



Appendix B

Rangeland Health Evaluation

Vulture Complex

Jones Allotment #03045

Garcia Allotment #03095

Los Caballeros Allotment #03052

Cactus Garden Allotment #03011

June 16, 2020

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Abstract

This Rangeland Health Evaluation is a stand-alone report designed to determine compliance with the Arizona Standards for Rangeland Health on the Jones, Garcia, Los Caballeros, and Cactus Garden grazing allotments.

Standard One is met on this complex.

Standard Two, is not applicable to this complex of allotments as no riparian areas are present.

Standard Three is met on this complex, with the exception of one Key Area on the Garcia Allotment.

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 Jones, Garcia, Los Caballeros, and Cactus Garden grazing allotments (hereafter the “Vulture 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 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). DPC objectives were established to ensure soil condition and ecosystem function standards, described in Standards 1 and 2, are 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 biological resources and physical components/characteristics of the desert ecosystems found on these grazing allotments.

This evaluation seeks to ascertain: 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 found 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 Vulture Complex is located south of the town of Wickenburg, Arizona. Vulture Mine road bisects the Garcia and Jones allotments, with the Los Caballeros and Cactus Garden allotments lying east of the Jones allotment, respectively. The eastern boundary of the Cactus Garden allotment is the Hassayampa River. 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 acreages of the allotments within the Vulture Complex are given below.

Land Classification	Jones	Garcia	Los Caballeros	Cactus Garden
Public Acres	26,998	37,705	12,684	10,077
State Acres	0	12,339	3,497	1,595
Private Land Acres	506	1,802	793	816
Total Acres	27,504	51,846	16,974	12,488

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 north 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 Vulture 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. MCFCD updated their station numbers in 2018. The stations below were used in the calculation of precipitation on the Complex:

Station Name	Station Number	Latitude	Longitude	Years of Record	Mean Annual Rainfall
Douglas Ranch Rd	72200	33.77660	-112.64052	4	8.12
Belmont Mountains	46300	33.65735	-112.91167	13	7.44
Black Mountain	51000	33.94682	-112.88271	23	9.02
Box Wash	47500	33.84927	-112.79911	14	8.6
Dead Horse Wash	43700	33.78099	-113.02862	15	7.66
Flying E Tank	51500	33.93671	-112.81699	22	9.64
Four Mile Wash	26500	33.53987	-112.85368	16	6.58
Harman Wash	51200	33.96277	-112.82798	23	9.51
Jackrabbit Wash	45000	33.71543	-112.88179	34	7.55
Morristown	45200	33.85653	-112.62425	24	8.33
Outlaw Hill	28500	33.91425	-112.93914	15	9.6
Twin Peaks	46800	33.88360	-112.82289	12	9.32

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). 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 7-10” precipitation zone is more appropriate for the majority of soils within the complex, particularly on the northern areas.

Approximately 65 soil types, associations, and complexes occur on public lands within the Vulture Complex. These soils are typical of desert floor and mountainous soils (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 Carrizo Series:

Carrizo soils are present in 9 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 Denure Series:

Denure soils are present in 2 of the soil types on the complex. These soils are coarse-loamy, mixed, superactive, hyperthermic Typic Haplocambids. These soils are very deep, well drained and somewhat excessively drained soils formed in alluvium along alluvial fans, relict basin floors, stream terraces or fan piedmonts. Slopes range from 0 to 8 percent and elevations range from 500 to 2,200 feet. Runoff is negligible to low and the erosion hazard is slight. Denure soils in this complex are associated with the Sandy Loam Upland ecological site.

The Eba Series:

Eba soils are present in 6 of the soil types on the complex. These soils are clayey-skeletal, mixed, superactive, thermic typic Calciargids. These soils are very deep, well drained soils formed in mixed alluvium on fan terraces. Slopes range from 1 to 15 percent and elevations range from 1,800 to 3,300 feet. Runoff is medium and the erosion hazard is moderate. Depending on their position on the landform, Eba soils are associated with the Clay Loam Upland, Loamy Upland, and Loamy Slopes ecological sites.

The Ebon Series:

Ebon soils are present in 6 of the soil types on the complex. These soils are clayey-skeletal, mixed, superactive, hyperthermic typic Haplargids. These soils are very deep, well drained soils formed in mixed alluvium on fan terraces. Slopes range from 0 to 40 percent with elevations from 850 to 2,290 feet. Runoff is medium and the erosion hazard is slight to moderate. Ebon soils are associated with the Clay Loam Upland ecological site in the complex.

The Gran Series:

Gran soils are present in 3 of the soil types on the complex. These soils are clayey-skeletal, mixed, superactive, thermic, shallow typic Haplargids. These soils are very shallow and shallow soils formed in alluvium-colluvium on pediments, hillslopes and mountain slopes. Slopes range from 1 to 65 percent with elevations from 1,800 to 4,000 feet. Runoff is slow to medium and the erosion hazard is slight to moderate. Gran soils are associated with the Granitic Upland and Shallow Hills ecological sites.

The Gunsight Series:

Gunsight soils are present in 8 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 Lehmans Series:

Lehman soils are present in 2 of the soil types on the complex. These soils are clayey, smectitic, thermic lithic Haplargids. These soils are very shallow and shallow formed in slope alluvium from volcanic rock. Slopes range from 5 to 60 percent, with elevations from 1,700 to 4,000 feet. Runoff on these soils is medium and the erosion hazard is moderate. Lehmans soils are associated with the Volcanic Hills ecological site.

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. 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.

The Pinaleno Series:

Pinaleno soils are present in 3 of the soil types on the complex. These soils are loamy-skeletal, mixed, superactive, thermic typic Calciargids. Soils are very deep and formed in fan alluvium on fan and stream terraces. Slopes range from 0 to 45 percent with elevations from 1,500 to 5,400 feet. Runoff on these soils is slow to medium and the erosion hazard is slight. These soils are associated with the Clay Loam Upland and Loamy Slopes ecological sites, depending upon slope.

The Pinamt Series:

Pinamt soils are present in 4 of the soil types on the complex. These soils are loamy-skeletal, mixed, superactive, hyperthermic typic Calciargids. Soils are very deep and formed in fan and stream alluvium on fan and stream terraces. Slopes are from 0 to 40 percent with elevations from 700 to 3,000 feet. Runoff on these soils is medium, and the erosion hazard is slight. These soils are associated with the Limy Upland Deep ecological site.

The Rillito Series:

Rillito soils are present in 5 of the soil types on the complex. These soils are coarse-loamy, mixed, superactive, hyperthermic typic Haplocalcids. Soils are very deep and somewhat excessively drained and formed in mixed alluvium on fan or stream terraces. Slopes are generally from 0 to 5 percent, but range to 40 percent, with elevations from 400 to 2,200 feet. Runoff is slow to medium, and the erosion hazard is slight. These soils are associated with the Limy Upland and Limy Fan ecological sites, depending upon depth to carbonate layers.

The Tremant Series:

Tremant soils are present in 8 of the soil types on the complex. These soils are fine-loamy, mixed, superactive, hyperthermic typic Calciargids. Soils are very deep, formed in fan and stream alluvium and eolian deposits on fan and stream terraces or relict basin floors. Slopes are from 0 to 5 percent with elevations from 400 to 2,500 feet. Runoff is medium, and the erosion hazard is slight. These soils are associated with the Sandy Loam Upland, Limy Fan, and Loamy Upland ecological sites depending on landform position and carbonate content.

The Wickenburg Series:

Wickenburg soils are present in 3 of the soil types on the complex. These soils are loamy-skeletal, mixed, superactive, thermic, shallow typic Haplocambids. Soils are shallow and formed in mixed alluvium-colluvium on pediment hillslopes and mountain slopes. Slopes are from 1 to 65 percent with elevations

from 1,800 to 4,000 feet. Runoff is medium to rapid and the erosion hazard is moderate. These soils are associated with the Granitic Hills ecological site.

2.3 Biological Resources

2.3.1 Major Land Resource Areas

The Vulture 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. Each is influenced by the other and influences the development of the others. (BLM TR 1734-07, Ecological Site Inventory)

Ecological sites are named and classified based on soil parent material or soil texture and precipitation. There are several ecological sites that occur within the Vulture Complex. NRCS has mapped ecological sites on the complex within the 3-7 inch, the 7-10 inch and the 10-13” precipitation zones. Average rainfall across the complex, as shown above, generally falls within the 7-10 inch precipitation zone, with the exception of the southernmost end of the Garcia allotment. For this reason, ecological sites used for this evaluation are the 7-10 inch precipitation zone ecological site guides. The dominant ecological sites on Public lands within the complex are described below. Reference Map 3, Appendix A, for ecological sites occurring on the complex and Section 5, Appendix A, for a list of Ecological Sites and their percentage of Public Lands within the Complex.

