Rangeland Health Evaluation

Lower Centennial Complex
Clem Allotment #03017
Bialac Allotment #03008
Carter-Herrera Allotment #03015
Flat Iron Allotment #03031

Contents

Abstract

This draft Rangeland health evaluation seeks to ascertain if the Arizona Standards for Rangeland Health are met on the Lower Centennial Complex of allotments.
Standard One is achieved on this Complex.
Standard Two is not applicable on the Complex.
Standard Three is achieved on this Complex.

1.0 Introduction

The purpose of this draft land health evaluation is to gauge whether the Arizona Standard of Rangeland Health (Standards) are being achieved on the Clem, Carter-Herrera, Bialac, and Flat Iron grazing allotments (hereafter the "Lower Centennial Complex" or "Complex") and to determine if livestock are the causal factor for either not achieving or not making significant progress towards achieving land health standards. An evaluation is not a decision document, but a standalone report that clearly records the analysis and interpretation of the available inventory and monitoring data. As part of the land health assessment process Desired Plant Community (DPC) objectives were established for the Biological Resources (biological objects within the boundaries of the allotments). The DPC objectives will assure that soil condition and ecosystem function described in Standard 1 is met.

The Secretary of the Interior approved Arizona's Standards for Rangeland Health and Guidelines for Grazing Administration (Guidelines) in April 1997. The Decision Record, signed by the BLM State Director (April 1997) provides for full implementation of the Standards and Guides in Arizona BLM Land Use Plans. See Appendix B for Arizona's Standards for Rangeland Health.

Land Health Standards are measurable and attainable goals for the desired condition of the biological resources and physical components/characteristics of the desert ecosystems found within the boundaries of these grazing allotments.

This evaluation seeks to determine: 1) if standards are being achieved, not achieved, and, in cases of not achieved, if significant progress is being made towards achievement of land health. 2) Where it is determined that land health standards are not being achieved, determine whether livestock grazing is a significant factor causing that non-achievement.

2.0 Complex Profile

2.1 Complex Location

The Lower Centennial Complex is located west and north of the town of Tonopah, Arizona. Interstate 10 runs along the south boundary of most of the complex, with the exception of an isolated parcel on the Clem allotment. Salome road bisects the Clem allotment, and Wickenburg (Aguila) road is the eastern boundary of the complex. Acreages for the allotments within the complex are given in Section 2.2.1, below. A map of the Complex allotments is available in Appendix A.

2.2 Physical Description

2.2.1 Allotment Acreages

The approximate acreages of the allotments within the Lower Centennial Complex are given below.

Land Classification	Clem	Carter-Herrera	Bialac	Flat Iron
Public Acres	46,203	20,046	10,321	7,869
Bureau of Reclamation	346	0	0	0
State Acres	22,203	3,788	0	1,234
Private Land Acres	29,246	17,851	11,842	10,373
Total Acres	97,998	41,685	22,163	19,476

2.2.2 Climate Data

Climate data for this allotment are taken from the Western Regional Climate Center data available at www.wrcc.dri.edu. The data are based on the National Oceanic and Atmospheric Administration (NOAA) site located in Wickenburg, AZ northeast of the complex. Average mean air temperature at this site is 65.7°F, with an average of 150.4 days per year at a daily maximum temperature above 90°F and 61.2 days a year with a daily minimum below 32°F. This is consistent with the Natural Resource Conservation Service (NRCS) Agricultural Handbook 296, which describes the climate of the area as:

> *"The average annual air temperature is 58 to 74 degrees F (15 to 23 degrees C). The freeze-free period averages 285 days and ranges from 205 to 365 days, decreasing in length with increasing elevation."* (USDA 2006)

2.2.3 Precipitation

Precipitation data for the Lower Centennial Complex is taken from the Maricopa County Flood Control District (MCFCD). MCFCD maintains a network of rain, streamflow, and weather stations within the watershed in and surrounding Maricopa County, with publicly available historic station data. The stations below were used in the calculation of precipitation on the Complex:

Station Name	Station Number	Lat	Long	Years of Record	Mean Annual Rainfall
Buckeye Rd. @547 Ave	5080	33.43568	-113.23039	16	5.7
Centennial Trib. @ Dobbins Rd.	5045	33.36364	-112.99321	4	4.92
Eagle Eye Road @ CAP	5065	33.584548	-113.271285	13	5.5
I-10 @ 355 Ave	5070	33.47085	-112.81627	15	6.05
Centennial Levee	5120	33.51942	-113.26049	32	5.51
Harquahala FRS	5125	33.54868	-113.09772	23	4.86
Four Mile Wash	5135	33.53987	-112.85368	15	6.51
Tiger Wash Fan	5140	33.67036	-113.3139	22	6.00
Narrows Damsite	5150	33.72497	-113.51268	22	5.74
Belmont Mountains	5240	33.65735	-112.91167	13	7.38

Based on the above rainfall information, the complex falls within the 4-7" precipitation zone for the NRCS ecological site guides. The central areas within the complex receive less rainfall than the eastern and western areas of the complex, decreasing potential for plant growth and recruitment within this area.

An interpolation (kriging) of rainfall data using the above rain gauges was completed in order to predict average annual rainfall at each Key Area within the complex. A generalized rainfall prediction map is available in Appendix A, Map 4.

2.2.4 Soils Data

Soils data for the Complex are taken from the NRCS soil surveys of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties (2013) and Maricopa County, Central Part (2013). Soils data is currently not available for those parts of the Clem allotment which lie within La Paz county (approximately 7,858 acres). The soils data is limited to public lands within the allotments, and does not include soils present on State trust or privately held lands. Soil descriptions are taken from the NRCS/USDA soils website. NRCS classifies the soils as falling within the 4-7" and 7-10" precipitation zone, however, rainfall data shows that use of the 4-7" precipitation zone is more appropriate for the soils within the complex.

Approximately 60 soil types, associations, and complexes occur on public lands within the Lower Centennial Complex. These soils are typical of desert floor and mountainous soils. These are shown in Appendix A, Section 4. The majority of the complexes and associations are of similar soil series. The dominant soil series are described, alphabetically, below:

The Antho Series:
Antho soils are present on 11 of the soil types in the complex. There soils are coarse-loamy, mixed, superactive, calcareous, hyperthermic typic torrifluvents. There soils are very deep, somewhat excessively drained soils formed in alluvium on alluvial fans and flood plains. Slopes range from 0 to 5 percent, and elevations range from 100 to 3,000 feet. Runoff is medium on these soils, and the erosion hazard is slight to moderate. In 3-7 inch rainfall regimes, the Antho soil is associated with the Sandy Loam Upland ecological site, and in 7-10 inch rainfall regimes is associated with the Sandy Loam deep or Limy Fan ecological sites, depending on soil carbonate content.

The Carrizo Series:
Carrizo soils are present in 8 of the soil types on the complex. These soils are sandy-skeletal, mixed hyperthermic typic torriorthents. These soils are very deep, excessively drained soils formed in alluvium along flood plains and alluvial fans. Slopes range from 0 to 12 percent, and elevations range from 750 to 1,400 feet. Runoff is slow on these soils, and the erosion hazard is slight. Depending on their position on the landform, Carrizo soils are associated with the Sandy Wash, Sandy Loam deep, and Limy Upland deep ecological sites.

The Cherioni Series:
Cherioni soils are present in 3 of the soil types of the complex. These soils are loamy-skeletal, mixed, superactive, hyperthermix, shallow Typic Haplodurids. These soils are very shallow to shallow over hardpan, somewhat excessively drained soils formed in slope alluvium over volcanic bedrock. Slopes range from 0 to 70 percent, with elevations from 150 to 3,000 feet. Runoff is medium to rapid on the soils due to slope, and the erosion hazard is moderate. Depending on their position and slope on the landform, Cherioni soils are associated with the Basalt Hills and Limy Upland ecological sites.

The Chuckawalla Series:
Chuckawalla soils are present in 2 of the major soil types of the complex. These soils are loamy-skeletal, mixed, superactive hyperthermic typic calciargids. There soils are very deep, well drained and formed in mixed alluvium on fan terraces. Slopes range from 0 to 15 percent with elevations from 1,200 to 1,600 feet. Runoff is medium on these soils and the erosion hazard is slight. Chuckawalla soils generally have low vegetative production and form desert pavement. Depending on rainfall regime and landform position, Chuckawalla soils are associated with the Limy Upland deep and Granitic Hills ecological sites.

The Cipriano Series:
Cipriano soils are present in 4 of the soil types on the complex. These soils are loamy-skeletal, mixed, superactive hyperthermic typic haplodurids. These soils are shallow to very shallow over hardpan, excessively drained, and formed in volcanic alluvium on fan terraces. Slopes range from 0 to 55 percent with elevations from 500 to 2,200 feet. Runoff is variable on these soils based on slope and the erosion hazard is low to moderate. Cipriano soils are associated with the Limy Upland ecological site.

The Gilman Series:
Gilman soils are present in 6 of the soil types on the complex. These soils are coarse-loamy, mixed, superactive, calcareous, hyperthermic typic torrifluvents. These soils are very deep, well drained soils formed in alluvium. Slopes range from 0 to 3 percent, with elevations from 75 to 2,500 feet. Runoff is slow on these soils, and the erosion hazard is slight. These soils are generally associated with the Limy Fan ecological site.

The Gunsight Series:
Gunsight soils are present in 10 of the soil types on the complex. These soils are loamy-skeletal, mixed, superactive, hyperthermic typic haplocalcids. These soils are very deep, somewhat excessively drained, calcareous soils formed in alluvium. Slopes range from 0 to 60 percent, with elevations from 400 to 2,600 feet. Runoff is variable on these soils based on slope and the erosion hazard is slight to moderate. Gunsight soils are generally associated with the Limy Upland deep ecological site, but in some complexes are classified as Limy Fans.

The Momoli Series:
Momoli soils are present in 4 of the soil types on the complex. These soils are loamy-skeletal, mixed, superactive, hyperthermic typic haplocambids. There soils are very deep, somewhat excessively drained soils formed in alluvium on stream and fan terraces. Slopes range from 0 to 15 percent, with elevations from 400 to 2,500 feet. Runoff on these soils is slow to medium and the erosion hazard is slight. Momoli soils are associated with the Sandy Loam Upland and Limy Upland deep ecological sites, depending upon soil carbonate content.

2.3 Biological Resources

2.3.1 Major Land Resource Areas

The Lower Centennial Complex lies within Major Land Resource Area (MLRA) 40, Sonoran Basin and Range. MLRAs are described in USDA NRCS Agriculture Handbook 296: “Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin” (2006). MRLAs describe, on a large-landscape scale, the physiography, geology, climate, water, soils, biological resources and general land use.

Ecological Site Descriptions produced by the NRCS are organized by MLRA for reference purposes.

2.3.2 Ecological Sites

An ecological site is a distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation. It is the product of all the environmental factors responsible for its development, and it has a set of key characteristics (soils, hydrology, and vegetation) that are included in the ecological site description. Development of the soils, hydrology, and vegetation are all interrelated and influence one another to some degree. (TR 1734-07, Ecological Site Inventory)

There are several ecological sites that occur within the Lower Centennial Complex. Each are named and classified based on soil parent material or soil texture and precipitation. NRCS has the ecological sites on the complex mapped within the 3-7 inch and the 7-10 inch precipitation zone, mostly based on elevation differences in the mountainous areas. Average rainfall across the complex, as shown above, generally falls within the 3-7 inch precipitation zone. For this reason, ecological sites used for this evaluation are the 3-7 inch precipitation zone ecological site guides. The dominant ecological sites on Public lands within the complex are described below. Refer to Map 3, Appendix A, for the location of ecological sites occurring on the complex.

NRCS provides Ecological Site Descriptions online at https://esis.sc.egov.usda.gov/.

Granitic Hills 3-7”pz R040XC305AZ

This site occurs on hills and mountains. Slopes range from 15 to 75% and elevations are from 400 to 2,000 feet. Soils are shallow to moderately deep, with moderate permeability and non-calcareous, formed on granite, gneiss, and schist bedrock. Soils generally contain more than 35% coarse fragments, with soil surface cover being 15-55% rock cover. The potential plant community is a shrub dominated site with an understory of grasses and forbs. Annual production on this site is expected to be between 158 and 306lbs air-dry weight per acre.

Limy Upland 3-7”pz Deep R040XC311AZ

This site occurs on alluvial fans and fan terraces. Slopes are from 0 to 6%, with elevations from 400 to 1000 feet. Soils are deep, but shallow to layers high in lime, and formed in alluvium. Soils are calcareous and loamy to sandy loam textured. Surface rock fragments are common, and subsurface rock fragments comprise up to 70% of the total soil volume. Plant-soil moisture relationships are moderate. The potential plant community is primarily desert shrubs and cacti with sparse grass. Creosote bush is the dominant plant species. Annual vegetative production is expected to be between 87 and 115lbs air-dry weight per acre.

Limy Upland 3-7”pz R040XC310AZ

This site occurs on alluvial fans and fan terraces. Slopes are from 0 to 6%, with elevations from 400 to 1000 feet. Soils are shallow to plant root restricting layers and are calcareous. Surface fragments are common, and fragments occur throughout the soil. Plant-soil moisture relationships are very good. The potential plant community is primarily desert shrubs and cacti with sparse grass. Creosote bush is the dominant plant species. Annual vegetative production is expected to be between 92 and 120lbs air-dry weight per acre.

Sandy Loam Upland 3-7"pz R040XC320AZ
This site occurs on flood plains, terraces, and alluvial flats. Slopes are from 0 to 3%, with elevations from 75 to 1,200 feet. Soils are deep to bedrock or other plant root restricting layers and are non- to slightly-calcareous. Surface and subsurface fragments account for 5 to 15% of the soil. Plant-soil moisture relationships are good. The potential plant community is a mixture of desert shrubs and trees with an understory of perennial grasses. Annual vegetative production is expected to be between 270 and 520lbs air-dry weight per acre.

