% Broom snakeweed – 2%	Minor
	Total – 4%	
Forbs 6-20% Composition	None	None
	Total – 0%	

¹ Dominant (D) roughly 40-100% composition, Sub-dominant (S) roughly 10-40% composition, Minor Composition (M) roughly 2-10% composition, or Trace (T) roughly <2% composition.

Appendix C. BLM ID Team DPC Objectives Calculations

DESIRED PLANT COMMUNITY COMPOSITION		
ESD = Ecological Site Description for Loamy Upland 10-14" p.z. (R035XA113AZ) RW&PMG = Rangeland Wildlife and Pronghorn Management Guide 2006		
<i>ESD Cover = Low and High % Cover Values listed in ESD Loamy Upland 10-14" p.z. R035XA113AZ Reference Sheet</i>		
ESD Range of Cover	Low = 30% High = 40%	<u>Average = 35%</u>
ESD Cover - <u>Grasses</u>	Low = 25% High = 30%	
ESD Cover - <u>Shrubs</u>	Low = 5% High = 10%	
ESD Cover - <u>Forbs</u>	Low = 2% High = 5%	
ESD Composition Low % = <u>ESD Cover Low % / ESD Range of Cover Average 35% x 100</u> ESD Composition High % = <u>ESD Cover High % / ESD Range of Cover Average 35% x 100</u>		
ESD Composition - <u>Grasses</u>	$25/35 \times 100 = 71\% \text{ low}$ $30/35 \times 100 = 86\% \text{ high}$	
ESD Composition - <u>Shrubs</u>	$5/35 \times 100 = 14\% \text{ low}$ $10/35 \times 100 = 29\% \text{ high}$	
ESD Composition - <u>Forbs</u>	$2/35 \times 100 = 6\% \text{ low}$ $5/35 \times 100 = 14\% \text{ high}$	
PLANT COMMUNITY COMPOSITION = Range of composition extrapolated from ESD Composition, the Rangeland Wildlife and the Pronghorn Management Guide 2006 objectives		
<u>Grasses</u>	ESD Composition = 71 – 86% RW&PMG = <u>50</u> – 80%	Range = 50 – 86%
<u>Shrubs</u>	ESD Composition = 14 – <u>29</u> % RW&PMG = < <u>5</u> %	Range = 0 – 29%
<u>Forbs</u>	ESD Composition = <u>6</u> – 14% RW&PMG = 10 – <u>20</u> %	Range = 6 – 20%

Appendix D. Interested Public

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

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

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

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

Cody Nicoll Weagant
P.O. Box 2345
Florence, AZ 85132

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

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

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

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