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

Clay Loam Upland 7-10”pz R040XB205AZ

This site occurs on fan terraces and stream terraces with slopes ranging from 1 to 3%. Elevations range from 1,000 to 2,050 feet. Soils are deep and formed in clayey alluvium from mixed origins. Plant-soil moisture relationships are fair. The potential plant community is a mixture of perennial grasses and forbs, desert shrubs and cacti with a shrubland aspect. Annual vegetative production is expected to be between 300-460 lbs air-dry weight per acre.

Granitic Hills 7-10”pz R040XB206AZ

This site occurs on hillslopes and ridgetops. Slopes range from 15 to 65%. Elevations are from 1000 to 2500 feet. Soils are shallow and formed on acid igneous materials. Soils are non-calcareous, coarse textured and have well developed covers of gravels and cobbles. Large areas of rock outcrop and boulder occur up to 25% of the area. Plant-soil moisture relationships are fair. The potential plant community is a diverse mixture of desert trees, shrubs, and cacti. Perennial grass is not a major component of the

ecological site. Annual vegetative production is expected to be between 400-625lbs air-dry weight per acre.

Limy Upland 7-10”pz Deep R040XB208AZ

This site occurs on fan terraces, old stream terraces and ridge-tops. Slopes are from 1 to 15%. Elevations range from 1000 to 2100 feet. Soils are deep, formed in very gravelly alluvium. Soils are calcareous, and loamy textured. Surface rock fragments are common. Plant-soil moisture relationships are poor. The potential plant community on this site is dominated by creosotebush with limited other shrub and cacti species. Annual vegetative production is expected to be between 218-276 lbs air-dry weight per acre.

Loamy Swale 7-10”pz R040XB211AZ

This site occurs on floodplains and alluvial fans, with slopes from 0 to 2%. Elevations range from 900 to 2,050 feet. Soils are deep and formed on loamy alluvium, and may or may not be calcareous. Plant-soil moisture relationships are excellent. The potential plant community is a mixture of perennial grasses and forbs, trees, shrubs and cacti with a shrubland aspect. Annual vegetative production is expected to be between 1380-2220 lbs air-dry weight per acre.

Sandy Bottom 3-7”pz, 7-10”pz R040XC318AZ, R040XB

These sites occur in a bottom position. They benefit significantly from run-in moisture from adjacent areas. The soils may suffer from excessive loss from runoff. It occurs as floodplains, low terraces, alluvial fans and drainageways. Slopes are from 0% to 3%. Elevations range from 0 to 1,000 feet for the lower rainfall regime, and 900 to 2,000 feet for the higher rainfall regime. Soils are very young, and of mixed origin. Soils may or may not be calcareous. Plant-soil moisture relationships are poor in the lower rainfall regime, but tend to be good due to the extra moisture received in the higher rainfall regime. Annual vegetative production is expected to be between 950 and 1675lbs air-dry weight per acre in the lower rainfall regime, and between 1650 and 2775lbs air-dry weight in the higher rainfall regime.

Sandy Loam Upland 7-10”pz R040XB218AZ

This site occurs on fan terraces and stream terraces with slopes ranging from 1 to 8%. Elevations range from 1,000 to 2,050 feet. Soils are deep and formed in loamy alluvium from mixed origins. Soils are non-calcareous in the surface and slightly calcareous below. Plant-soil moisture relationships are good. The potential plant community on this site is a mixture of desert trees, shrubs and cacti with perennial and annual forbs and grasses. The aspect is shrubland. Annual vegetative production is expected to be between 375-575 lbs air-dry weight per acre.

Volcanic Hills 7-10”pz R040XB210AZ

This site occurs on hillslopes and ridge tops with slopes ranging from 15-65% and elevations from 1000’ to 2500’. Soils are shallow and formed on intermediate igneous material. Soils are slightly calcareous, loamy textured and have very well developed covers of cobble, stones and gravel. Rock outcrops can account for up to 35% of the area. Plant-soil moisture relationships are fair to good. The potential plant community is a diverse mixture of desert shrubs, trees and cacti with limited perennial grass. Annual vegetative production is expected to be between 450-575lbs air-dry weight per acre.

2.3.3 General Wildlife Resources

Wildlife species that occur within the Vulture Complex are typical and representative of the vegetative communities present in the area. Species present include, but are not limited to, mule deer, coyote, javelina, mountain lion, bobcat, gray fox, raccoon, desert cottontail, black-tailed jackrabbits, Gambel’s quail, great horned owls, and various reptiles, small mammals and migratory birds. Desert bighorn sheep occupy steep, rugged habitat in the Belmont Mountains in the far southern end of the Garcia allotment.

2.3.4 Special Status Species, T&E

The Garcia and Cactus Garden allotments are adjacent to occupied habitat for the endangered southwestern willow flycatcher (*Empidonax traillii extimus*) and the threatened yellow-billed cuckoo (*Coccyzus americanus*) along the Hassayampa River. The Vulture Complex of grazing allotments does not include the Hassayampa River and its associated riparian habitat. Livestock within the complex are excluded from the Hassayampa River and its associated riparian habitat by pasture fencing and railroad right of way fencing, located between occupied habitat and upland habitat within the complex. Small portions of critical habitat for southwestern willow flycatcher, and proposed critical habitat for yellow-billed cuckoo, occur on the Vulture Complex where drainages intersect with the railroad embankment and increase soil moisture, supporting patches of vegetation that are denser than the surrounding upland habitat (Figures 1 and 2). Of the 468 acre Hassayampa River southwestern willow flycatcher critical habitat unit, there is a single 0.9 acre patch of critical habitat on the Cactus Garden allotment. Of the 2,838 acre Hassayampa River yellow-billed cuckoo proposed critical habitat unit 14, the Vulture Complex contains 7.2 acres of proposed critical habitat. There are two patches of yellow billed cuckoo proposed critical habitat on the Garcia allotment (a 2.8 acre patch, and a 1.3 acre patch) and a single 3.1 acre patch of proposed critical habitat on the Cactus Garden allotment (Table below).

Approximate acres of southwestern willow flycatcher (SWFL) critical habitat (CH) and Yellow-billed Cuckoo (YBCU) proposed critical habitat (PCH) on the Vulture Complex are given in the table below.