2.3.3 General Wildlife Resources

Wildlife species that occur within the Lower Centennial Complex are typical and representative of the vegetative communities and topography present in the area. Species present include, but are not limited to, mule deer, coyote, javelina, mountain lion, bobcat, gray fox, desert cottontail, black-tailed jackrabbits, Gambel's quail, great horned owls, and various reptiles, small mammals, bats, and migratory birds. Desert bighorn sheep occupy steep, rugged habitat in the Big Horn and Belmont Mountains as well as Saddle Mountain.

2.3.4 Special Status Species, T&E

Sonoran desert tortoise (*Gopherus morafkai*), also a BLM sensitive species, occupy upland areas in Sonoran desert scrub vegetation in the Complex. The desert tortoise distribution is not uniform within its range. Tortoises tend to occupy hillsides and ridges with outcrops of large boulders as well as areas with incised washes and caliche caves, but may be found in lower densities throughout the area. Tortoises generally use natural and excavated cover sites between or under boulders and in caliche caves along washes wherever they occur. Their diet consists of annual forbs (30.1%), perennial forbs (18.3%), grasses (27.4%), woody plants (23.2%) and prickly pear fruit (1.1%) (Van Devender,et al. 2002).

The Lower Centennial Complex contains category II and category III desert tortoise habitat. Category II habitat is defined as: 1) Habitat that may be essential to the maintenance of viable populations; 2) Habitat where most conflicts are resolvable; and 3) Habitat that contains medium to high densities of tortoises or low densities contiguous with medium or high densities. Category III habitat is defined as: 1) Habitat that is not considered essential to the maintenance of viable populations; 2) Habitat where most conflicts are not resolvable; and 3) Habitat that contains low to medium densities of tortoises not contiguous with medium or high densities. The table below shows the approximate acreages of desert tortoise habitat within the complex.

Allotment	Category 2 Acres	Category 3 Acres
Clem	11,631	5,640
Carter-Herrera	8,030	3,171
Bialac	5,838	3,384
Flat Iron	9,348	2,769

2.4 Special Management Areas

The Clem allotment contains approximately 9,371 acres of the Big Horn Mountains wilderness area.

2.5 Recreational Resources

Public access generally coincides with routes permitted for use the grazing permittees. Minor maintenance of the existing routes is generally welcomed by the public. Major upgrades to the existing routes may be less welcome due to the recreationists' expectation for rough, minimally maintained roads. Improving roads to a higher standard is sometimes perceived by the public, to invite vandals and new uses which may leave trash or displace authorized use. Improving access can have the effect of increasing use of an area which was previously lightly used, leading to increased litter and increasing impacts to vegetation and water quality.

3.0 Grazing Management

3.1 Grazing History

The Clem Allotment consists of three major pastures. The "Clem" pasture lies south of I-10 and is managed by the Lower Sonoran Field Office. The West Clem pasture lies north of I-10, and west of the 75E road. The East Clem pasture lies east of the 75E road, and contains a small pasture south of I-10 located at the base of Saddle Mountain. Each pasture is run by separate grazing permittees. The East and West Clem pastures are managed by the Hassayampa Field Office, and are the subject of this Rangeland Health Evaluation. The southern Clem pasture will be evaluated separately by the Lower Sonoran Field office.

The permittees on the East Clem pasture are Timothy and Andrea Maxwell. The Maxwells acquired the ranch in 2015. They are currently working with NRCS for additional interior pasture fencing and livestock water sources that are to be located on State and Public lands, as well as designing an Allotment Management Plan.

The West Clem allotment has been recently sold. The transfer of grazing preference is currently being processed.

The permittee on the Carter-Herrera and Bialac allotments is Bruce Hunter. Mr. Hunter acquired the allotments in 2016, and has been involved in their management since the early 2000s.

The permittee on the Flat Iron allotment is White Dog Ranch, LLC. They acquired the ranch in 2006. This allotment has generally been in a non-use or slight use status since 2007.

3.2 Mandatory Terms and Conditions for Permitted Use

The Clem, Carter-Herrera, and Flat Iron allotments within the complex are perennial allotments and are authorized to maintain a year-long base herd. The Bialac allotment is designated ephemeral use only. The Mandatory Terms and Conditions of the permits are listed below:

Allotment Name	Pasture	Allotment Number	Livestock Number	Livestock Kind	%PL	Type Use	AUMs
Clem	East	03017	137	Cattle	68	Active	1118
Clem	West	03017	65	Cattle	100	Active	780
Carter-Herrera	--	03015	52	Cattle	82	Active	512
Bialac	--	03008	0	Cattle	100	Ephemeral	0
Flat Iron	--	03031	38	Cattle	86	Active	392

4.0 Objectives

4.1 Relevant Planning and Environmental Documents

The Taylor Grazing Act of 1934 provides for two types of authorized use: (1) A *grazing permit*, which is a document authorizing use of the public lands within an established grazing district, and are administered in accordance with Section 3 of the Taylor Grazing Act; and (2) a *grazing lease*, which is a document authorizing use of the public lands outside an established grazing district, and are administered in accordance with Section 15 of the Taylor Grazing Act. The allotments within the Lower Centennial Complex are Section 3 grazing permits.

The BLM is responsible for establishing the appropriate levels and management strategies for livestock grazing in these allotments. Grazing permits issued must be in compliance with the multiple use and sustained yield concepts of the Federal Land Policy and Management Act (FLPMA) and the Fundamentals of Rangeland Health (43 CFR 4180), and be in accordance with the Guidelines for Grazing Administration while continuing to achieve Arizona Standards for Rangeland Health.

Land Health Standards:
On April 28, 1997, the Secretary of Interior approved the implementation of the *Arizona Standards for Rangeland Health and Guidelines for Grazing Administration* for all Land Use Plans in Arizona. The purpose of the Standards and Guidelines is to maintain or improve the health of the public rangelands. Standards and guidelines are intended to help the Bureau, rangeland users and others focus on a common understanding of acceptable resource conditions and work together to achieve that vision. Standards and Guidelines were incorporated into Phoenix District land use plans in 1997 and into the *Bradshaw-Harquahala RMP* in 2010.

As defined by the Arizona Resource Advisory Council, "Standards" are goals for the desired condition of the biological and physical components and characteristics of rangelands. "Guidelines" are management approaches, methods, and practices that are intended to achieve a standard. Guidelines are developed and applied consistent with the desired condition and within the site's capability and specific public land uses, and may be adjusted over time. Arizona S&Gs are defined as the following:

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.

The Bradshaw-Harquahala Resource Management Plan (2010) contains additional desired future condition objectives for wildlife special status species. For the Lower Centennial Complex, the desired future condition objectives for Sonoran desert tortoise are applicable. These objectives are given below:

> *"TE-3. In Category I and II areas, vegetation will consist of at least 5 percent native perennial grasses, at least 10 percent native perennial forbs or subshrubs, at least 30 percent native trees and cacti, by dry weight, as limited by the potential of the ecological site as described by the Natural Resource Conservation Service (NRCS) ecological site guides."*

4.2 Key Area Objectives

Specific Key Area objectives step down from the Desired Future Condition objectives found in the Bradshaw-Harquahala RMP (2010). These Key Area specific objectives are designed to assess Public Land conformance to the Arizona Standards for Rangeland Health on the Upper Centennial Complex.

There are 10 active Key Areas on the Lower Centennial Complex. The Clem allotment contains 5 Key Areas. The Carter-Herrera, and Bialac each contain 2 active Key Areas. One Key Area is located on the Flat Iron allotment. The table below shows the active key areas on the complex:

Allotment	Key Area	Ecological Site
Clem East Pasture	KA1	Limy Upland deep
	KA2	Limy Upland deep
	KA3	Limy Upland deep
	KA4	Sandy Loam Upland
Clem West Pasture	KA1	Limy Upland
Carter-Herrera	KA1	Abandoned
	KA2	Basalt Hills
	KA3	Limy Upland
Bialac	KA1	Limy Upland
	KA2	Basalt Hills
Flat Iron	KA1	Granitic Hills

Desired Plant Community (DPC) Objectives were developed for each Key Area within the Complex by an interdisciplinary team of BLM resource specialists and biologists. These objectives are designed to maintain or improve the biotic integrity of the Public Lands, provide for wildlife habitat, and provide for usable forage as limited by the potential of the ecological site. These objectives, and the rationale for each objective, are given below.

4.2.1 Standard 1- Upland Sites, applies to all key areas.

Objective: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate, and landform (ecological site). (Bradshaw-Harquahala RMP decision LH-1)

Soil erosion on the key area is appropriate to the ecological site on which it is located. Factors indicating conformance to Standard 1 include ground cover, litter, vegetative foliar cover, flow patterns, rills, and plant pedestalling in accordance to developed NRCS Ecological Site Guides and/or Reference Sheets. Deviations that are "slight" or "slight to moderate" from the appropriate site guide or reference are considered meeting the Standard. Departures of Moderate or greater will not meet the Standard except in cases where the departure is documented as showing an improvement of land health over what is expected on a reference site.

4.2.2 Standard Two – Proper Functioning Condition

Standard Two does not apply to this complex. No riparian areas are present within the complex.

4.2.3 Standard 3- Desired Resource Condition Objectives

Upland Sites

Objective: Productive, diverse upland and riparian-wetland plant communities exist and are maintained.

DPC objectives detail a site-specific plant community, which, when obtained, will assure rangeland health, State water quality standards, and habitat for endangered, threatened and sensitive species. Because DPC objectives are site-specific, Key Areas located on similar stratum may have difference DPC objectives. This is due to differences in slope, elevation, aspect and rainfall factors, as well as other site potential limiting factors such as prior disturbance, rock outcroppings, or heavy gravel cover. The recommended palatable shrub and grass compositions will provide for adequate wildlife forage on the site for species such as Sonoran desert tortoise, mule deer, quail, and other non-game wildlife species. The foliar or canopy cover and bare ground cover class objectives will provide thermal and hiding cover for wildlife species and will prevent accelerated erosion on the sites.

Sonoran desert tortoise habitat requirements are listed in the Bradshaw-Harquahala RMP. The DPC objectives for each key area within desert tortoise habitat are consistent with the Sonoran desert tortoise habitat requirements based on the potential for the site. Several sites lie within Category 2 and 3 desert tortoise habitat.

Clem Allotment- East Pasture

Key Area 1

Limy Upland 3-7"precipitation zone (pz) deep

- Maintain palatable browse species composition of ≥10%
- Maintain a vegetative canopy cover of ≥10%
- Maintain a bare ground cover class of ≤15%

Rationale:
Key area 1 is located on a northwest facing aspect Gunsight-Rillito complex soil at 1310 feet above sea level. Average predicted rainfall on the site is 5.53 inches. The site is located within Category 2 Sonoran desert tortoise habitat.

Rationale for the DPC objectives is taken from the NRCS Limy Upland 3-7"pz deep ecological site description and 7-10"pz reference sheet. NRCS has not developed a reference sheet for the 3-7"pz, so the 7-10"pz reference sheet was used. The lower precipitation on this site in comparison to the reference sheet is expected to produce lower than reference sheet values in vegetative cover, vegetative production, and grass and forb composition on the site. Perennial grass composition ranges from 2-5% in the ecological site description. A perennial grass objective was not set on this site. Perennial grasses are not present on the site, and the seed bank is insufficient to naturally colonize the area. Shrub composition on this site is expected to be between 29 and 51% of the vegetation community based on the ecological site description, and 50% of the cover on the site based on the reference sheet. Maintaining a palatable browse composition of 10% or greater is appropriate to the site based on the site potential. In the reference state, canopy cover is expected to be between 20-25%. Due to the low rainfall on this site compared to reference conditions, maintaining a canopy cover of 10% is appropriate to the site. Bare ground measurements range from 10-60% in the reference state, and are dependent on gravel and rock soil cover levels. Due to the high gravel and rock cover currently on the site, maintaining a bare ground cover class of less than 15% is appropriate to the site, and will help to prevent accelerated erosion.

Key Area 2
Limy Upland 3-7" pz deep

- Maintain a perennial grass composition of ≥1%
- Maintain palatable browse species composition of ≥10%
- Maintain a vegetative canopy cover of ≥10%
- Maintain a bare ground cover class of ≤30%

Rationale:
Key Area 2 is located on a southern facing aspect Momoli-Carrizo complex soil at 1,290 feet above sea level. Average predicted annual rainfall on the site is 5.22 inches. The site is not located in Sonoran desert tortoise habitat.
Rationale for the DPC objectives is taken from the NRCS Limy Upland 3-7"pz deep ecological site description and 7-10"pz reference sheet. NRCS has not developed a reference sheet for the 3-7" pz, so the 7-10"pz reference sheet was used. The lower precipitation on this site in comparison to the reference sheet is expected to produce lower than reference sheet values in vegetative cover, vegetative production, and grass and forb composition on the site. Perennial grass composition ranges from 2-5% in the ecological site description. Perennial grasses are present on the site in draws and areas that collect additional moisture, but are a minor component of the overall site. Setting a DPC objective of maintaining greater than 1% composition ensures that grasses will not be extirpated from the site. Shrub composition on this site is expected to be between 29 and 51% of the vegetation community based on the ecological site description, and 50% of the cover on the site based on the reference sheet. Maintaining a palatable browse composition of 10% or greater is appropriate to the site based on the site potential. In the reference state, canopy cover

is expected to be between 20-25%. Due to the low rainfall on this site compared to reference conditions, maintaining a canopy cover of 10% is appropriate to the site. Bare ground measurements range from 10-60% in the reference state, and are dependent on gravel and rock soil cover levels. Due to the high gravel but low rock cover currently on the site, maintaining a bare ground cover class of less than 30% is appropriate to the site, and will help to prevent accelerated erosion.