Allotment	SWFL CH (acres)	YBCU PCH (acres)
Garcia	0.0	4.1
Cactus Garden	0.9	3.1

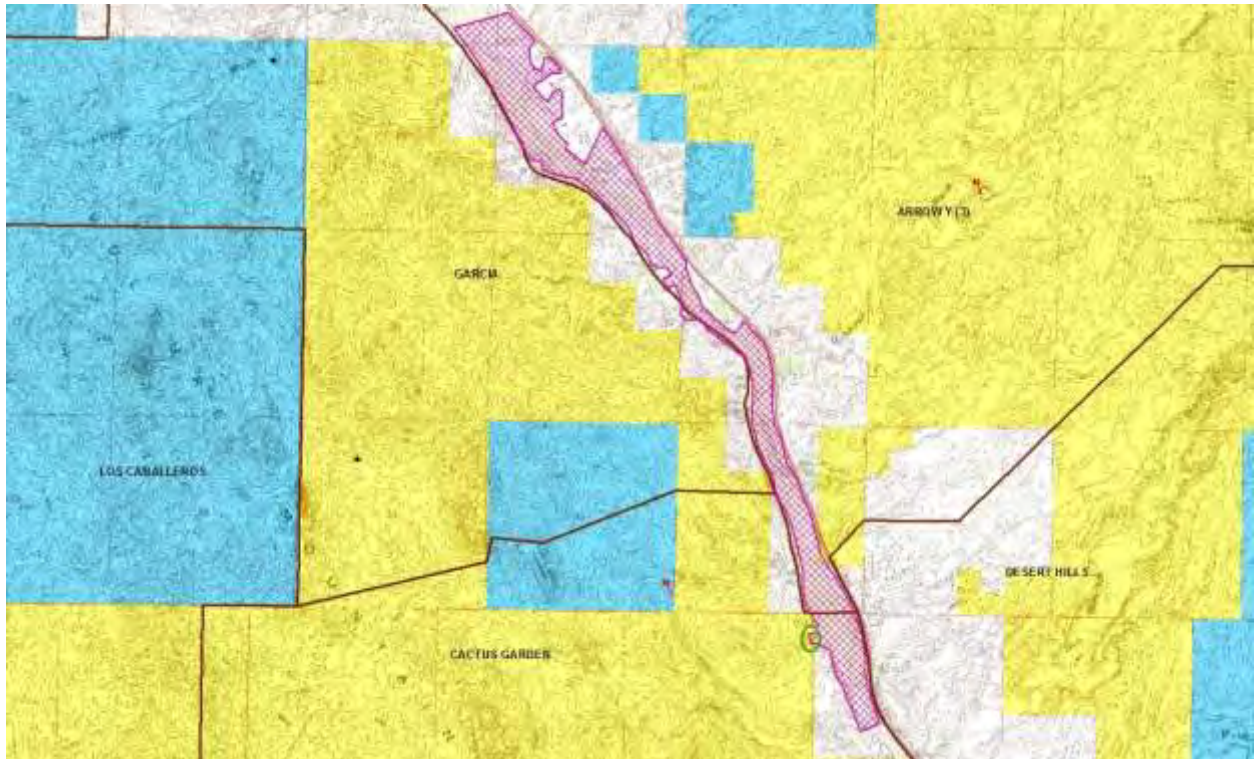


Figure 1. Critical habitat for southwestern willow flycatcher (red cross-hatched polygon) adjacent to the Garcia and Cactus Garden allotments. The 0.9 acre patch of critical habitat that occurs on the Vulture Complex is outlined by the green circle.

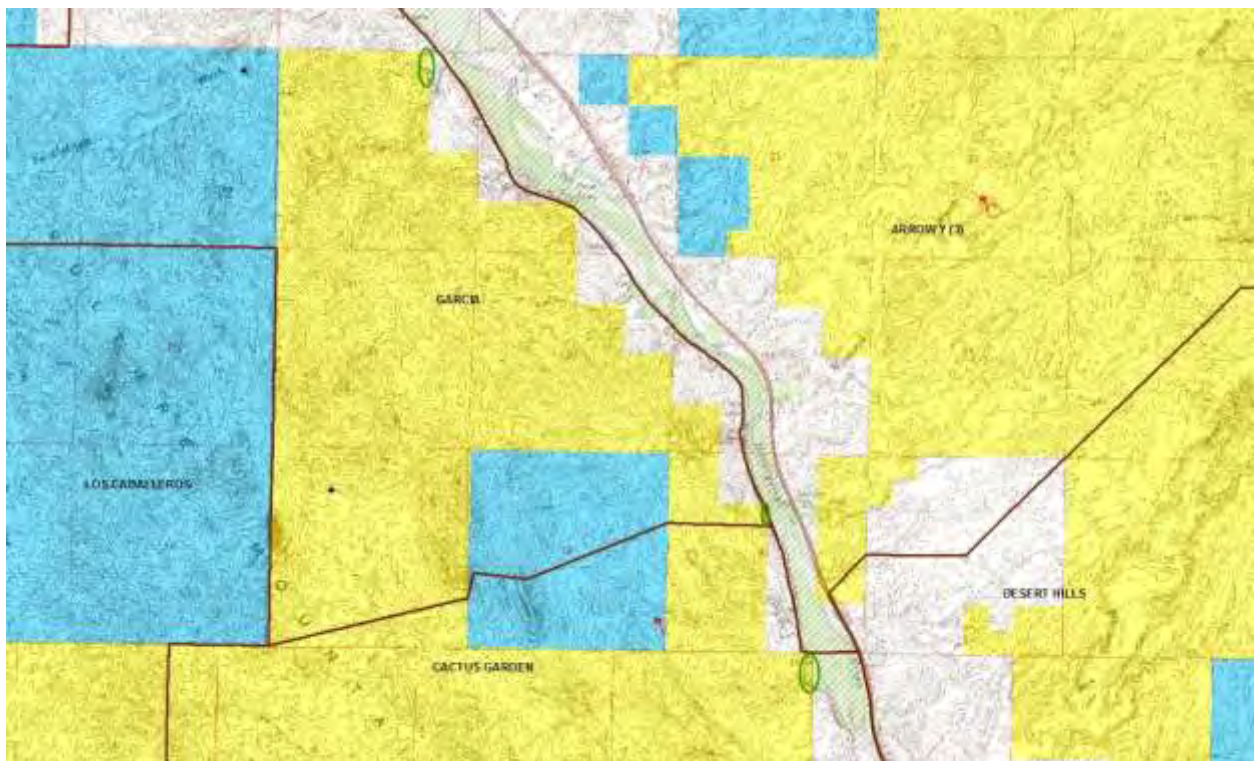


Figure 2. Proposed critical habitat for yellow-billed cuckoo (hatched polygon) adjacent to the Garcia (4.1 acres) and Cactus Garden (3.1 acres) allotments. The patches of proposed critical habitat that occur on the Vulture Complex is outlined by the green circles.

Sonoran desert tortoises (*Gopherus morafkai*), a BLM sensitive species, occupies much of the upland areas in the Vulture Complex. However, desert tortoise distribution within the Complex is not uniform. 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 Vulture complex contains category II and 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 acreages of desert tortoise habitat on public lands within the complex.

Allotment	Category 1 Acres	Category 2 Acres	Category 3 Acres
Los Caballeros	0	11,301	0
Cactus Garden	0	9,793	263
Garcia	0	12,044	3,007
Jones	0	16,624	0

2.4 Special Management Areas

The Vulture Mountain ACEC is an approximately 6,500 acre area within the Vulture Complex surrounding Vulture and Caballeros Peaks on the Garcia, Jones and Los Caballeros allotments. The cliffs along the crest of Vulture and Caballeros Peaks are scenic landmarks and are significant habitat features for many raptors. Large concentrations of hawks and falcons use these cliff faces for nesting. Vulture and Caballeros Peaks form a unique physical front that is essential to maintaining the area's biologic diversity.

2.5 Recreational Resources

The Vulture Mountains Recreation and Public Purposes (R&PP) lease granted to Maricopa County lies within the Garcia and Jones allotments. On the Garcia allotment, this R&PP encompasses 839.9 acres located along Vulture Mine road adjacent to the existing Vulture Peak Trailhead. On the Jones allotment, this R&PP encompasses 207.34 acres east of the historic Vulture Mine.

The Jones allotment contains routes used for permitted motorized desert racing east and north of the historic Vulture Mine.

3.0 Grazing Management

3.1 Grazing History

The current permit holder for the Jones and Garcia allotments is Sand Arroyo Ranch INC. They acquired the permits in 2016. The Jones allotment contains two pastures. The Garcia allotment is split by the Jones, and contains 4 pastures, two on the northern parcels and two in the southern parcel (Appendix A, Map 1). There is no formal rotation system in place on the allotments.

The current permit holder for the Los Caballeros allotment is the Los Caballeros Ranch. The ranch has operated the grazing allotment since 1962. There is no formal rotation system in place on the allotment, there is one division fence in the southern part of the allotment.

The current permit holder for the Cactus Garden allotment is Spear B Livestock, under a base property lease from Crestone Ranches. They acquired the permit in 2018. There are a few pasture fences on the allotment, however, there is no formal rotation system in place, and livestock are moved based on water and forage availability.

BLM billing records show continuous use on these grazing allotments since the 1960s. Livestock have likely been present in this area since the mid-1800s.

3.2 Mandatory Terms and Conditions for Permitted Use

All of the grazing allotments of the complex are classified as perennial/ephemeral grazing permits. Additional livestock beyond the base stocking rate may be allowed on the allotment during years of additional, seasonal forage availability with prior approval. The Mandatory Terms and Conditions of the permits and leases are listed below:

Allotment Name	Allotment Number	Livestock Number	Livestock Kind	% Public Land	Type of Use	AUMs
Jones	3045	75	Cattle	100	Active	900
Garcia	3095	350	Cattle	75	Active	3150
		0	Sheep	75	Ephemeral	0
Los Caballeros	3052	101	Cattle	72	Active	921
		2	Horse	72	Active	18
Cactus Garden	3011	104	Cattle	88	Active	1098

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. All four allotments within the 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 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* (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 Vulture 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 Vulture Complex.

There are 14 active Key Areas on the Vulture Complex. The Jones allotment contains 5 Key Areas. The Garcia allotment contains 5 Key Areas. Key Area 2 was abandoned in 2018. The Los Caballeros contains 2 Key Areas. The Cactus Garden contains 3 Key Areas. The table below shows the active key areas on the complex:

Allotment	Key Area	Ecological Site
Jones	KA1	Limy Upland 7-10 Deep
	KA2	Granitic Upland 7-10
	KA3	Sandy Wash 7-10
	KA4	Loamy Bottom 7-10
	KA5	Limy Upland 7-10 Deep
Garcia	KA1	Granitic Hills 7-10
	KA2	ABANDONED
	KA3S	Sandy Wash 7-10
	KA3L	Loamy Bottom 7-10
	KA4	Sandy Loam Upland 7-10
Los Caballeros	KA1	Granitic Hills 7-10
	KA2	Volcanic Hills 7-10
Cactus Garden	KA1	Sandy Wash 7-10
	KA2	Volcanic Hills 7-10
	KA3	Schist Hills 7-10

Garcia Key Area 2 was abandoned due to its location on State Trust Lands. There are 4 additional Utilization plots on the Garcia allotment that were established in the 1980s. All of these plots are currently located on State Trust lands. In 2006, a BLM-contracted USFS monitoring crew established 5 upland monitoring plots and 2 “Proper Functioning Condition” Riparian plots. The upland plot data was unusable for this analysis due to improper, non-repeatable methods, including insufficient sample size and improper method application. The Riparian plots were not used for this analysis because one was established on privately owned land and the other was established in a neighboring allotment not part of this evaluation, on a stretch of dry riverbed not classified as riparian.

Desired Plant Community (DPC) Objectives were developed for each active 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 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. Methods for data collection are given in Section 5.2.

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 with 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 3- Desired Resource Condition Objectives

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 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 are consistent with the Sonoran desert tortoise habitat requirements based on the potential for the site.

The Jones Allotment

Key Area 1

Limy Upland 7-10"precipitation zone (pz) Deep

- Maintain palatable browse species composition of $\geq 20\%$
- Maintain a vegetative canopy cover of $\geq 25\%$
- Maintain a bare ground cover class of $\leq 20\%$

Rationale:

Key area 1 is located on a south-southeast facing aspect Pinamt-Tremant complex soil at 2170 feet above sea level. Average predicted rainfall on the site is 8.5 inches. The site is located within Category 2 Sonoran desert tortoise habitat.

Rationale for the DPC objectives is taken from the NRCS Limy Upland 7-10"pz deep ecological site description and 7-10"pz reference sheet. Perennial grass composition ranges from 0-1% in the ecological site description. A perennial grass objective was not set on this site because perennial grasses are not present, and the seed bank is insufficient to naturally colonize the area. Shrub composition is expected to be between 76-100% of the vegetation community based on the ecological site description, and 50% of the cover based on the reference sheet. Maintaining a palatable browse composition of 20% or greater is appropriate based on the site potential. In the reference state, canopy cover is expected to be between 20-25%. Due to the rainfall on this site compared to reference conditions, maintaining a canopy cover of 25% is appropriate. Bare ground measurements range from 10-60% in the reference state, and are dependent on gravel and rock soil cover levels. Due to the moderate gravel and rock cover currently on the site, maintaining a bare ground cover class of less than 20% is appropriate, and will help to prevent accelerated erosion.

Key Area 2

Granitic Upland 7-10"pz

- Maintain palatable browse species composition of $\geq 15\%$
- Maintain a vegetative canopy cover of $\geq 20\%$

- Maintain a bare ground cover class of $\leq 15\%$

Rationale:

Key area 2 is located on a south facing aspect Gran-Wickenburg complex (low precipitation) soil at 2420 feet above sea level. Average predicted rainfall on the site is 9.0 inches. The site is located within Category 2 Sonoran desert tortoise habitat.

Rationale for the DPC objectives is taken from the NRCS Granitic Upland 7-10"pz deep ecological site description and reference sheet. Perennial grass composition ranges from 1-2% in the ecological site description. A perennial grass objective was not set on this site, because perennial grasses are not present, and the seed bank is insufficient to naturally colonize this area. Shrub composition is expected to be between 20 and 31% 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 based on the site potential. In the reference state, canopy cover is expected to be between 15-20%. Based on the rainfall on the site, and the current vegetation community, maintaining a canopy cover of greater than 20% is appropriate. 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, and will help to prevent accelerated erosion.

Key Area 3

Sandy Wash 7-10"pz

- Maintain a perennial grass composition of $\geq 1\%$
- Maintain palatable browse species composition of $\geq 40\%$
- Maintain a vegetative canopy cover of $\geq 60\%$
- Maintain a bare ground cover class of $\leq 15\%$

Rationale:

Key area 3 is located on a south-southeast facing aspect Momoli-Carrizo complex soil at 2,120 feet above sea level, along the bank of Jimmie Wash. Average predicted rainfall at the site is 8.6 inches. This site is located within Category 2 Sonoran desert tortoise habitat.

Rationale for the DPC objectives is taken from the NRCS Sandy Wash 7-10"pz deep ecological site description and reference sheet. Perennial grass composition ranges from 4-6% in the ecological site description. Grasses on this site primarily consist of Aristida and Eragrostis species. Due to the growth form of these grasses, they contribute negligibly to composition measurements. Maintaining a composition of 1% or greater will ensure that these grasses are not extirpated from the site. Shrub and tree canopy composition is expected to be between 65-70% of the vegetation community based on the reference sheet. Maintaining a palatable browse composition of 40% or greater is appropriate based on the site potential. In the reference state, canopy cover is expected to be between 60-70%. Maintaining a canopy cover of 60% is appropriate based on the site potential. Bare ground measurements range from 15-40% in the reference state, and are dependent on gravel and rock soil cover levels. Maintaining a bare ground cover class of less than 15% is appropriate based on the current gravel and rock cover present on the wash banks.

Key Area 4

Loamy Swale 7-10"pz

- Maintain a perennial grass composition of $\geq 5\%$
- Maintain a palatable browse species composition of $\geq 30\%$
- Maintain vegetative foliar cover of $\geq 60\%$

- Maintain a Bare Ground cover class of $\leq 25\%$

Rationale:

Key Area 4 is located on a southern facing aspect Pinamt-Tremant complex soil at 1,900 feet above sea level, in a loamy swale. Average predicted annual precipitation for this site is 8.2 inches. This site is not located within Sonoran desert tortoise habitat.

Rationale for DPC objectives is taken from the NRCS Loamy Swale 7-10”pz ecological site description and reference sheet. NRCS has not fully developed the plant community section, so the Loamy Swale 10-13”pz ecological site description was also referenced. The higher rainfall amount on the 10-13”pz ecological site is expected to produce greater vegetation as compared to the rainfall regime present on the key area. Perennial grass composition in the 10-13”pz ecological site description is between 16-77%, however, vine mesquite (*Panicum obtusum*) accounts for 7-27% of this, and Big sacaton (*Sporobolus wrightii*) accounts for 1-16% of this. Neither of these grasses have been observed on this stratum. 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 9-35%. Shrub composition is expected to be slightly higher than what is listed in the site description due to the rainfall regime and current soil conditions. A palatable browse composition of greater than 30% is appropriate, given these factors. Canopy cover is expected to be between 20-30% in the reference state. Maintaining a foliar cover of greater than 60% is appropriate, given the considerably higher shrub composition than in the reference state. In the reference state, bare ground is expected to be between 20-60%, based on gravel and rock cover, and annual species litter. Given the litter, moderate gravel and rock cover values on this site, maintaining a bare ground cover class of less than 25% is appropriate and will help to prevent accelerated erosion.

Key Area 5

Limy Upland 7-10”pz Deep

- Maintain a palatable browse species composition of $\geq 20\%$
- Maintain vegetative foliar cover of $\geq 20\%$
- Maintain a Bare Ground cover class of $\leq 20\%$

Rationale:

Key area 5 is located on a southern facing aspect Ebon-Gunsight-Cipriano associate soil at 2,140 feet above sea level. Average predicted annual precipitation for this site is 8.5 inches. This site is not located within Sonoran desert tortoise habitat.

Rationale for the DPC objectives is taken from the NRCS Limy Upland 7-10”pz deep ecological site description and 7-10”pz reference sheet. Perennial grass composition ranges from 0-1% in the ecological site description. A perennial grass objective was not set on this site because perennial grasses are not present on the site, and the seed bank is insufficient to naturally colonize the area. Shrub composition is expected to be between 76-100% 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 based on the site potential. In the reference state, canopy cover is expected to be between 20-25%. Due to the rainfall on this site compared to reference conditions, as well as the slope and aspect of this site compared to Key Area 1, maintaining a canopy cover of 20% is appropriate. Bare ground measurements range from 10-60% in the reference state, and are dependent on gravel and rock soil cover levels. Due to the moderate gravel and rock cover currently on the site, maintaining a bare ground cover class of less than 20% is appropriate, and will help to prevent accelerated erosion.