Key Area 3
Limy Upland 3-7"pz deep

- Maintain palatable browse species composition of ≥15%
- Maintain a vegetative canopy cover of ≥20%
- Maintain a bare ground cover class of ≤15%

Rationale:
Key Area 3 is located on a south-southeast facing aspect Chuckawalla-Gunsight complex soil at 1,580 feet above sea level. Average predicted rainfall on the site is 5.46 inches. This site is located within Category 2 Sonoran desert tortoise habitat.

Rationale for the DPC objectives is taken from the NRCS Limy Upland 3-7"pz deep ecological site description and 7-10"pz reference sheet. NRCS has not developed a reference sheet for the 3-7" pz, so the 7-10"pz reference sheet was used. The lower precipitation on this site in comparison to the reference sheet is expected to produce lower than reference sheet values in vegetative cover, vegetative production, and grass and forb composition on the site. Perennial grass composition ranges from 2-5% in the ecological site description. A perennial grass objective was not set on this site. Perennial grasses are not present on the site, and the seed bank is insufficient to naturally colonize the area. Shrub composition on this site is expected to be between 29 and 51% of the vegetation community based on the ecological site description, and 50% of the cover on the site based on the reference sheet. Maintaining a palatable browse composition of 15% or greater is appropriate to the site based on the site potential. In the reference state, canopy cover is expected to be between 20-25%. Maintaining a canopy cover of 20% is appropriate to the site due to areas within the study area that receive additional moisture from adjacent areas. Bare ground measurements range from 10-60% in the reference state, and are dependent on gravel and rock soil cover levels. Due to the high gravel and moderate rock cover currently on the site, maintaining a bare ground cover class of less than 15% is appropriate to the site, and will help to prevent accelerated erosion.

Key Area 4
Sandy Loam Upland 3-7"pz

- Maintain a perennial grass composition of ≥5%
- Maintain a palatable browse species composition of 10%
- Maintain vegetative foliar cover of ≥10%
- Maintain a Bare Ground cover class of ≤30%

Rationale:
Key Area 4 is located on a southern facing aspect Denure-Momoli-Carrizo complex soil at 1,480 feet above sea level. Average predicted annual precipitation for this site is 5.82 inches. The site is not located within Sonoran desert tortoise habitat.

Rationale for DPC objectives is taken from the NRCS Sandy Loam Upland 3-7"pz ecological site description and reference sheet. Perennial grass composition in the ecological site description is between 21-46%, however, the reference sheet shows grass composition being less than shrub and subshrub composition. This soil type on the allotment exhibits characteristics of both the Sandy Loam Upland and Limy Upland in a highly mixed ratio. Due to this soil mixing, the average annual precipitation, and the timing of that moisture, it is unlikely this site is capable of producing the composition of grass given in the ecological site description. A perennial grass composition of at least 5% is most appropriate to the site given these limitations. Shrub and tree composition on this site is between 30-56%. Due to the mixing of soils as described above, shrub composition is expected to be slightly higher than what is listed in the site description, and is expected to include higher percentages of non-palatable species such as creosotebush. A palatable browse composition of greater than 10% is appropriate for the site, given these factors. Canopy cover on the site is expected to be between 10-15% in the reference state. Maintaining a foliar cover of greater than 10% is appropriate for the site. In the reference state, bare ground is expected to be between 10-60%, based on gravel and rock cover, and annual species litter. Given the high litter, moderate gravel and low rock cover values on this site, maintaining a bare ground cover class of less than 30% is appropriate for the site and will help to prevent accelerated erosion.

The Clem Allotment- West Pasture

Key Area 1
Limy Upland 3-7"pz

- Maintain a palatable browse species composition of ≥20%
- Maintain a vegetative foliar cover of ≥5%
- Maintain a Bare Ground cover class of ≤15%

Rationale:
Key Area 1 is located on a northeast facing aspect. Soils have not been mapped in this area. The ecological site was keyed out using the NRCS ecological site key for MLRA 40. Elevation of the site is 1,490 feet above sea level. Average predicted annual precipitation for this site is 6.01 inches. The site is not located within Sonoran desert tortoise habitat.

Rationale for the DPC objectives is taken from the NRCS Limy Upland 3-7"pz ecological site description and 7-10"pz reference sheet. NRCS has not developed a reference sheet for the 3-7" pz, so the 7-10"pz reference sheet was used. The lower precipitation on this site in comparison to the reference sheet is expected to produce lower than reference sheet values in vegetative cover, vegetative production, and grass and forb composition on the site. Perennial grass composition ranges from 5-10% in the ecological site description. A perennial grass objective was not set on this site. Perennial grasses are not present on the site, and the seed bank is insufficient to naturally colonize the area. Shrub composition on this site is expected to be between 34-91% of the vegetation community based on the ecological site description, and 50% of the cover on the site based on the reference sheet. Maintaining a palatable browse composition of 20% or greater is appropriate to the site based on the site potential. In the reference state, canopy cover is expected to be between 20-25%. Due to the lower rainfall regime of the site and high gravel cover, maintaining a foliar cover class of greater than 5% is appropriate to the site. Bare ground measurements range from 10-60% in the reference state, and are dependent on gravel and rock soil cover levels. Due to the high gravel cover currently on the site, maintaining a bare ground cover class of less than 15% is appropriate to the site, and will help to prevent accelerated erosion.

The Carter-Herrera Allotment

Key Area 2
Basalt Hills 3-7"pz

- Maintain a perennial grass frequency of ≥5%
- Maintain a palatable browse species composition of ≥20%
- Maintain a vegetative foliar cover of ≥10%
- Maintain a Bare Ground cover class of ≤10%

Rationale:
Key Area 2 is located on a north-northeast facing aspect Cherioni-Rock Outcrop complex soil at 1,540 feet above sea level. Average predicted annual precipitation for this site is 5.14 inches. This site is within Category 3 Sonoran desert tortoise habitat.

Rationale for the DPC objectives is taken from the NRCS Basalt Hills 3-7"pz ecological site description and 7-10"pz reference sheet. NRCS has not developed a reference sheet for the 3-7" pz, so the 7-10"pz reference sheet was used. The lower precipitation on this site in comparison to the reference sheet is expected to produce lower than reference sheet values in vegetative cover, vegetative production, and grass and forb composition on the site. Perennial grass composition ranges from 4-9% in the ecological site description. Grasses on this site primarily consist of Aristida species. Due to the growth form of these grasses, they contribute negligibly to composition measurements. Maintaining a frequency of 5% or greater will ensure that these grasses are not extirpated from the site on the allotment. In the reference state, canopy cover is expected to be between 10-15%. Due to the lower rainfall on this site, maintaining a foliar cover of 10% or greater is appropriate to the site. In the reference state, bare ground is expected to be between 1-5%. The lower rainfall on this site when compared to the reference state is expected to produce a higher bare ground cover class, and maintaining a bare ground cover class of 10% or less is appropriate to the site.

Key Area 3
Limy Upland 3-7"pz

- Maintain a palatable browse species composition of ≥20%
- Maintain a vegetative foliar cover of ≥5%
- Maintain a Bare Ground cover class of ≤15%

Rationale:
Key Area 3 is located on a southeast facing aspect Cherioni-Rock Outcrop complex soil at 1,440 feet above sea level. Average predicted annual precipitation for this site is 5.70 inches. This site is within Category 2 Sonoran desert tortoise habitat.

Rationale for the DPC objectives is taken from the NRCS Limy Upland 3-7"pz ecological site description and 7-10"pz reference sheet. NRCS has not developed a reference sheet for the 3-7" pz, so the 7-10"pz reference sheet was used. The lower precipitation on this site in comparison to the reference sheet is expected to produce lower than reference sheet values in vegetative cover, vegetative production, and grass and forb composition on the site. Perennial grass composition ranges from 5-10% in the ecological site description. A perennial grass objective was not set on this site. Perennial grasses are not present on the site, and no seed bank exists to naturally colonize the area. Shrub composition on this site is expected to be between 34-91% of the vegetation community based on the ecological site description, and 50% of the

cover on the site based on the reference sheet. Maintaining a palatable browse composition of 20% or greater is appropriate to the site based on the site potential. In the reference state, canopy cover is expected to be between 20-25%. Due to the lower rainfall regime of the site and high gravel cover, maintaining a foliar cover class of greater than 5% is appropriate to the site. Bare ground measurements range from 10-60% in the reference state, and are dependent on gravel and rock soil cover levels. Due to the high gravel cover currently on the site, maintaining a bare ground cover class of less than 15% is appropriate to the site, and will help to prevent accelerated erosion.

The Bialac Allotment

Key Area 1
Limy Upland 3-7"pz

- Maintain a palatable browse species composition of ≥20%
- Maintain a vegetative foliar cover of ≥5%
- Maintain a Bare Ground cover class of ≤15%

Rationale:
Key Area 1 is located on a south facing aspect Sal-Cipriano complex soil at 1,560 feet above sea level. Average predicted annual precipitation for this site is 6.21 inches. This site is within Category 3 Sonoran desert tortoise habitat.

Rationale for the DPC objectives is taken from the NRCS Limy Upland 3-7"pz ecological site description and 7-10"pz reference sheet. NRCS has not developed a reference sheet for the 3-7" pz, so the 7-10"pz reference sheet was used. The lower precipitation on this site in comparison to the reference sheet is expected to produce lower than reference sheet values in vegetative cover, vegetative production, and grass and forb composition on the site. Perennial grass composition ranges from 5-10% in the ecological site description. A perennial grass objective was not set on this site. Perennial grasses are not present on the site, and no seed bank exists to naturally colonize the area. Shrub composition on this site is expected to be between 34-91% of the vegetation community based on the ecological site description, and 50% of the cover on the site based on the reference sheet. Maintaining a palatable browse composition of 20% or greater is appropriate to the site based on the site potential. In the reference state, canopy cover is expected to be between 20-25%. Due to the lower rainfall regime of the site and high gravel cover, maintaining a foliar cover class of greater than 5% is appropriate to the site. Bare ground measurements range from 10-60% in the reference state, and are dependent on gravel and rock soil cover levels. Due to the high gravel cover currently on the site, maintaining a bare ground cover class of less than 15% is appropriate to the site, and will help to prevent accelerated erosion.

Key Area 2
Basalt Hills 3-7"pz

- Maintain a perennial grass frequency of ≥1%
- Maintain a palatable browse species composition of ≥20%
- Maintain a vegetative foliar cover of ≥10%
- Maintain a Bare Ground cover class of ≤10%

Rationale:

Key Area 2 is located on a northwest facing aspect Cherioni-Rock Outcrop complex soil at 1,640 feet above sea level. Average predicted annual precipitation for this site is 5.70 inches. This site is within Category 2 Sonoran desert tortoise habitat.

Rationale for the DPC objectives is taken from the NRCS Basalt Hills 3-7"pz ecological site description and 7-10"pz reference sheet. NRCS has not developed a reference sheet for the 3-7" pz, so the 7-10"pz reference sheet was used. The lower precipitation on this site in comparison to the reference sheet is expected to produce lower than reference sheet values in vegetative cover, vegetative production, and grass and forb composition on the site. Perennial grass composition ranges from 4-9% in the ecological site description. Grasses on this site are limited to areas of increase moisture availability, such as rills. Maintaining a frequency of 1% or greater will ensure that these grasses are not extirpated from the site on the allotment. Shrub composition on this site is expected to be between 46-78% of the vegetation community based on the ecological site description, and 70-80% of the cover on the site based on the reference sheet. Maintaining a palatable browse composition of 15% or greater is appropriate to the site based on the site potential. In the reference state, canopy cover is expected to be between 10-15%. Due to the lower rainfall on this site, maintaining a foliar cover of 10% or greater is appropriate to the site. In the reference state, bare ground is expected to be between 1-5%. The lower rainfall on this site when compared to the reference state is expected to produce a higher bare ground cover class, and maintaining a bare ground cover class of 10% or less is appropriate to the site.

The Flat Iron Allotment

Key Area 1
Granitic Hills 3-7"pz

- Maintain a grass frequency of ≥10%
- Maintain a palatable browse species frequency of ≥20%
- Maintain a vegetative foliar cover of ≥15%
- Maintain a Bare Ground cover class of ≤5%

Rationale:
Key Area 1 is located on a northeast facing aspect Quiltosa-Vaiva-Rock Outcrop complex soil at 1,540 feet above sea level. Average predicted annual precipitation is 6.94 inches. The site is within Category 2 Sonoran desert tortoise habitat.

Rationale for DPC objectives is taken from the NRCS Granitic Hills 3-7" p.z. Ecological Site Description and Reference Sheet (R038XC305AZ). The ecological site guide shows a grass composition from 9-17%, and the ecological site guide indicates little to no grass cover on the site. Maintaining a grass frequency of 10% or greater is appropriate to the site based on aspect and rainfall. Shrub composition is expected to be between 45-83% per the ecological site description. Maintaining a palatable browse frequency of 20% or greater will provide adequate forage on the site and is appropriate to the ecological site, as not all species present are palatable. (See Appendix A, Section 3).The reference sheet shows an expected canopy cover of 5-10%. Maintaining a vegetative foliar cover of 15% or greater is appropriate to the site due to its aspect and slope and will prevent accelerated erosion of the site. Bare ground cover class is expected to be between 1-20% in the reference state. Maintaining a bare ground cover class of 5% or less is appropriate to the site due to gravel cover present on the site, and will prevent accelerated erosion of the site above what is expected in the reference state.

5.0 Inventory and Monitoring Data

5.1 Rangeland Survey Data

Rangeland Inventory was completed on the Lower Centennial Complex in 1981. This inventory was completed using the Modified Soil Vegetation Inventory Methodology based on BLM Handbook H-4410-1, "National Range Handbook" and Technical Reference 1734-7, "Ecological Site Inventory". The inventory was used to determine range condition and apparent trend as described in the 1982 Lower Gila North Draft Grazing Environmental Impact Statement.