The Garcia Allotment

Key Area 1

Granitic Hills 7-10"pz

- Maintain a perennial grass composition of $\geq 10\%$
- Maintain a palatable browse species composition of $\geq 30\%$
- Maintain a vegetative foliar cover of $\geq 20\%$
- Maintain a Bare Ground cover class of $\leq 5\%$

Rationale:

Key Area 1 is located on an east facing aspect Gran-Wickenburg-Rock Outcrop complex soil at 2,580 feet above sea level. Average predicted annual precipitation on this site is 9.2 inches. This site is located in Category 2 Sonoran desert tortoise habitat.

Rationale for the DPC objectives is taken from the NRCS Granitic Hills 7-10"pz ecological site description and reference sheet. Perennial grass composition ranges from 1-5% in the ecological site description. Maintaining a grass composition of 10% or greater is appropriate to this site, due to soil inclusions allowing for increased production above the reference state. Shrub composition is expected to be between 45-97% 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 30% or greater is appropriate based on the site potential. In the reference state, canopy cover is expected to be between 15-20%. Due to the site lying at the upper end of the rainfall regime, maintaining a foliar cover class of greater than 20% is appropriate. Bare ground measurements range from 1-15% in the reference state, and are dependent on gravel and rock soil cover levels. Due to the gravel cover currently on the site, maintaining a bare ground cover class of less than 5% is appropriate, and will help to prevent accelerated erosion.

Key Area 3S

Sandy Wash 7-10"pz

- Maintain a palatable browse species composition of $\geq 40\%$
- Maintain a vegetative foliar cover of $\geq 70\%$
- Maintain a Bare Ground cover class of $\leq 15\%$

Rationale:

Key Area 3S is located on a southeast aspect Gunsight-Rillito complex soil at 1640 feet above sea level along the bank of Powerline Wash. Average predicted annual precipitation for this site is 7.5 inches. This site is not located in Sonoran desert tortoise habitat.

Rationale for the DPC objectives is taken from the NRCS Sandy Wash 7-10"pz deep ecological site description and reference sheet. Perennial grass composition ranges from 4-6% in the ecological site description. Grasses are not currently present on the site. Shrub and tree canopy composition on this site is expected to be between 65-70% of the vegetation community based on the reference sheet. Maintaining a palatable browse composition of 40% or greater is appropriate based on the site potential. In the reference state, canopy cover is expected to be between 60-70%. Maintaining a canopy cover of 70% is appropriate based on the site potential. Bare ground measurements range from 15-40% in the reference state, and are dependent on gravel and rock soil cover levels. Maintaining a bare ground cover class of less than 15% is appropriate based on the current gravel and rock cover present on the wash banks.

Key Area 3L

Loamy Swale 7-10"pz

- Maintain a perennial grass composition of $\geq 5\%$
- Maintain a palatable browse species composition of $\geq 30\%$
- Maintain a vegetative foliar cover of $\geq 25\%$
- Maintain a Bare Ground cover class of $\leq 25\%$

Rationale:

Key Area 3L is located on a southeast aspect Gunsight-Rillito complex soil at 1640 feet above sea level in a loamy swale. Average predicted annual precipitation for this site is 7.5 inches. This site is not located in Sonoran desert tortoise habitat.

Rationale for DPC objectives is taken from the NRCS Loamy Swale 7-10"pz ecological site description and reference sheet. NRCS has not fully developed the plant community section, so the Loamy Swale 10-13"pz ecological site description was also referenced. The higher rainfall amount on the 10-13"pz ecological site is expected to produce greater vegetation as compared to the rainfall regime present on the key area. Perennial grass composition in the 10-13"pz ecological site description is between 16-77%, however, vine mesquite (*Panicum obtusum*) accounts for 7-27% of this, and Big sacaton (*Sporobolus wrightii*) accounts for 1-16% of this. Neither of these grasses have been observed on this stratum. A perennial grass composition of at least 5% is most appropriate to the site given these limitations. Shrub and tree composition is expected to be between 9-35%. Shrub composition is expected to be slightly higher than what is listed in the site description due to the rainfall regime and current soil conditions. A palatable browse composition of greater than 30% is appropriate, given these factors. Canopy cover is expected to be between 20-30% in the reference state. Maintaining a foliar cover of greater than 60% is appropriate for the site, which has considerably higher shrub composition than in the reference state. In the reference state, bare ground is expected to be between 20-60%, based on gravel and rock cover, and annual species litter. Given the litter, moderate gravel and rock cover values on this site, maintaining a bare ground cover class of less than 25% is appropriate and will help to prevent accelerated erosion.

Key Area 4

Sandy Loam Upland 7-10"pz

- Maintain a perennial grass composition of $\geq 14\%$
- Maintain a palatable browse species composition of $\geq 20\%$
- Maintain a vegetative foliar cover of $\geq 15\%$
- Maintain a Bare Ground cover class of $\leq 25\%$

Rationale:

Key Area 4 is located on a southern facing aspect Denure-Momoli-Carrizo complex soil at 1740 feet above sea level. Average predicted annual precipitation for this site is 7.8 inches. This site is not located in Sonoran desert tortoise habitat.

Rationale for the DPC objectives is taken from the NRCS Sandy Loam Upland 7-10"pz ecological site description and reference sheet. Perennial grass composition ranges from 11-21% in the ecological site description. Maintaining a perennial grass composition of 14% or greater is appropriate to the site. Shrub and tree composition is expected to be between 54-85% of the vegetation community based on the ecological site description, and 30% of the cover on the site based on the reference sheet. Maintaining a palatable browse composition of 20% or greater is appropriate based on the site potential. In the reference state, canopy cover is expected to be up to 30%. Maintaining a foliar cover class of greater than 15% is appropriate under the current conditions. Bare ground measurements range from 60-65% in the reference state, and are dependent on gravel and rock soil cover levels. Due to the high litter cover, but low gravel and rock cover currently on the site, maintaining a bare ground cover class of less than 25% is appropriate, and will help to prevent accelerated erosion.

The Los Caballeros Allotment

Key Area 1

Granitic Hills 7-10"pz

- Maintain a perennial grass composition of $\geq 20\%$
- Maintain a palatable browse species composition of $\geq 30\%$
- Maintain a vegetative foliar cover of $\geq 25\%$
- Maintain a Bare Ground cover class of $\leq 5\%$

Rationale:

Key Area 1 is located on a northeast facing aspect Gran-Wickenburg-Rock Outcrop complex (low precipitation) soil at 2,760 feet above sea level. Average predicted annual precipitation for this site is 9.2 inches. This site is within Category 2 Sonoran desert tortoise habitat.

Rationale for the DPC objectives is taken from the NRCS Granitic Hills 7-10"pz ecological site description and reference sheet. Perennial grass composition ranges from 1-5% in the ecological site description. Maintaining a grass composition of 20% or greater is appropriate to this site, due to soil inclusions allowing for increased production above the reference state. Shrub composition on this site is expected to be between 45-97% 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 30% or greater is appropriate based on the site potential. In the reference state, canopy cover is expected to be between 15-20%. Due to the site lying at the upper end of the rainfall regime, maintaining a foliar cover class of greater than 25% is appropriate to the site. Bare ground measurements range from 1-15% in the reference state, and are dependent on gravel and rock soil cover levels. Due to the gravel and rock cover currently on the site, maintaining a bare ground cover class of less than 5% is appropriate, and will help to prevent accelerated erosion.

Key Area 2

Volcanic Hills 7-10"pz

- Maintain a perennial grass composition of $\geq 5\%$
- Maintain a palatable browse species composition of $\geq 20\%$
- Maintain a vegetative foliar cover of $\geq 25\%$
- Maintain a Bare Ground cover class of $\leq 4\%$

Rationale:

Key Area 2 is located on a southwest facing aspect Eba-Pinaleno complex soil at 2,320 feet above sea level. Average predicted annual precipitation for this site is 8.7 inches. This site is within Category 2 Sonoran desert tortoise habitat.

Rationale for the DPC objectives is taken from the NRCS Volcanic Hills 7-10"pz ecological site description and 7-10"pz reference sheet. Perennial grass composition ranges from 2-5% in the ecological site description. Maintaining a grass composition of 5% or greater is appropriate to this site, due to soil inclusions allowing for slightly increased production above the reference state. Shrub composition is expected to be between 55-83% of the vegetation community based on the ecological site description, and trees compose 90-95% of the cover based on the reference sheet. Maintaining a palatable browse composition of 20% or greater is appropriate based on the site potential. In the reference state, canopy cover is expected to be between 10-20%. Based on the rock and gravel cover, maintaining a foliar cover

class of 25% or greater is appropriate to the site. Bare ground measurements range from 1-5% in the reference state, and are dependent on gravel and rock soil cover levels. Due to the rock and gravel cover currently on the site, maintaining a bare ground cover class of less than 4% is appropriate, and will help to prevent accelerated erosion.