5.2 Upland Monitoring Protocols

Monitoring protocols used at the Key Areas on the allotments include a variety of study methods. Compliance with Standard One is completed using the Interpreting Indicators of Rangeland Health study method, as described in BLM Technical Reference 1734-6 Version 4 (2005). This study method is supplemented with quantitative data collected in the methods described below.

Compliance with Standard Three is completed using a variety of upland study methods. Key Areas were conducted using Pace Frequency, Point Cover, Belt Density, or Line Intercept for the 2016-2017 data sets. Methods used on each key area were selected by an interdisciplinary team based on landform, aspect, and cover observations. These methods are described in detail in BLM Technical Reference 1734-4, "Sampling Vegetation Attributes".

Data presented in Appendix A are organized by Key Area. Frequency percentages are based on occurrence by species in data frames, divided by the total number of data frames taken at each monitoring site. Density percentage is the total counted number of individuals by species divided by the total number of plants within the belt density transect. Ground Cover percentage is the percentage of the surface cover that lies underneath canopy cover and is calculated by species from the Line Intercept transects. Canopy composition is the percentage of the total canopy cover each species occupies.

Utilization data was collected at each Key Area using the Key Species method in 2016-2017. These methods are described in BLM Technical Reference 1734-3, "Utilization Studies and Residual Measurements".

6.0 Management Evaluation and Summary of Studies Data

6.1 Actual Use

Actual Use reporting is not required on the allotments in the Lower Centennial Complex. Actual use reporting is an optional term and condition that has not been included on the prior permits. Livestock numbers provided in the tables below are based on ranch records provided by the permittees or billed use.

6.1.1 Clem Allotment East Pasture

Number of Active Livestock	Kind	Grazing Begin	Period End	%PL	AUMs
137	Cattle	3/1/2016	2/28/2017	68	1118
137	Cattle	3/1/2015	2/28/2016	68	1118
137	Cattle	3/1/2014	2/28/2015	68	1118
137	Cattle	3/1/2013	2/28/2014	68	1118
137	Cattle	3/1/2012	2/28/2013	68	1118

6.1.2 Clem Allotment West Pasture

Number of Active Livestock	Kind	Grazing Begin	Period End	%PL	AUMs
65	Cattle	3/1/2016	2/28/2017	100	780
65	Cattle	3/1/2015	2/28/2016	100	780
65	Cattle	3/1/2014	2/28/2015	100	780
65	Cattle	3/1/2013	2/28/2014	100	780
65	Cattle	3/1/2012	2/28/2013	100	780

6.1.3 Carter-Herrera Allotment

Number of Active Livestock	Kind	Grazing Begin	Period End	%PL	AUMs
52	Cattle	3/1/2016	2/28/2017	82	512
52	Cattle	3/1/2015	2/28/2016	82	512
52	Cattle	3/1/2014	2/28/2015	82	512
52	Cattle	3/1/2013	2/28/2014	82	512
52	Cattle	3/1/2012	2/28/2013	82	512

6.1.4 Bialac Allotment

The Bialac allotment has not applied for ephemeral grazing use since 1988.

6.1.5 Flat Iron Allotment

Livestock have not been placed on the Flat Iron allotment since the current permittee purchased the ranch in 2006.

7.0 Conclusions

7.1 Upland Health Conclusions

Summary of Standard Achievement or Non-achievement for all Key Areas:

Allotment	Key Area	Standard One	Standard Three
Clem East Pasture	1	Achieved	Achieved
	2	Achieved	Achieved
	3	Achieved	Achieved
	4	Achieved	Achieved
Clem West Pasture	1	Achieved	Achieved
Carter-Herrera	1	Achieved	Not Achieved
	2	Achieved	Achieved
Bialac	1	Achieved	Achieved
	2	Achieved	Achieved
Flat Iron	1	Achieved	Achieved

Upland Health Conclusions are based on the analysis of the current monitoring data for each key area. Standard Three analysis is based on Frequency, Belt Density, Line Intercept and/or Point Cover study methods. Grass composition results are based on the sum composition percent for all grass species occurring on the study area. Palatable shrub composition results are based on the sum composition percent for all palatable browse species as listed, by animal species, in Appendix A, Section 3, "Upper Centennial Complex Plant List". Vegetative foliar cover and bare ground cover class results are based on point cover data.

Utilization data is used to determine if livestock are a potential causal factor for non-achievement of Standards. Based on Holechek (1988), livestock utilization levels on perennial grass species in this precipitation zone should be between 30-40% for moderate use without producing deleterious effects to the ecological site. Based on Heffelfinger(2006), browse utilization in this precipitation zone should be limited to 35% to prevent deleterious effects to deer habitat.

7.1.1 Clem allotment East Pasture

Key Area 1

Standard One: Upland Site Achieves Standard

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

Signs of accelerated erosion are minimal and are consistent with the site reference state. Soil and Site Stability and Hydrologic Function ratings are both categorized as a "None to Slight Departure" from the reference state. Reference Section 2.1.1 of Appendix A.

Standard Three: Standard is achieved on this site.

- Maintain palatable browse species composition of ≥10% ACHIEVED
- Maintain a vegetative canopy cover of ≥10% NOT ACHIEVED

- Maintain a bare ground cover class of ≤15% ACHIEVED

Rationale:
This key area achieves the palatable browse species objective with a Krameria composition of 10.9% in addition to a Larrea composition of 50.9% and a cylindropuntia composition of 38.2%. Both Larrea and Cylindropuntia species are of limited or seasonal browse value. The vegetative cover objective is not met on this site, with a point cover value of 4.2% and a line intercept canopy measurement of 7.84%. The majority of the canopy on this site is Larrea species. Given adequate rainfall, this site has the potential to meet the canopy objectives in the future. Bare ground cover class objectives are met, with a bare ground cover class of 1.2%.

No utilization was observed on this site. Livestock use is unlikely to be a causal factor in not meeting vegetative cover objectives. Drought effects from reduced rainfall over the last decade are likely a causal factor for vegetative canopy measurements.

Key Area 2
Standard One: Upland Site Achieves Standard
Objective: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate, and landform (ecological site).

Signs of accelerated erosion are minimal and are consistent with the site reference state. Soil and Site Stability and Hydrologic Function ratings are both categorized as a "None to Slight Departure" from the reference state. Reference Section 2.1.2 of Appendix A.

Standard Three: Standard is achieved on this site.
- Maintain a perennial grass composition of ≥1% ACHIEVED
- Maintain palatable browse species composition of ≥10% NOT ACHIEVED
- Maintain a vegetative canopy cover of ≥10% ACHIEVED
- Maintain a bare ground cover class of ≤30% ACHIEVED

Rationale:
This key area meets objectives for perennial grass species, with a perennial grass composition of 1.2%. Palatable browse species objectives are not met, with a browse composition of 6.2% Ambrosia species. Vegetative cover objectives are met, with a foliar point cover of 10.8% and a line intercept measured cover of 11.32%. Bare ground cover class objectives are met, with a bare ground cover class of 12.0%.

Utilization on this site was slight, with a utilization of 5.6% on Pleuraphis species. Livestock use is unlikely to be a causal factor in not meeting palatable browse objectives. Given adequate rainfall, this site has the potential to meet browse objectives in the future.

Key Area 3
Standard One: Upland Site Achieves Standard
Objective: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate, and landform (ecological site).

Signs of accelerated erosion are minimal and are consistent with the site reference state. Soil and Site Stability and Hydrologic Function ratings are both categorized as a "None to Slight Departure" from the reference state. Reference Section 2.1.3 of Appendix A.

Standard Three: Standard is achieved on this site.

- Maintain palatable browse species composition of ≥15% ACHIEVED
- Maintain a vegetative canopy cover of ≥20% ACHIEVED
- Maintain a bare ground cover class of ≤15% ACHIEVED

Rationale:
This key area meets objectives for palatable browse with a palatable browse composition of slightly more than 22%. Vegetative cover requirements are met on this site, with a foliar point cover of 25.6% and a line intercept canopy measurement of 31.88%. Bare ground cover class requirements are met, with a bare ground cover class of 8.8%.

No utilization was observed on the site. Livestock were present south of the site and livestock sign was present in the area of the site.

Key Area 4
Standard One: Upland Site Achieves Standard
Objective: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate, and landform (ecological site).

Signs of accelerated erosion are minimal and are consistent with the site reference state. Soil and Site Stability and Hydrologic Function ratings are both categorized as a "None to Slight Departure" from the reference state. Reference Section 2.1.4 of Appendix A.

Standard Three: Standard is achieved on this site.

- Maintain a perennial grass composition of ≥5% NOT ACHIEVED
- Maintain a palatable browse species composition of ≥10% ACHIEVED
- Maintain vegetative foliar cover of ≥10% ACHIEVED
- Maintain a Bare Ground cover class of ≤30% ACHIEVED

Rationale:
Perennial grass objectives are not met on this site, with a perennial grass composition of 1.26%. This site has the potential to meet objectives given adequate rainfall and vegetative recruitment. Palatable browse objectives are met on this site, with an Ambrosia composition of 37.73%, in addition to several species that are of limited seasonal forage value, such as Cylindropuntia and Ferocactus species. Vegetative cover objectives are met, with a foliar point cover of 12.3% and a measured line intercept canopy of 14.61%. Bare ground cover class objectives are met, with a bare ground cover class of 19.0%.

Utilization on this site was slight, with a utilization level of slightly less than 10%. It is unlikely that livestock are a causal factor for the non-achievement of grass composition objectives on this key area. Drought conditions and historic use are likely to be causal factors for the non-achievement of standards on this site.

7.1.2 Clem Allotment West Pasture

Key Area 1:

Standard One: Upland Site Achieves Standard

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

Signs of accelerated erosion are minimal and are consistent with the site reference state. Soil and Site Stability and Hydrologic Function ratings are both categorized as a "None to Slight Departure" from the reference state. Reference Section 2.2.1 of Appendix A.

Standard Three: Standard is achieved on this site.

- Maintain a palatable browse species composition of ≥20% — ACHIEVED
- Maintain a vegetative foliar cover of ≥5% — NOT ACHIEVED
- Maintain a Bare Ground cover class of ≤15% — ACHIEVED

Rationale:

The palatable browse objective is achieved on this site. Ambrosia and Krameria species account for 29.0% and 11.6% composition, respectively, in addition to several species that are of limited or seasonal forage value, such as Cylindropuntia and Parkinsonia species. Vegetative cover objectives are not met on the site, with a foliar point cover of 4% and a measured line intercept canopy of 8.42%. Bare ground cover class objectives are met, with a bare ground cover class of 1%.

No utilization was observed on the site. Livestock are unlikely to be a causal factor in not achieving foliar cover objectives on the site. Drought effects from reduced rainfall over the last decade are likely a causal factor for vegetative canopy measurements.

7.1.3 The Carter-Herrera Allotment

Key Area 2:

Standard One: Upland Site Achieves Standard

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

Signs of accelerated erosion are minimal and are consistent with the site reference state. Soil and Site Stability and Hydrologic Function ratings are both categorized as a "None to Slight Departure" from the reference state. Reference Section 2.3.1 of Appendix A.

Standard Three: Standard is not achieved on this site.

- Maintain a perennial grass frequency of ≥5% — ACHIEVED
- Maintain a palatable browse species composition of ≥20% — ACHIEVED
- Maintain a vegetative foliar cover of ≥10% — NOT ACHIEVED
- Maintain a Bare Ground cover class of ≤10% — NOT ACHIEVED

Rationale:

The perennial grass frequency objectives are met on this site, with an Aristida frequency of 5%. Palatable browse species composition objectives are met, with a canopy composition of Krameria at 24.7%, in addition to several species that are of limited or seasonal forage value, such as Encelia and Larrea species. Vegetative cover objectives are not met on this site, with a foliar point cover value of 9.0% and a

measured line intercept canopy cover of 15.75%. Bare ground cover class objectives are not met on the site, with a bare ground cover class of 12.5% and 9.0% based on pace frequency point cover and line point intercept cover, respectively.

No utilization was observed on this key area. Livestock are unlikely to be a causal factor for the non-achievement of standards on this site. Drought effects from reduced rainfall over the last decade are likely a causal factor for vegetative canopy measurements. Drought effects also reduce plant recruitment, which is a likely causal factor for the observed bare ground cover class measurements.

Key Area 3:
Standard One: Upland Site Achieves Standard
Objective: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate, and landform (ecological site).

Signs of accelerated erosion are minimal and are consistent with the site reference state. Soil and Site Stability and Hydrologic Function ratings are both categorized as a "None to Slight Departure" from the reference state. Reference Section 2.3.2 of Appendix A.

Standard Three: Standard is achieved on this site.

- Maintain a palatable browse species composition of ≥20% ACHIEVED
- Maintain a vegetative foliar cover of ≥5% ACHIEVED
- Maintain a Bare Ground cover class of ≤15% ACHIEVED

Rationale:
Palatable browse composition objectives are met on this site, with an Ambrosia composition of 38.89% and an Eriogonum fasiculatum composition of 5.56%, in addition to several species of limited or seasonal forage value, such as Cylindropuntia and Olneya species. Vegetative cover objectives are met on the site, with a foliar point cover of 13.6% and a measured canopy cover of 13.44%. Bare ground cover class objectives are met on the site, with a bare ground cover class of 3.6%.

No utilization was observed on the site.

7.1.4 The Bialac Allotment

Key Area 1:
Standard One: Upland Site Achieves Standard
Objective: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate, and landform (ecological site).

Signs of accelerated erosion are minimal and are consistent with the site reference state. Soil and Site Stability and Hydrologic Function ratings are both categorized as a "None to Slight Departure" from the reference state. Reference Section 2.4.1 of Appendix A.

Standard Three: Standard is achieved on this site.

- Maintain a palatable browse species composition of ≥20% NOT ACHIEVED
- Maintain a vegetative foliar cover of ≥5% ACHIEVED
- Maintain a Bare Ground cover class of ≤15% ACHIEVED

Rationale:
Palatable browse composition objectives are not met on this site. Canopy composition of primary browse species such as Krameria is slightly less than 5%. Several species of limited or seasonal browse are present, such as Ambrosia deltoidia, Cylindropuntia, and Larrea are present on the site. Vegetative cover objectives are met on the site, with a vegetative cover of 8.29%. Bare ground cover class objectives are met, with a bare ground cover class of 11.5% and 11%, based on pace frequency point cover and line point intercept cover respectively.

No utilization was observed on the site. As this allotment has not had approved livestock use for several decades, it is unlikely that livestock have been a causal factor for the non-achievement of browse species objectives. Drought effects are likely a causal factor for lack of palatable browse recruitment.

Key Area 2:
Standard One: Upland Site Achieves Standard
Objective: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate, and landform (ecological site).

Signs of accelerated erosion are minimal and are consistent with the site reference state. Soil and Site Stability and Hydrologic Function ratings are both categorized as a "None to Slight Departure" from the reference state. Reference Section 2.4.2 of Appendix A.

Standard Three: Standard is achieved on this site.

- Maintain a perennial grass frequency of ≥1% — ACHIEVED
- Maintain a palatable browse species composition of ≥20% — NOT ACHIEVED
- Maintain a vegetative foliar cover of ≥10% — ACHIEVED
- Maintain a Bare Ground cover class of ≤10% — ACHIEVED

Rationale:
Perennial grass objectives are met on this site, with a perennial grass frequency of 1%. Browse species objectives are not met on this site. Canopy composition of primary browse species such as Ambrosia dumosa is slightly less than 10% on this site. Several species of limited or seasonal browse are present, such as Ambrosia deltoidia, Cylindropuntia, and Larrea are present on the site. Vegetative cover objectives are met on this site, with a foliar cover class of 12.07%. Bare ground cover class objectives are met, with a bare ground cover class of 9.5% and 10.0%, based on pace frequency point cover and line point intercept cover respectively.

No utilization was observed on the site. As this allotment has not had approved livestock use for several decades, it is unlikely that livestock have been a causal factor for the non-achievement of browse species objectives. Drought effects are likely a causal factor for lack of palatable browse recruitment.

7.1.5 The Flat Iron Allotment

Key Area 1:
Standard One: Upland Site Achieves Standard
Objective: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate, and landform (ecological site).

Signs of accelerated erosion are minimal and are consistent with the site reference state. Soil and Site Stability and Hydrologic Function ratings are both categorized as a "None to Slight Departure" from the reference state. Reference Section 2.5.1 of Appendix A.

Standard Three: Standard is achieved on this site.

- Maintain a grass frequency of ≥10% — ACHIEVED
- Maintain a palatable browse species frequency of ≥20% — NOT ACHIEVED
- Maintain a vegetative foliar cover of ≥15% — ACHIEVED
- Maintain a Bare Ground cover class of ≤5% — ACHIEVED

Rationale:
Perennial grass objectives are met on this site, with a perennial grass frequency of 11.5%. Browse species objectives are not met on this site. Canopy composition of primary browse species such as Ambrosia dumosa is slightly less than 6% on this site. Several species of limited or seasonal browse are present, such as Ambrosia deltoidia, Cylindropuntia, and Larrea are present on the site. Vegetative cover objectives are met on this site, with a foliar cover class of 26.6%. Bare ground cover class objectives are met, with a bare ground cover class of 1.75% and 0.0%, based on pace frequency point cover and line point intercept cover respectively.

No utilization was observed on the site. Livestock are not expected to be a causal factor for the non-achievement of palatable browse objectives. Drought effects are likely a causal factor for lack of palatable browse recruitment.

8.0 Recommended Management Actions

8.1 Recommended Management Actions for all Allotments

To facilitate orderly management of the range, Actual Use reporting should be added to the terms and conditions of the permits. Actual Use reporting is an optional term and condition that has not been included in prior grazing permits. The reporting requirement will ensure appropriate use levels have been maintained during drought years, and will facilitate desired stocking rate calculations in years that Utilization data is collected.

In order to reduce grazing pressure near livestock water sources within the complex, any salt or supplement blocks placed on the public lands should be located at least one-quarter of a mile from available water sources, and should be located at least one-eighth of a mile above major drainages.

Central Arizona Project (CAP), Maricopa County Flood Control District(MCFCD), and the Bureau of Reclaimation (BOR) have been in contact with the BLM in regards to the CAP canal which crosses all of the allotments within the complex. Erosion control structures designed to protect the CAP canal are built along the north side of the length of the canal. Livestock use on these erosion control structures can cause bank destabilization, reducing the effectiveness of these structures over time. These areas should be excluded from livestock use and the right-of-way of the canal and erosion control structures which lie within should be fenced.

8.2 Recommended Management Actions for the Clem Allotment

The Clem allotment should be divided into three separate allotments to facilitate orderly management of the range. The allotment is currently run as a common allotment between three permittees and two field offices. Division of the allotment is expected to simplify management.

The NRCS is currently working with the permittee on the Clem East pasture to develop additional pasture fencing and water sources within the allotment. These improvements, where they occur on public land, must be analyzed under the following NEPA analysis to approve new range facilities.

9.0 List of Preparers

Name	Title
James Holden	Rangeland Management Specialist
Codey Carter	Wildlife Biologist

10.0 References

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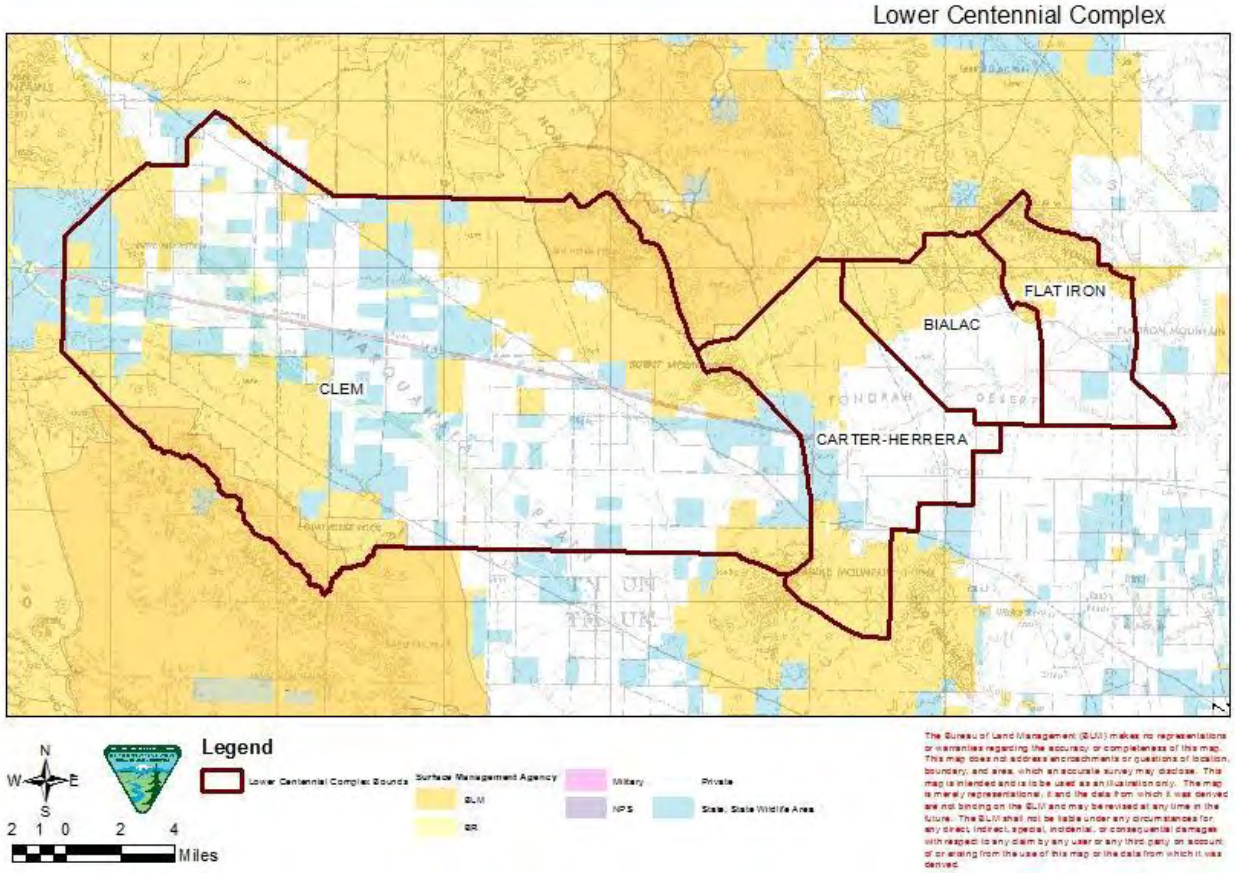
Upper Centennial Complex