The Cactus Garden Allotment

Key Area 1

Sandy Wash 7-10''pz

- Maintain a palatable browse species composition of $\geq 40\%$
- Maintain a vegetative foliar cover of $\geq 60\%$
- Maintain a Bare Ground cover class of $\leq 15\%$

Rationale:

Key Area 1 is located on a south facing aspect Eba-Pinaleno complex soil on the banks of an unnamed drainage at 2,130 feet above sea level. Average predicted annual precipitation for this site is 8.6 inches. This site is within Category 2 Sonoran desert tortoise habitat.

Rationale for the DPC objectives is taken from the NRCS Sandy Wash 7-10''pz deep ecological site description and reference sheet. Perennial grass composition ranges from 4-6% in the ecological site description. Grasses are currently not present on the site, so a perennial grass objective was not set, and the seed bank is insufficient to naturally colonize the area. Shrub and tree canopy composition is expected to be between 65-70% of the vegetation community based on the reference sheet. Maintaining a palatable browse composition of 40% or greater is appropriate based on the site potential. In the reference state, canopy cover is expected to be between 60-70%. Maintaining a canopy cover of 60% is appropriate based on the site potential. Bare ground measurements range from 15-40% in the reference state, and are dependent on gravel and rock soil cover levels. Maintaining a bare ground cover class of less than 15% is appropriate based on the current gravel and rock cover present on the wash banks.

Key Area 2

Volcanic Hills 7-10''pz

- Maintain a perennial grass composition of $\geq 5\%$
- Maintain a palatable browse species composition of $\geq 20\%$
- Maintain a vegetative foliar cover of $\geq 25\%$
- Maintain a Bare Ground cover class of $\leq 4\%$

Rationale:

Key Area 2 is located on a western facing aspect Rock Outcrop-Lehmans complex soil at 2,080 feet above sea level. Average predicted annual precipitation for this site is 8.7 inches. This site is within Category 3 Sonoran desert tortoise habitat.

Rationale for the DPC objectives is taken from the NRCS Volcanic Hills 7-10''pz ecological site description and 7-10''pz reference sheet. Perennial grass composition ranges from 2-5% in the ecological site description. Maintaining a grass composition of 5% or greater is appropriate to this site, due to soil inclusions allowing for slightly increased production above the reference state. Woody species composition is expected to be between 55-83% of the vegetation community based on the ecological site description, and trees compose 90-95% of the cover based on the reference sheet. Maintaining a palatable browse composition of 20% or greater is appropriate based on the site potential. In the reference state, canopy cover is expected to be between 10-20%. Based on the rock and gravel cover on the site, maintaining a foliar cover class of 25% or greater is appropriate. Bare ground measurements range from

1-5% in the reference state, and are dependent on gravel and rock soil cover levels. Due to the rock and gravel cover currently on the site, maintaining a bare ground cover class of less than 4% is appropriate, and will help to prevent accelerated erosion.

Key Area 3

Schist Hills 7-10"pz

- Maintain a palatable browse species composition of $\geq 25\%$
- Maintain a vegetative foliar cover of $\geq 20\%$
- Maintain a Bare Ground cover class of $\leq 5\%$

Rationale:

Key Area 3 is located on a north facing aspect Dixaleta-Rock Outcrop complex soil at 1,980 feet above sea level. Average predicted annual precipitation is 8.5 inches. This site is within Category 2 Sonoran desert tortoise habitat.

Rationale for DPC objectives is taken from the NRCS Schist Hills 7-10" p.z. Ecological Site Description and Reference Sheet. The ecological site guide shows a grass composition from 24-41%, however, the ecological site guide indicates little to no grass cover on the site and 100% mortality on grass species. A perennial grass objective was not set on this site because perennial grasses are not present, and the seed bank is insufficient to naturally colonize the area. Woody species composition is expected to be between 46-84% per the ecological site description. Maintaining a palatable browse composition of 25% or greater will provide adequate forage 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 8-10%. Maintaining a vegetative foliar cover of 20% or greater is appropriate due to its aspect and slope and will prevent accelerated erosion of the site. Bare ground cover class is expected to be between 1-2% in the reference state, with a rock fragment cover of 95-97%. Maintaining a bare ground cover class of 5% or less is appropriate due to gravel cover present on the site, and will prevent accelerated erosion 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 Vulture 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. This data was not used in this analysis due to the non-repeatability of its study design.

5.2 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, Dry Weight Rank, and Point Cover for the 2009-2018 data sets. Earlier

data sets consisted of Pace Frequency and Point Cover, Utilization measurements, or photo plots only. Pace frequency and point cover methods were conducted using a 40x40cm frame with a centrally located point. These methods are described in detail in BLM Technical Reference 1734-4, “Sampling Vegetation Attributes”.

Point cover methods have varied since some of the Key Areas within the complex were established, and historic data is generally not comparable to current data for the Bare Ground, Gravel, and Rock cover classes due to different methods of collection. Pace frequency methods are equivalent across all years.

Utilization data was collected at each Key Area using the Key Species method from 2009-2018. Prior studies on these sites were completed using either the Key Species or Grazed Class method. 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 Vulture Complex. Livestock numbers provided in the tables below are based on actual use reports as available, and billed use.

6.1.1 Jones

<u>Number of Active Livestock</u>	<u>Kind</u>	<u>Type Use</u>	<u>Grazing Begin</u>	<u>Period End</u>	<u>%PL</u>	<u>AUMs</u>
75	Cattle	Active	3/1/2018	2/28/2019	100	900
38	Cattle	Active	3/1/2017	2/28/2018	100	431
0	Cattle	Active	3/1/2016	2/28/2017	100	0
0	Cattle	Active	3/1/2015	2/28/2016	100	0
75	Cattle	Active	3/1/2014	2/28/2015	100	900

6.1.2 Garcia

<u>Number of Active Livestock</u>	<u>Kind</u>	<u>Type Use</u>	<u>Grazing Begin</u>	<u>Period End</u>	<u>%PL</u>	<u>AUMs</u>
350	Cattle	Active	3/1/2018	2/28/2019	75	3150
175	Cattle	Active	3/1/2017	2/28/2018	75	1575
0	Cattle	Active	3/1/2016	2/28/2017	75	0
0	Cattle	Active	3/1/2015	2/28/2016	75	0
0	Cattle	Active	3/1/2014	2/28/2015	75	0
34	Cattle	Active	3/1/2013	2/28/2014	75	306

6.1.3 Los Caballeros

<u>Number of Active Livestock</u>	<u>Kind</u>	<u>Type Use</u>	<u>Grazing Begin</u>	<u>Period End</u>	<u>%PL</u>	<u>AUMs</u>
101	Cattle	Active	3/1/2018	2/28/2019	76	921
2	Horse	Active	3/1/2018	2/28/2019	76	18
101	Cattle	Active	3/1/2017	2/28/2018	76	921

2	Horse					18
101 2	Cattle Horse	Active	3/1/2016	2/28/2017	76	921 18
101 2	Cattle Horse	Active	3/1/2015	2/28/2016	76	921 18
101 2	Cattle Horse	Active	3/1/2014	2/28/2015	76	921 18
101 2	Cattle Horse	Active	3/1/2013	2/28/2014	76	921 18
101 2	Cattle Horse	Active	3/1/2012	2/28/2013	76	921 18

6.1.4 Cactus Garden

<u>Number of Active Livestock</u>	<u>Kind</u>	<u>Type Use</u>	<u>Grazing Begin</u>	<u>Period End</u>	<u>%PL</u>	<u>AUMs</u>
104	Cattle	Active	3/1/2018	2/28/2019	88	1098
104	Cattle	Active	3/1/2017	2/28/2018	88	1098
104	Cattle	Active	3/1/2016	2/28/2017	88	1098
104	Cattle	Active	3/1/2015	2/28/2016	88	1098
104	Cattle	Active	3/1/2014	2/28/2015	88	1098
104	Cattle	Active	3/1/2013	2/28/2014	88	1098

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
Jones	KA1	Achieved	Achieved
	KA2	Achieved	Achieved
	KA3	Achieved	Achieved
	KA4	Achieved	Achieved
	KA5	Achieved	Achieved
Garcia	KA1	Achieved	Achieved
	KA3S	Achieved	Achieved
	KA3L	Achieved	Not Achieved
	KA4	Achieved	Achieved
Los Caballeros	KA1	Achieved	Achieved
	KA2	Achieved	Achieved
Cactus Garden	KA1	Achieved	Achieved
	KA2	Achieved	Achieved
	KA3	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 Dry Weight Rank and 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, “Vulture Complex Plant List”. Species of limited forage value, specifically *Ambrosia deltoidea* and *Larrea tridentata*, are limited to 10% of the total percent of palatable species, based on their reduced percentage in target species forage diet studies. 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 Jones 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” 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 $\geq 20\%$ ACHIEVED
- Maintain a vegetative canopy cover of $\geq 25\%$ ACHIEVED
- Maintain a bare ground cover class of $\leq 20\%$ ACHIEVED

Rationale:

Palatable browse composition objectives are met for desert tortoise, with slightly less than 26% of the plant community. Browse composition objectives are met for mule deer, at slightly less than 26% of the plant community. Vegetative foliar objectives are met, with a foliar cover of 33.2%. Bare ground cover class objectives are met, with a bare ground cover class of 13.9%.