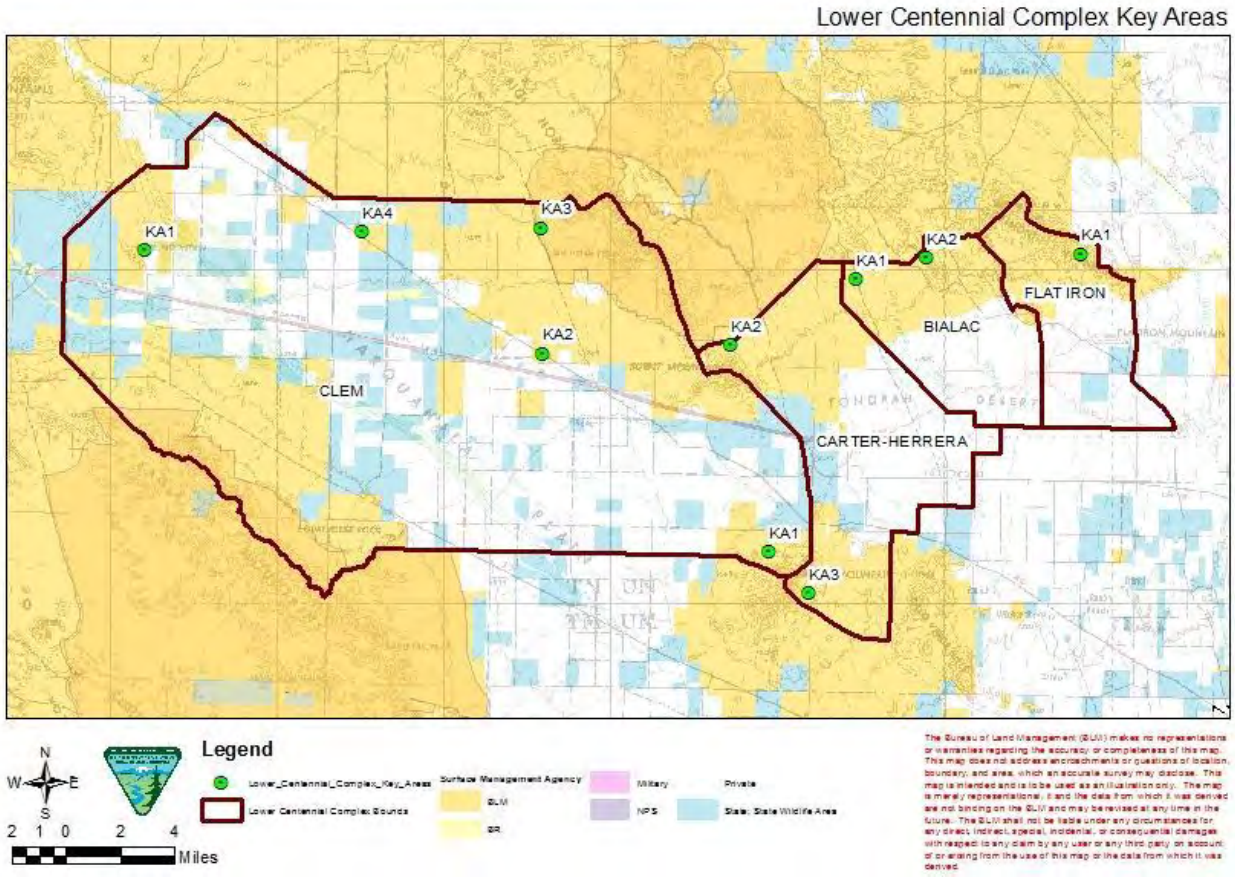
Data Appendices

1.0 Complex Maps

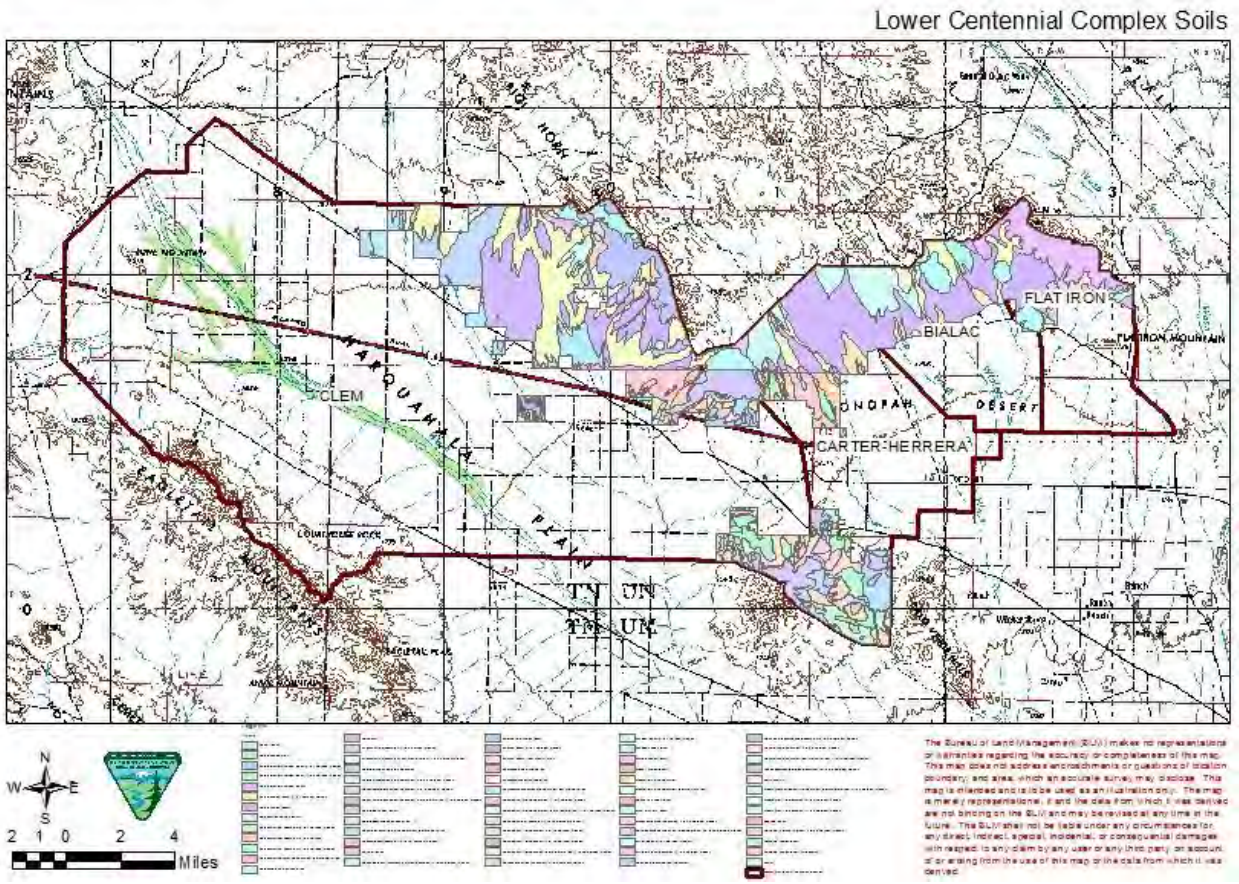
Map 1, Lower Centennial Complex Boundaries



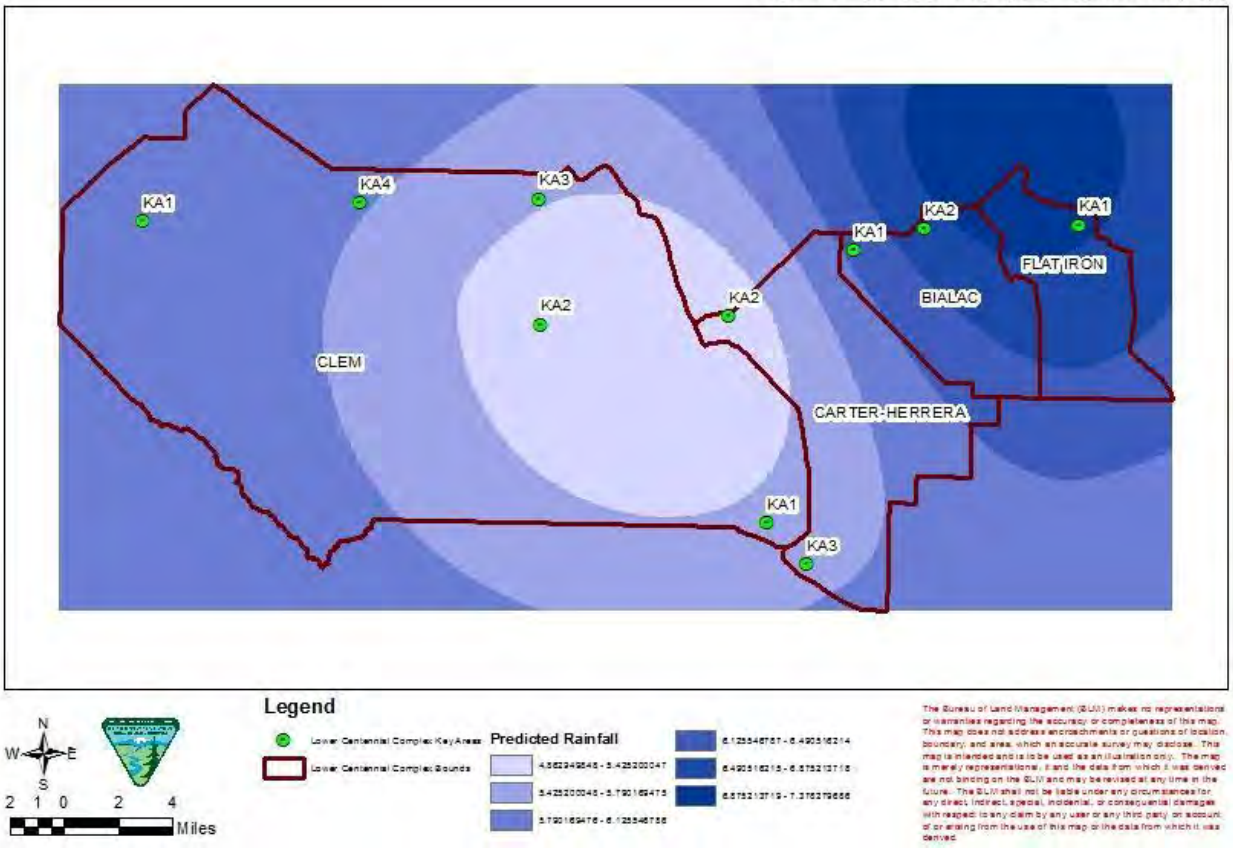
Map 2, Lower Centennial Complex Key Areas



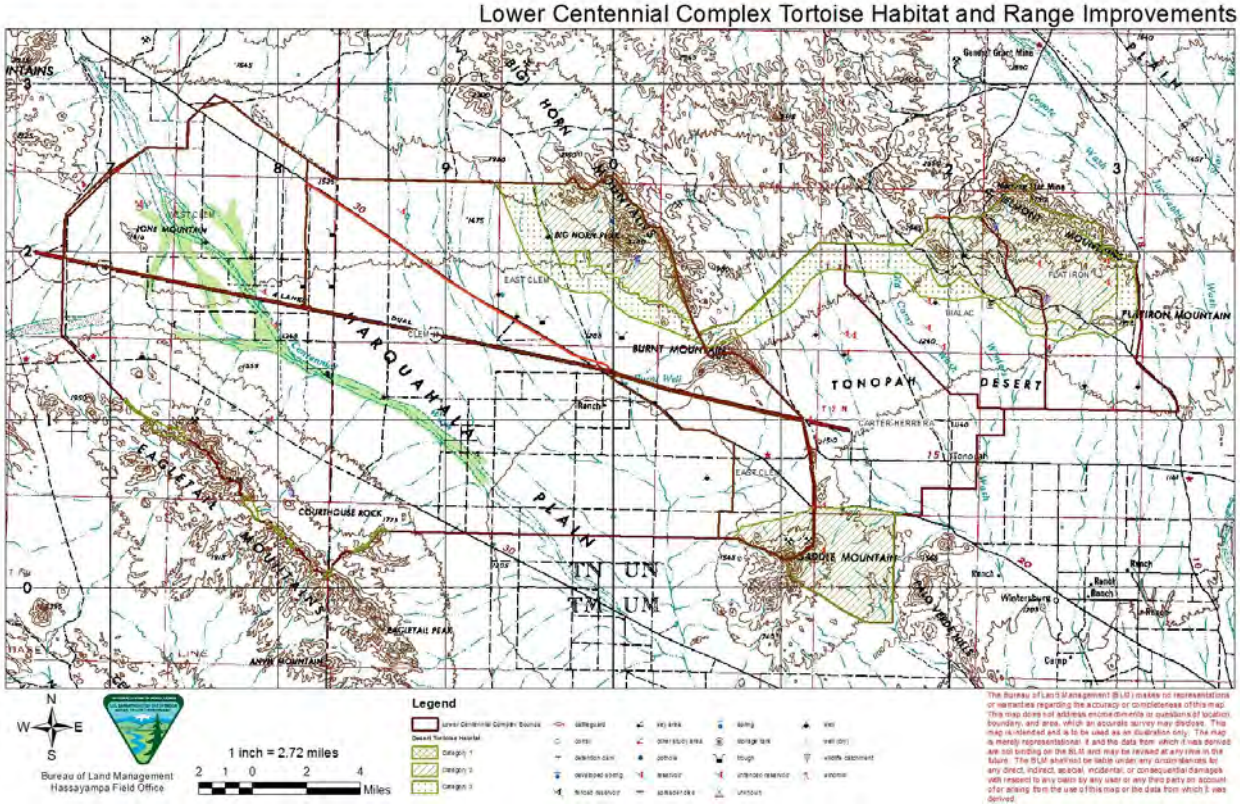
Map 3, Lower Centennial Complex Soil Map



Map 4, Lower Centennial Complex Predicted Rainfall



Map 5, Lower Centennial Complex Desert Tortoise Habitat



2.0 Key Area Data

2.1 Clem Allotment East Pasture

2.1.1 Key Area 1

Interpreting Indicators of Rangeland Health:

Attribute Rating:	Rationale:
Soil and Site Stability (S):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Hydrologic Function (H):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Biotic Integrity (B):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.

Codes: N-S (None to Slight) S-M (Slight to Moderate) M (Moderate) M-E (Moderate to Extreme) E-T (Extreme to Total)

Cover Data:

Point Cover data were collected in conjunction with line point intercept data in 2016.

Year	Bare Ground	Foliar Cover	Litter	Gravel (2mm-1/2")	Rock (>1/2")	Cryptogam
2016	1.2	4.2	20.8	46.5	22.3	5.0

Frequency and Composition Data:

Ground cover and canopy composition are taken from Line Intercept transects.

KA1 Plant Species	Symbol	Ground Cover (%)	Canopy Composition (%)	Belt Density Composition (%)
Tree and Shrub Species		**2016**	**2016**	**2016**
Cylindropuntia fulgida	CYFU10	0.14	1.81	38.2
Krameria erecta	KRER	0.62	7.91	10.9
Larrea tridentata	LATR2	7.08	90.28	50.9

Utilization data:

KA 1 Utilization	
Year	KRER
2017	0

2.1.2 Key Area 2

Interpreting Indicators of Rangeland Health:

Attribute Rating:	Rationale:
Soil and Site Stability (S):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Hydrologic Function (H):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Biotic Integrity (B):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.

Codes: N-S (None to Slight) S-M (Slight to Moderate) M (Moderate) M-E (Moderate to Extreme) E-T (Extreme to Total)

Point Cover Data:

Point Cover data were collected in conjunction with line point intercept data in 2017.

Year	Bare Ground	Foliar Cover	Litter	Gravel (2mm-2")	Rock (>2")	Cryptogam
2017	12.0	10.8	33.6	30.8	0.8	12.0

Frequency and Composition Data:

Ground cover and canopy composition are taken from Line Intercept transects.

KA2 Plant Species	Symbol	Ground Cover (%)	Canopy Composition (%)	Belt Density Composition (%)
Tree and Shrub Species		**2016**	**2016**	**2016**
Ambrosia dumosa	AMDU2	0.38	3.37	6.2
Larrea tridentata	LATR2	10.91	96.36	92.6
Grass and Forb Species				
Pleuraphis rigida	PLRI3	0.03	0.26	1.2

Utilization data:

KA 2 Utilization	% Utilization
Year	PLRI3
2017	5.6

2.1.3 Key Area 3

Interpreting Indicators of Rangeland Health:

Attribute Rating:	Rationale:
Soil and Site Stability (S):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Hydrologic Function (H):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Biotic Integrity (B):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.

Codes: N-S (None to Slight) S-M (Slight to Moderate) M (Moderate) M-E (Moderate to Extreme) E-T (Extreme to Total)

Point Cover Data:

Point Cover data were collected in conjunction with line point intercept data in 2017.

Year	Bare Ground	Foliar Cover	Litter	Gravel (2mm-2")	Rock (>2")	Cryptogam
2017	8.8	25.6	20.8	32.0	10.4	2.4

Frequency and Composition Data:

Ground cover and canopy composition are taken from Line Intercept transects.

KA3 Plant Species	Symbol	Ground Cover (%)	Canopy Composition (%)	Belt Density Composition (%)
Tree and Shrub Species		**2017**	**2017**	**2017**
Acacia greggii	ACGR	0.20	0.64	0.40
Ambrosia dumosa	AMDU2	1.15	3.61	14.34
Bebbia juncia	BEJU	-	-	0.4
Carnegia gigantia	CAGI10	-	-	0.40
Ferocactus wislizeni	FEWI	-	-	0.8
Krameria erecta	KRER	0.19	0.58	1.99
Larrea tridentata	LATR2	18.05	56.60	62.15
Lycium andersonii	LYAN	6.08	19.08	11.55
Olneya tesota	OLTE	0.99	3.10	0.80
Parkinsonia microphylla	PAMI5	3.88	12.18	1.99
Prosopis velutina	PRVE	1.28	4.01	0.40
Trixis california	TRCA8	0.06	0.19	4.78

Utilization data:

KA 3 Utliization	Utilization (%)
Year	AMDU

2017	0

2.1.4 Key Area 4

Interpreting Indicators of Rangeland Health:

Attribute Rating:	Rationale:
Soil and Site Stability (S):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Hydrologic Function (H):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Biotic Integrity (B):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.

Codes: N-S (None to Slight) S-M (Slight to Moderate) M (Moderate) M-E (Moderate to Extreme) E-T (Extreme to Total)

Point Cover Data:

Year	Bare Ground	Foliar Cover	Litter	Gravel (2mm-2")	Rock (>2")	Cryptogam
2017	19.0	12.3	31.0	29.8	0.0	7.9

Frequency and Composition Data:

Composition data is based on Line Point Intercept and Belt Density.

KA4 Plant Species	Symbol	Ground Cover (%)	Canopy Composition (%)	Belt Density Composition (%)
Tree and Shrub Species		**2017**	**2017**	**2017**
Ambrosia dumosa	AMDU2	1.71	11.72	37.73
Cylindropuntia fulgida	CYFU10	0.08	0.55	2.52
Ferocactus wislizeni	FEWI	0.08	0.53	0.63
Larrea tridentata	LATR2	7.64	52.28	45.91
Lycium andersonii	LYAN	2.4	16.42	10.69
Prosopis velutina	PRVE	2.34	16.03	1.26
Grasses and Forbs				
Pleuraphis rigida	PLRI3	0.36	2.46	1.26

Utilization data:

KA 4 Utliization	
	Utilization %
Year	PLRI3
2017	9.72

2.2 Clem Allotment West Pasture

2.2.1 Key Area 1

Interpreting Indicators of Rangeland Health:

Attribute Rating:	Rationale:
Soil and Site Stability (S):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Hydrologic Function (H):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Biotic Integrity (B):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.

Codes: N-S (None to Slight) S-M (Slight to Moderate) M (Moderate)M-E (Moderate to Extreme) E-T (Extreme to Total)

Ground Cover Data:

Year	Bare Ground	Foliar Cover	Litter	Gravel (2mm-1/2")	Rock (>1/2")
2016	1	4	4	85	4

Composition Data:

Ground cover and canopy composition are taken from Line Intercept transects.

KA1 Plant Species	Symbol	Ground Cover (%)	Canopy Composition (%)	Belt Density Composition (%)
Tree and Shrub Species		**2016**	**2016**	**2016**
Ambrosia dumosa	AMDU2	1.35	16.02	29.0
Cylindropuntia leptocaulis	CYLE8	-	-	0.7
Krameria erecta	KRER	0.40	4.64	11.6
Larrea tridentata	LATR2	5.93	70.53	57.3
Parkinsonia microphylla	PAMI5	0.74	8.81	1.4

Utilization Data:

KA 1 Utliization		
	Utilization %	
Year	AMDU2	KRER
12/2016	0	0

2.3 Carter-Herrera Allotment

2.3.1 Key Area 2

Interpreting Indicators of Rangeland Health:

Attribute Rating:	Rationale:
Soil and Site Stability (S):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Hydrologic Function (H):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Biotic Integrity (B):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.

Codes: N-S (None to Slight) S-M (Slight to Moderate) M (Moderate) M-E (Moderate to Extreme) E-T (Extreme to Total)

Cover Data:

Point Cover data were collected in conjunction with frequency and line point intercept data in 2016.

Year	Bare Ground	Basal Cover	Litter	Gravel (2mm-1/2")	Rock (>1/2")	Cryptogam	Foliar Cover
2016 (Frequency)	12.5	5.0	11.0	33.0	33.5	5.0	N/A
2016 (LPI)	9.0	-	12.0	30.0	39.0	1.0	9.0

Composition Data:

Ground cover and canopy composition data were collected using the Line Point Intercept method.

Plant Species KA2	Symbol	Frequency (%)	Ground Cover (%)	Canopy Composition (%)
		2016	2016	2016
Tree and Shrub Species				
Carnegia gigantia	CAGI10	0.25	-	-
Cylindropuntia acanthocarpa	CYAC8	4.0	1.74	11.05
Encelia farinosa	ENFA	19.50	3.3	20.95
Krameria erecta	KRER	4.75	3.89	24.70
Larrea tridentata	LATR2	13.75	6.7	42.54
Parkinsonia microphylla	PAMI5	5.0	-	-
Grasses and Forbs				
Aristida purpurea	ARPU9	5.0	0.12	0.76

Utilization data:

KA 2 Utilization	Utilization %
Year	KRER
2016	0

2.3.2 Key Area 3

Interpreting Indicators of Rangeland Health:

Attribute Rating:	Rationale:
Soil and Site Stability (S):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Hydrologic Function (H):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Biotic Integrity (B):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.

Codes: N-S (None to Slight) S-M (Slight to Moderate) M (Moderate) M-E (Moderate to Extreme) E-T (Extreme to Total)

Point Cover Data:

Point Cover data were collected in conjunction with line point intercept data in 2016.

Year	Bare Ground	Litter	Gravel (2mm-1/2")	Rock (>1/2")	Cryptogam	Foliar Cover
2016 (LPI)	3.6	10.4	43.6	28.8	0	13.6

Composition Data:

Composition data is based on Belt Density and Line Point Intercept.

Plant Species KA3	Symbol	Density (%)	Ground Cover (%)	Canopy Composition (%)
		2016	2016	2016
Tree and Shrub Species				
Ambrosia dumosa	AMDU2	38.89	2.72	20.23
Carnegia gigantia	CAGI10	0.46	-	-
Cylindropuntia acanthocarpa	CYAC8	0.46	-	-
Cylindropuntia fulgida	CYFU10	0.46	-	-
Echinocereus engelmannii	ECEN	0.46	-	-
Eriogonum fasiculatum	ERFA	5.56	0.18	1.34
Eriogonum sp.	ERIOG	9.72	0.03	0.25
Larrea tridentata	LATR2	40.74	6.52	48.50
Olneya tesota	OLTE	2.78	3.22	23.98
Parkinsonia microphylla	PAMI5	0.46	0.77	5.70

Utilization data:

KA 3 Utilization	Utilization %
Year	AMDU2
2016	0

2.4 Bialac Allotment

2.4.1 Key Area 1

Interpreting Indicators of Rangeland Health:

Attribute Rating:	Rationale:
Soil and Site Stability (S):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Hydrologic Function (H):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Biotic Integrity (B):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.

Codes: N-S (None to Slight) S-M (Slight to Moderate) M (Moderate) M-E (Moderate to Extreme) E-T (Extreme to Total)

Point Cover Data:

Point Cover data were collected in conjunction with frequency and line point intercept data in 2016. Foliar Cover measurements are taken from the Line Point Intercept data.

Year	Bare Ground	Basal Cover	Litter	Gravel (2mm-1/2")	Rock (>1/2")	Cryptogam	Foliar Cover
2016 (Frequency)	11.5	0.5	8.5	58.75	17.5	3.25	N/A
2016 (LPI)	11.0	-	3.0	65.0	19.0	2.0	8.29

Frequency and Composition Data:

Ground cover and canopy composition data were collected using the Line Point Intercept method.

Plant Species KA1	Symbol	Frequency (%)	Ground Cover (%)	Canopy Composition (%)
		2016	2016	2016
Tree and Shrub Species				
Ambrosia deltoidea	AMDE4	7.75	3.69	44.51
Ambrosia dumosa	AMDU2	11.0	-	-
Carnegia gigantia	CAGI10	0.5	-	-
Cylindropuntia acanthocarpa	CYAC8	0.25	-	-
Cylindropuntia bigelovii	CYBI9	0.25	-	-
Cylindropuntia leptocaulis	CYLE8	0.25	0.41	4.94
Ferocactus wislizeni	FEWI	0.25	-	-
Fouquieria splendens	FOSP2	0.25	-	-
Krameria erecta	KRER	2.5	0.45	5.43
Larrea tridentata	LATR2	9.5	3.74	45.11
Parkinsonia microphylla	PAMI5	7.0	-	-

Utilization data:

KA 1 Utilization	% Utilization
Year	KRER
2016	0

2.4.2 Key Area 2

Interpreting Indicators of Rangeland Health:

Attribute Rating:	Rationale:
Soil and Site Stability (S):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Hydrologic Function (H):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Biotic Integrity (B):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.

Codes: N-S (None to Slight) S-M (Slight to Moderate) M (Moderate) M-E (Moderate to Extreme) E-T (Extreme to Total)

Point Cover Data:

Point Cover data were collected in conjunction with frequency and line point intercept data in 2016. Foliar Cover measurements are taken from the Line Point Intercept data.

Year	Bare Ground	Basal Cover	Litter	Gravel (2mm-1/2")	Rock (>1/2")	Cryptogam	Foliar Cover
2016 (Frequency)	9.5	3.0	7.5	49.5	25.75	4.5	N/A
2016 (LPI)	10.0	-	4.0	66.0	18.0	1.0	12.07

Frequency and Composition Data:

Ground cover and canopy composition data were collected using the Line Point Intercept method.

Plant Species KA2	Symbol	Frequency (%)	Ground Cover (%)	Canopy Composition (%)
		2016	2016	2016
Tree and Shrub Species				
Ambrosia deltoidea	AMDE4	35.75	8.26	68.43
Ambrosia dumosa	AMDU2	-	1.19	9.86
Cylindropuntia acanthocarpa	CYAC8	1.75	-	-
Encelia farinosa	ENFA	0.25	-	-
Krameria erecta	KRER	3.0	0.41	3.40
Larrea tridentata	LATR2	3.5	2.21	18.31

Lycium andersonii	LYAN	0.5	-	-
Olneya tesota	OLTE	1.5	-	-
Parkinsonia microphylla	PAMI5	3.0	-	-
Grasses and Forbs				
Pleuraphis rigida	PLRI3	1.0	-	-

Utilization data:

KA 1 Utilization	% Utilization
Year	PLRI3
2016	0

2.5 Flat Iron Allotment

2.5.1 Key Area 1

Interpreting Indicators of Rangeland Health:

Attribute Rating:	Rationale:
Soil and Site Stability (S):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Hydrologic Function (H):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Biotic Integrity (B):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.

Codes: N-S (None to Slight) S-M (Slight to Moderate) M (Moderate) M-E (Moderate to Extreme) E-T (Extreme to Total)

Cover Data:

Point Cover data were collected in conjunction with frequency and line point intercept data in 2016. Foliar Cover measurements are taken from the Line Point Intercept data.

Year	Bare Ground	Basal Cover	Litter	Gravel (2mm-1/2")	Rock (>1/2")	Cryptogam	Foliar Cover
2016 (Frequency)	1.75	0.25	14.5	45.0	37.0	1.5	N/A
2016 (LPI)	-	0	7.0	52.0	38.0	3.0	26.6

Frequency and Composition Data:

Ground cover and canopy composition data were collected using the Line Point Intercept method.

Plant Species KA1	**Symbol**	**Frequency (%)**	**Ground Cover (%)**	**Canopy Composition (%)**
		2016	**2016**	**2016**

Tree and Shrub Species				
Acacia greggii	ACGR	3.0	-	-
Ambrosia deltoidea	AMDE4	35.5	13.31	50.04
Ambrosia dumosa	AMDU2	1.75	1.57	5.90
Carnegia gigantia	CAGI10	0.25	-	-
Cylindropuntia acanthocarpa	CYAC8	1.00	1.05	3.95
Cylindropuntia fulgida	CYFU10	0.75	-	-
Encelia farinosa	ENFA	4.25	1.46	5.49
Ferocactus wislizeni	FEWI	0.25	-	-
Fouquieria splendens	FOSP2	2.0	0.97	3.65
Krameria erecta	KRER	1.0	-	-
Larrea tridentata	LATR2	0.50	-	-
Lycium andersonii	LYAN	1.25	0.09	0.34
Parkinsonia microphylla	PAMI5	14.50	7.92	29.77
Grasses and Forbs				
Aristida purpurea	ARPU9	1.75	-	-
Dasyochloa pulchella	DAPU7	9.75	0.23	0.86

Utilization data:

KA 1 Utilization	% Utilization
Year	KRER
2016	0

3.0 Lower Centennial Complex Plant List

The following plant list comprises all the plant species identified on long-term monitoring transects. This list is not exhaustive nor all inclusive of the plants on the Complex. Plant species on the list are identified by common name, scientific name, and NRCS Plants Database symbol. Palatable plants are identified, by species, for Sonoran desert tortoise, mule deer, and domestic livestock (cattle). Palatability of plant species for Sonoran desert tortoise is taken from VanDevender, et al (2002) and Oftedal (2002). Palatability of plant species for mule deer is taken from the "Habitat Guidelines for Mule Deer: Southwest Deserts Ecoregion" (Heffelfinger 2006) and "Diets of Desert Mule Deer" (Krausmann et al, 1997). Livestock plant palatability is taken from the Complex-associated Ecological Site Descriptions.