Trend:

Frequency and composition measurements have mostly remained stable on this site between 2018 and 2009. Foliar cover on the site has remained fairly constant, with slight increases in desirable browse species such as *Krameria*. Short-lived perennial/biennial species such as *euphorbia* have reduced in frequency, likely due to drought conditions over these years. Utilization on this site has historically been none to slight.

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 2.1.1 of Appendix A.

Standard Three: Standard is achieved on this site.

- Maintain palatable browse species composition of $\geq 15\%$ ACHIEVED
- Maintain a vegetative canopy cover of $\geq 20\%$ ACHIEVED
- Maintain a bare ground cover class of $\leq 15\%$ ACHIEVED

Rationale:

Palatable browse composition objectives are met for desert tortoise, at slightly more than 17% of composition. Browse composition objectives are met for mule deer, at slightly more than 18% of composition. Vegetative foliar cover objectives are met, with a vegetative foliar cover of slightly more than 29%. Bare ground cover class objectives are met, with a bare ground percentage of 9.2%.

Trend:

Frequency measurements of desirable forage plant species have increased on this site between 2009 and 2017, while weighted composition measurements have generally remained constant, with the exception of *Parkinsonia*, *Krameria*, and *Larrea* species. The increase in perennial *Eriogonum* species frequency, but stable weighted composition, indicates recruitment is taking place, as younger, smaller plants contribute less to weighted composition. Utilization on this site has remained consistent since the site was established, with most years having utilization in the slight to light category.

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 a perennial grass composition of $\geq 1\%$ ACHIEVED
- Maintain palatable browse species composition of $\geq 40\%$ ACHIEVED
- Maintain a vegetative canopy cover of $\geq 60\%$ ACHIEVED
- Maintain a bare ground cover class of $\leq 15\%$ ACHIEVED

Rationale:

Perennial grass composition objectives are met on this site, with a perennial grass composition of 1%. Palatable browse objectives for desert tortoise are met on this site, at slightly more than 51% of composition. Browse objectives for mule deer are met on this site, at slightly more than 51% of composition. Vegetative foliar cover objectives are met on this site, with a foliar cover of 64%. Bare ground cover class objectives are met on this site, with a bare ground cover class of 12%.

Trend:

Plant species on this site have remained fairly stable between 2009 and 2017. Utilization on this site is shown as none to slight in the available year of data. This site lies on the bank of a wash frequently used as a vehicle route.

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 $\geq 5\%$ NOT ACHIEVED
- Maintain a palatable browse species composition of $\geq 30\%$ ACHIEVED
- Maintain vegetative foliar cover of $\geq 60\%$ ACHIEVED
- Maintain a Bare Ground cover class of $\leq 25\%$ ACHIEVED

Rationale:

Perennial grass composition objectives are not met on this site, with a perennial grass composition of less than 1%. Palatable browse composition objectives are met on this site for desert tortoise at slightly more than 53% of composition. Palatable browse composition objectives are met on this site for mule deer, at slightly more than 60% of composition. Vegetative foliar cover objectives are met on this site, with a foliar cover of 68.3%. Bare ground cover class requirements are met on this site, with a bare ground cover class of 16.8%.

Trend:

This key area shows slight recovery in desirable browse species between 2009 and 2017. Upland shrub species have decreased slightly. Grasses and forbs have decreased on the site. This key area is located in a pasture heavily utilized by a prior grazing permittee, as shown in the 2011 utilization measurements. With continuing drought conditions, grass and forb recovery will be slow in this pasture. Utilization measurements indicate that livestock use is a likely causal factor in not meeting perennial grass objectives.

Key Area 5

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 2.1.5 of Appendix A.

Standard Three: Standard is achieved on this site.

- Maintain a palatable browse species composition of $\geq 20\%$ ACHIEVED
- Maintain vegetative foliar cover of $\geq 20\%$ ACHIEVED
- Maintain a Bare Ground cover class of $\leq 20\%$ ACHIEVED

Rationale:

Palatable browse composition is met on this site for desert tortoise, at 31% of composition. Browse composition objectives are met for mule deer, at 31% of composition. Vegetative foliar cover objectives are met on this site, with a foliar cover of 22%. Bare ground cover class objectives are met on this site, with a bare ground cover class of 15%.

Trend:

Trend on this site is slightly down, with reductions in some shrub and large shrub species. Based on the limited use on this site, it is likely these effects are due to prolonged drought in this area.

7.1.2 Garcia 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 2.2.1 of Appendix A.

Standard Three: Standard is achieved on this site.

- Maintain a perennial grass composition of $\geq 10\%$ NOT ACHIEVED
- Maintain a palatable browse species composition of $\geq 30\%$ ACHIEVED
- Maintain a vegetative foliar cover of $\geq 20\%$ ACHIEVED
- Maintain a Bare Ground cover class of $\leq 5\%$ ACHIEVED

Rationale:

The perennial grass composition objective is not met on this site, with a perennial grass composition of slightly more than 9%. Palatable browse composition objectives are met for desert tortoise, at slightly less than 44% of composition. Browse objectives are met for mule deer, at slightly more than 43% of composition. The vegetative foliar cover objective is met on the site, with a foliar cover of 34.5%. The bare ground cover class objective is met, with a bare ground cover class of 1.5%.

Trend:

Perennial grass on this site has decreased on this site since the 1980s, but have remained fairly stable since 1992. Woody species have generally remained stable, with the exception of *Ambrosia deltoidea*, which has increased from 12% frequency to 43%, and *Larrea tridentata*, which has increased from 2.5% to 9%. Utilization on grasses on this site has generally been slight, except for 1993 and 1987 when it was classified as light. Utilization on browse is currently negligible to slight, however, use was moderate on

Ephedra in 1988 and 89. Due to these levels of utilization, it is likely that prolonged drought conditions are causing the observed changes in the vegetation community.

Key Area 3S:

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 mostly consistent with the site reference state. Soil and Site Stability and Hydrologic Function ratings are both categorized as a “Slight to Moderate Departure” from the reference state. Reference Section 2.2.2 of Appendix A.

Standard Three: Standard is achieved on this site.

- Maintain a palatable browse species composition of $\geq 40\%$ ACHIEVED
- Maintain a vegetative foliar cover of $\geq 70\%$ ACHIEVED
- Maintain a Bare Ground cover class of $\leq 15\%$ ACHIEVED

Rationale:

Palatable browse composition objectives are met for desert tortoise, at slightly more than 73% of composition. Browse objectives are met for mule deer, at slightly less than 80%. Vegetative foliar cover objectives are met on this site, with a foliar cover of 76.6%. Bare ground cover class objectives are met on this site, with a bare ground cover class of 10.6%.

Utilization on this site was negligible.

Key Area 3L:

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 mostly consistent with the site reference state. Soil and Site Stability and Hydrologic Function ratings are both categorized as a “Slight to Moderate” from the reference state. Reference Section 2.2.2 of Appendix A.

Standard Three: Standard is not achieved on this site.

- Maintain a perennial grass composition of $\geq 5\%$ NOT ACHIEVED
- Maintain a palatable browse species composition of $\geq 30\%$ NOT ACHIEVED
- Maintain a vegetative foliar cover of $\geq 25\%$ ACHIEVED
- Maintain a Bare Ground cover class of $\leq 25\%$ NOT ACHIEVED

Rationale:

The perennial grass composition objective is not met on this site, with a perennial grass composition of slightly less than 2%. Palatable browse composition objectives are not met for desert tortoise, at slightly less than 30% of composition. Browse objectives are met for mule deer, at slightly less than 40%. Vegetative foliar cover objectives are met on this site, with a foliar cover of 27.9%. Bare ground cover class objectives are not met on this site, with a bare ground cover class of 34.7%.