Common Name	Scientific Name	Symbol	Sonoran Tortoise	Mule Deer	Livestock
Catclaw Acacia	Acacia greggii	ACGR	X	X	
Triangle leaf bursage	Ambrosia deltoidea	AMDE4	X	X	
White Bursage	Ambrosia dumosa	AMDU2	X	X	X
N/A	Annual forbs	AAFF	X	X	X
N/A	Annual grasses	AAGG	X	X	X
Three awn	Aristida purpurea	ARPU9	X		X
Sweetbush bebbia	Bebbia juncia	BEJU	X	X	X
Saguaro	Carnegia gigantia	CAGI10			
Buckhorn cholla	Cylindropuntia acanthocarpa	CYAC8	X	X	X
Jumping cholla	Cylindropuntia fulgida	CYFU10			
Christmas cactus	Cylindropuntia leptocaulis	CYLE8			
Fluffgrass	Dasyochloa pulchella	DAPU7	X		X
Engelmann's hedgehog	Echinocereus engelmannii	ECEN			
Brittlebush	Encelia farinosa	ENFA	X		
Flat-top buckwheat	Eriogonum fasiculatum	ERFA2	X	X	X
Buckwheat	Eriogonum sp.	ERIOG	X	X	X
Barrel cactus	Ferocactus wislizeni	FEAC	X	X	
Ocotillo	Fouquieria splendens	FOSP2	X	X	
Range ratany	Krameria erecta	KRER	X	X	X
Creosote bush	Larrea tridentata	LATR2	X	X	
Wolfberry	Lycium andersonii	LYAN	X	X	
Wolfberry	Lycium	LYCIU	X	X	
Ironwood	Olneya tesota	OLTE			
Little leaf palo verde	Parkinsonia microphylla	PAMI5	X	X	X
Big galleta	Pleuraphis rigida	PLRI3	X		X
Velvet mesquite	Prosopis velutina	PRVE	X	X	X

Trixis	Trixis californica	TRCA8	X	X	X

4.0 Lower Centennial Complex Soils Data

Soils of the Lower Centennial Complex				
Soil Type	Percent Public Lands			
	Clem	Carter-Herrera	Bialac	Flat Iron
Antho-Carrizo-Maripo complex, low precipitation	0.9	0.8	N/A	0.2
Antho-Carrizo complex 0-1% slopes	0.5	N/A	N/A	N/A
Antho-Carrizo complex 0-3 percent slopes	3.6	5.2	N/A	N/A
Antho-Carrizo complex 1-3% slopes	0.3	N/A	N/A	N/A
Antho-Valencia association	T	N/A	N/A	N/A
Antho association	0.5	T	N/A	N/A
Antho gravelly sandy loam 0-1% slopes	0.6	N/A	N/A	N/A
Antho gravelly sandy loam 1-3% slopes	T	N/A	N/A	N/A
Antho gravelly sandy loams	0.2	N/A	N/A	N/A
Antho sandy loam 0-1% slopes	T	N/A	N/A	N/A
Antho sandy loams	0.1	N/A	N/A	N/A
Borrow Pit	0.1	N/A	N/A	N/A
Brios-Carrizo complex 1-5% slopes	0.4	0.2	N/A	N/A
Brios-Carrizo complex, low precipitation 1-5% slopes	0.3	N/A	0.6	0.7
Cherioni-Rock Outcrop complex	2.3	10.4	N/A	N/A
Cherioni-Rock outcrop complex, 5-60% slopes	T	3.6	10.3	4
Chuckawalla-Gunsight complex, 1-8% slopes	0.2	0.1	N/A	4.6
Chuckawalla-Gunsight complex, low precipitation, 1-8% slopes	21.1	24	45.7	27.5
Coolidge-Laveen association	0.2	N/A	N/A	N/A
Denure-Momoli-Carrizo complex, low precipitation	8.8	N/A	N/A	N/A
Ebon-Pinamt complex, 3-20% slopes	N/A	N/A	N/A	6.6
Estrella loam	0.2	N/A	N/A	N/A
Gachado-Lomitas-Rock outcrop complex 7-55% slopes	2.9	N/A	5.3	N/A
Gilman-Antho association	T	N/A	N/A	N/A
Gilman-Laveen association	0.2	N/A	N/A	N/A
Gilman-Momoli-Denure complex, low precipitation	5.9	N/A	N/A	N/A
Gilman fine sandy loam	0.1	N/A	N/A	N/A
Gilman loam 0-1% slopes	T	N/A	N/A	N/A
Gilman loams, low precipitation	0.1	N/A	N/A	N/A
Gunsight-Cipriano complex, 1-7% slopes	0.3	0.8	N/A	N/A
Gunsight-Cipriano complex, low precipitation 1-7% slopes	0.1	N/A	2.6	N/A

Gunsight-Pinal complex, 1-10% slopes	2.8	6.8	N/A	N/A
Gunsight-Rillito complex 0-10% slopes	1.8	7.8	N/A	N/A
Gunsight-Rillito complex, 1-25% slopes	N/A	T	N/A	N/A
Gunsight-Rillito complex, low precipitiaton, 1-40% slopes	0.0	3.1	5.9	0.2
Harqua-Gunsight complex, 0-5% slopes	2.5	7.1	N/A	N/A
Laveen loam, 0-1% slope	0.1	N/A	N/A	N/A
Laveen sandy loam	0.1	N/A	N/A	N/A
Maripo sandy loam	0.2	N/A	N/A	N/A
Mohall sandy loam	T	N/A	N/A	N/A
Momoli-Carrizo complex	0.6	T	N/A	N/A
Momoli-Carrizo complex, low precipitation	23.1	4.5	7.2	7.9
Pinal gravelly loam	1.1	5	N/A	N/A
Pinamt-Tremant complex, 1-10% slopes	0.2	2.8	N/A	N/A
Quiltosa-Vaiva-Rock outcrop complex, 20-65% slopes	0.8	N/A	1.2	42.7
Rillito-Harqua complex, 1-3% slopes	T	N/A	N/A	N/A
Rillito loam, 0-1% slopes	0.4	N/A	N/A	N/A
Rock outcrop-Cherioni complex	4.8	8.5	N/A	N/A
Rock outcrop-Gachado complex, 5-55% slopes	8.3	N/A	N/A	N/A
Sal-Cipriano complex, 1-10% slopes	2.1	T	N/A	N/A
Sal-Cipriano complex, low precipitation, 1-10% slopes	1.3	8.4	20.3	N/A
Schenco-Rock outcrop complex, 25-60% slopes	N/A	N/A	0.9	N/A
Torrifluvents	0.1	0.7	N/A	N/A
Tremant-Gunsight-Rillito complex, low precipitation, 1-5% slopes	N/A	N/A	N/A	1.5
Tremant-Rillito complex, 0-1% slopes	0.1	N/A	N/A	N/A
Tremant-Rillito complex, 1-3% slopes	0.1	N/A	N/A	N/A
Tucson loam	T	N/A	N/A	N/A
Vaiva very gravelly loam, 1-20% slopes	N/A	N/A	N/A	3.9
Valencia sandy loam	0.0	N/A	N/A	N/A
Valencia sandy loam, saline-alkali	0.1	N/A	N/A	N/A
Water	T	N/A	N/A	N/A

Appendix A – Comments and Responses to Comments

The BLM received one comment letter to consider on the draft Rangeland Health Evaluation. The comments received were reviewed and categorized. *Substantive* and *unique* comments are summarized below.

#	Comment	BLM Response
1	The Desert Tortoise Council (Council) is a non-profit organization comprised of hundreds of professionals and laypersons who share a common concern for wild desert tortoises and a commitment to advancing the public's understanding of this species. Established in 1975 to promote conservation of tortoises in the deserts of the southwestern United States and Mexico, the Council routinely provides information to individuals, organizations, and regulatory agencies on matters potentially affecting the desert tortoise within its geographic range. We have reviewed the Rangeland Health Evaluation for the Lower Centennial Complex (Evaluation) involving four cattle allotments and offer the following scoping comments to be addressed in the EA. Following a reiteration of information given in the Evaluation, along with a referenced section and/or page number, we provide specific requests and/or questions *in italics* that we expect to be addressed in the EA.	Noted.
2	We note on page 5 that the Evaluation seeks to determine: 1) if standards are being achieved, not achieved, and, in cases of not achieved, if significant progress is being made towards achievement of land health. 2) Where it is determined that land health standards are not being achieved, determine whether livestock grazing is a significant factor causing that non-achievement. *We ask that the EA clearly document pertinent standards as they pertain to the Sonoran desert tortoise (*Gopherus morafkai*) and analyze how these standards are being met, or not, for the species. The analysis should be based on existing rangeland heath data, and if no such data are available, document the absence of data.*	Where Key Areas occur within desert tortoise habitat, standards were designed to meet habitat requirements for the species.

3	Section 2.3.4. (Page 10) indicates that there is habitat for the Sonoran desert tortoise, including 29,597 acres of Category II Habitat and 14,964 acres of Category III Habitat. Among the various definitions provided on page 10, we note that Category II Habitats consist of 1) Habitat that may be essential to the maintenance of viable populations; 2) Habitat where most conflicts are resolvable; and 3) Habitat that contains medium to high densities of tortoises or low densities contiguous with medium or high densities. Unfortunately, the only four maps in the Evaluation (on pages 33 through 36) do not show the distribution of Category II and III Habitats relative to cattle use areas. *We ask that the EA include maps showing Category II and III Habitats. Additionally, we ask that water sources and other ancillary structures such as corrals that function to concentrate cattle use be mapped relative to Category II ad III Habitats. Based on this information, we expect the EA to present and analyze alternatives that show how cattle impacts can be minimized on Category II Habitats, in particular, by closing or moving some facilities and creating new ones to draw cattle away from habitats that may be essential to the maintenance of viable populations.*	A map showing the Category II and III desert tortoise habitat has been added to the final rangeland health evaluation. This map also shows the location of the range improvements on the Complex. The majority of the range improvements on the Complex lie outside of Category II habitat, with the exception of the Flat Iron Allotment improvements, as all public lands within this allotment are classified at tortoise habitat. These improvements could not be relocated outside of tortoise habitat, and moving them within the allotment would add additional disturbance areas. The Proposed Action includes terms and conditions for supplement placement that will assist in reducing livestock and tortoise interaction.
4	Page 21 indicates that utilization data were collected at each Key Area using the Key Species method in 2016-2017. *We ask that the EA document the locations of these data collection plots relative to Category II and III Habitats to see if they are appropriate to determine potential impacts to tortoise populations within the Lower Centennial Complex. If none occurs, the EA should identify utilization data plots in Category II and III Habitats.*	The Rangeland Health Evaluation states if Key Areas lied within or without desert tortoise habitat.
5	*The EA should document all available data relative to tortoise distribution and densities, and referencing these data, analyze each alternative in terms of its relative impact on tortoises. If no tortoise population data exist, the BLM in its EA should identify methods for monitoring tortoise populations so that it can determine if applicable standards are being achieved*.	Outside the scope of this NEPA analysis.

6	On page 14, the Evaluation indicates that Sonoran desert tortoise habitat requirements are listed in the Bradshaw-Harquahala Resource Management Plan (RMP). However, the Evaluation fails to summarize what these requirements are. *We ask that the EA document these habitat requirements and then analyze how the Preferred Alternative, versus other alternatives, does or does not meet the RMP requirements.*	The Bradshaw-Harquahala RMP is available for viewing on the BLM website.
7	As reported in Section 5.1 on page 21, we question the validity of relying on Rangeland Inventory data that were collected in 1981. The paragraph then indicates, "The inventory was used to determine range condition and *apparent trend* [emphasis added] as described in the 1982 Lower Gila North Draft Grazing Environmental Impact Statement." We contend that a "trend" cannot be established based on one or two years of data, particularly when the data are 36 years old. *The EA must divulge all available data used to analyze impacts to tortoise habitats associated with all alternatives, and in the absence of recent data, describe how BLM intends to implement and commit to new studies and evaluations to document impacts to tortoises.*	The inventory data collected in 1981 was not used to determine current trend or effects on the Complex. The Lower Gila North Grazing EIS was used to determine the stocking rates for the allotments in question. This Rangeland Health Evaluation and EA are a review of the stocking rate and grazing management practices on the Complex.
8	We appreciate that Section 8.1 indicates that Actual Use reporting will become a non-optional term and condition. *Going forward, we ask that Actual Use reporting, as described in Section 6.1 at the bottom of page 21, be a non-optional term and condition* ***specifically in Category II and III Habitats****. The EA should indicate how these data will be used to implement management of the allotments that would minimize impacts to tortoises*.	This term and condition would be unreasonable. Desert tortoise habitat is not pastured, fenced, or divided from the remainder of the Complex, and use between mapped habitat and the remainder of the Complex could not be determined.
9	We find that the Evaluation's summary of achieved and unachieved standards in Section 7.1 fails to analyze impacts to tortoises in Category II and III Habitats. *The EA must supplement information presented in the Evaluation as it pertains to achieving habitat requirements in the Bradshaw-Harquahala RMP and any other RMPs or other BLM rangeland health standards that are not be referenced in the Evaluation*.	A rangeland health evaluation does not analyze impacts to wildlife, but serves as a stand-alone documentation of current conditions of the allotment regarding vegetation condition and standards, including standards relating to desert tortoise habitat. The EA has analyzed impacts of the Proposed Action on wildlife resources.

10	The following statement is made on page 29: "In order to reduce grazing pressure near livestock water sources within the complex, any salt or supplement blocks placed on the public lands should be located at least one-quarter of a mile from available water sources, and should be located at least one-eighth of a mile above major drainages." *We ask that the EA prescribe similar requirements relative to Category II Habitats, and that salt and supplemental blocks not be placed in Category II Habitats or any other places where tortoise populations are known to be concentrated*.	Moved forward for analysis in EA.
11	Unfortunately, the Evaluation does not summarize existing Allotment Management Plans (AMPs). *As such, for full disclosure, we expect that the EA will summarize all pertinent AMPs for the four grazing allotments. Additionally, the EA must include an evaluation of the relevant AMPs to see if they should be revised to better protect public resources, including tortoises and their habitats. A few specific questions include: Would different seasons of grazing use, different stocking rates, different pasture locations, different pasture rotations, and/or different water and salt locations provide better resource protection? Before reaching a decision on whether to renew these grazing permits, the EA analysis must address these questions, and provide a reasonable range of feasible alternative management options for comparison of effects.*	None of the allotments within the Complex operate under AMPs, nor are there proposals for AMPs or a requirement to implement AMPs on these allotments.
12	*The EA must also consider an alternative where grazing in pastures with tortoises is limited to the tortoise inactive season*.	The BLM provided rationale in Section 2.4 of the EA why the alternative was not fully analyzed.
13	Herein, we ask that the Desert Tortoise Council be identified as an Affected Interest for this project; that the Environmental Assessment be provided to us for an opportunity to determine how the issues and questions identified herein have been addressed in that document.	Noted