Utilization on this site has been slight to light. It is unlikely that livestock grazing is the causal factor for the non-achievement of standards. Increased channelization of the drainage, decreasing water availability and prolonged drought are likely causal factors for the non-achievement of Standard 3.

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 mostly consistent with the site reference state. Soil and Site Stability and Hydrologic Function ratings are both categorized as a “Slight to Moderate” from the reference state. Reference Section 2.2.2 of Appendix A.

Standard Three: Standard is achieved on this site.

- Maintain a perennial grass composition of $\geq 14\%$ ACHIEVED
- Maintain a palatable browse species composition of $\geq 20\%$ ACHIEVED
- Maintain a vegetative foliar cover of $\geq 15\%$ NOT ACHIEVED
- Maintain a Bare Ground cover class of $\leq 25\%$ ACHIEVED

Rationale:

The perennial grass composition objective is met on this site, with a perennial grass composition of slightly more than 14%. Palatable browse composition objectives are met for desert tortoise, at slightly more than 23% of composition. Browse objectives are met for mule deer, at slightly more than 23%. Vegetative foliar cover objectives are not met on this site, with a foliar cover of 11.5%. Bare ground cover class objectives are met on this site, with a bare ground cover class of 21.5%.

Utilization on this site is currently moderate. Past utilization transects on this site have been slight to light. This is a historic utilization transect, no prior frequency or composition measurements were taken, and trend cannot be determined. Given the current years utilization, livestock may be a causal factor for not meeting vegetative foliar cover objectives.

7.1.3 Los Caballeros 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 2.3.1 of Appendix A.

Standard Three: Standard is achieved on this site.

- Maintain a perennial grass composition of $\geq 20\%$ ACHIEVED
- Maintain a palatable browse species composition of $\geq 30\%$ ACHIEVED
- Maintain a vegetative foliar cover of $\geq 25\%$ ACHIEVED
- Maintain a Bare Ground cover class of $\leq 5\%$ ACHIEVED

Rationale:

Perennial grass objectives are met, with a perennial grass composition of slightly less than 27%. The palatable browse composition objective is met for desert tortoise, at slightly less than 66% of composition. The browse objective for mule deer is met, at slightly more than 65% of composition. The vegetative cover objective is met, with a foliar cover of 52.8%. The bare ground cover class objective is met, with a bare ground cover class of 1.2%.

Trend:

Trend on this site has been stable from 2009 to 2018. Grass species frequency has been stable, with a reduction in grass composition likely due to increases in shrub and tree species and prolonged drought. Utilization on the site has generally been negligible to slight.

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 2.3.2 of Appendix A.

Standard Three: Standard is achieved on this site.

- Maintain a perennial grass composition of $\geq 5\%$ ACHIEVED
- Maintain a palatable browse species composition of $\geq 20\%$ ACHIEVED
- Maintain a vegetative foliar cover of $\geq 25\%$ ACHIEVED
- Maintain a Bare Ground cover class of $\leq 4\%$ ACHIEVED

Rationale:

The perennial grass composition objective is met on this site, with a perennial grass composition of slightly more than 9%. Palatable browse composition objectives are met for desert tortoise, at slightly less than 38% of composition. Browse objectives are met for mule deer, at slightly more than 37%. Vegetative foliar cover objectives are met on this site, with a foliar cover of 27%. Bare ground cover class objectives are met on this site, with a bare ground cover class of 0.5%.

Utilization on this site was negligible.

7.1.4 Cactus Garden 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 $\geq 40\%$ ACHIEVED
- Maintain a vegetative foliar cover of $\geq 60\%$ ACHIEVED
- Maintain a Bare Ground cover class of $\leq 15\%$ ACHIEVED

Rationale:

The palatable browse composition objective is met for desert tortoise, at slightly less than 74% of composition. The browse objective for mule deer is met, at slightly less than 74% of composition. The vegetative cover objective is met, with a foliar cover of 71.6%. The bare ground cover class objective is met, with a bare ground cover class of 9.8%.

Trend:

Trend on this key area has been upward between 2009 and 2018. Vegetation monitoring data show recruitment of several previously undetected forb species and browse species. Current utilization data show negligible to slight use, with historic data showing moderate to heavy use on browse species at the site.

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 composition of $\geq 5\%$ ACHIEVED
- Maintain a palatable browse species composition of $\geq 20\%$ ACHIEVED
- Maintain a vegetative foliar cover of $\geq 25\%$ ACHIEVED
- Maintain a Bare Ground cover class of $\leq 4\%$ ACHIEVED

Rationale:

The perennial grass composition objective is met, with a composition of slightly less than 11%. The palatable browse composition objective is met for desert tortoise, at slightly less than 33% of composition. The browse objective for mule deer is met, at slightly more than 34% of composition. The vegetative cover objective is met, with a foliar cover of 31.5%. The bare ground cover class objective is met, with a bare ground cover class of 4%.

Trend:

Perennial species appear to be stable on this site. There is an increase in frequency of Ambrosia, Cylindropuntia, and Parkinsonia species. Perennial grasses and forbs have maintained equal or similar frequency on the site since 1983. Utilization on this site has varied from negligible to light since 1985.

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 2.4.3 of Appendix A.

Standard Three: Standard is not achieved on this site.

- Maintain a palatable browse species composition of $\geq 25\%$ ACHIEVED
- Maintain a vegetative foliar cover of $\geq 20\%$ ACHIEVED
- Maintain a Bare Ground cover class of $\leq 5\%$ ACHIEVED

Rationale:

The palatable browse composition objective is met for desert tortoise, at slightly more than 64% of composition. The browse objective for mule deer is met, at slightly less than 58% of composition. The vegetative cover objective is met, with a foliar cover of 31.1%. The bare ground cover class objective is met, with a bare ground cover class of 2.9%.

Trend:

The vegetation community of the site appears stable between 2009 and 2018. Frequency measurements indicate an increase in some *Cylindropuntia* species and *Porophyllum* species, indicating recruitment on the site. Utilization on the site is negligible.

8.0 Recommended Management Actions

8.1 Recommended Management Actions for all Allotments

To facilitate range management, Actual Use reporting should be added to the terms and conditions of the permits. The permittees have voluntarily submitted Actual Use for several years, however, adding 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 on Sandy Wash sites and 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. Given the number of active livestock waters and number of major drainages within the complex, this is expected to more evenly distribute livestock across the uplands, reducing grazing pressure along the banks of washes.

To reduce livestock grazing pressure in and near southwestern willow flycatcher critical habitat and yellow-billed cuckoo proposed critical habitat, any salt and supplement blocks should be placed at least one-half mile from designated or propose critical habitat. BLM should consult with the US Fish and Wildlife Service on grazing management in designated and proposed critical habitat.

The areas within the Vulture R&PP lease are to be excluded from livestock grazing. Garcia Well, located in T6N R5W Section 7 NWNW, lies within this lease area, and serves as a primary water source for the grazing allotment. A new well located in T6N R6W Section 12 NESW should be constructed and the facility should be moved. This location is approximately one mile west-southwest of the existing facility, and would reduce recreation and livestock conflicts in the area. The current facility consists of corrals, a water storage tank, and windmill. The corrals and water storage would be moved to the extent possible to the new site. The windmill would be replaced with a solar powered water pump. An alternative location is located in T6N R5W Section 6, NESW, approximately one half mile north of the existing facility.

The southern pasture on the Garcia allotment would benefit from livestock rotation off the grassland areas during monsoon season. Additional fencing along Aguila and Vulture Mine roads would divide the large pasture into three smaller pastures, in addition to the pasture located on the east side of Vulture Mine road. This would allow for livestock rotation through these pastures during growing seasons on an alternating basis, reducing overall grazing pressure. Construction of fences would need concurrence from the Arizona State Land Department, as they would cross those lands as well.

Improvements on the southern, public land, portions of the Los Caballeros allotment are in fair to poor condition. To improve livestock distribution on the allotment, these facilities should be repaired. This involves refurbishment of a well located in T6N R5W Section 11 NENE, and dirt tank cleanouts in T6N R5W Section 3.

Loamy swales exhibiting localized channelization would benefit from the installation of semi-porous rock check dams. These would retain sediment and slow water passage through these areas, increasing available soil water for plant recovery and recruitment.

9.0 List of Preparers

Name	Title
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Vulture Complex Data Appendices

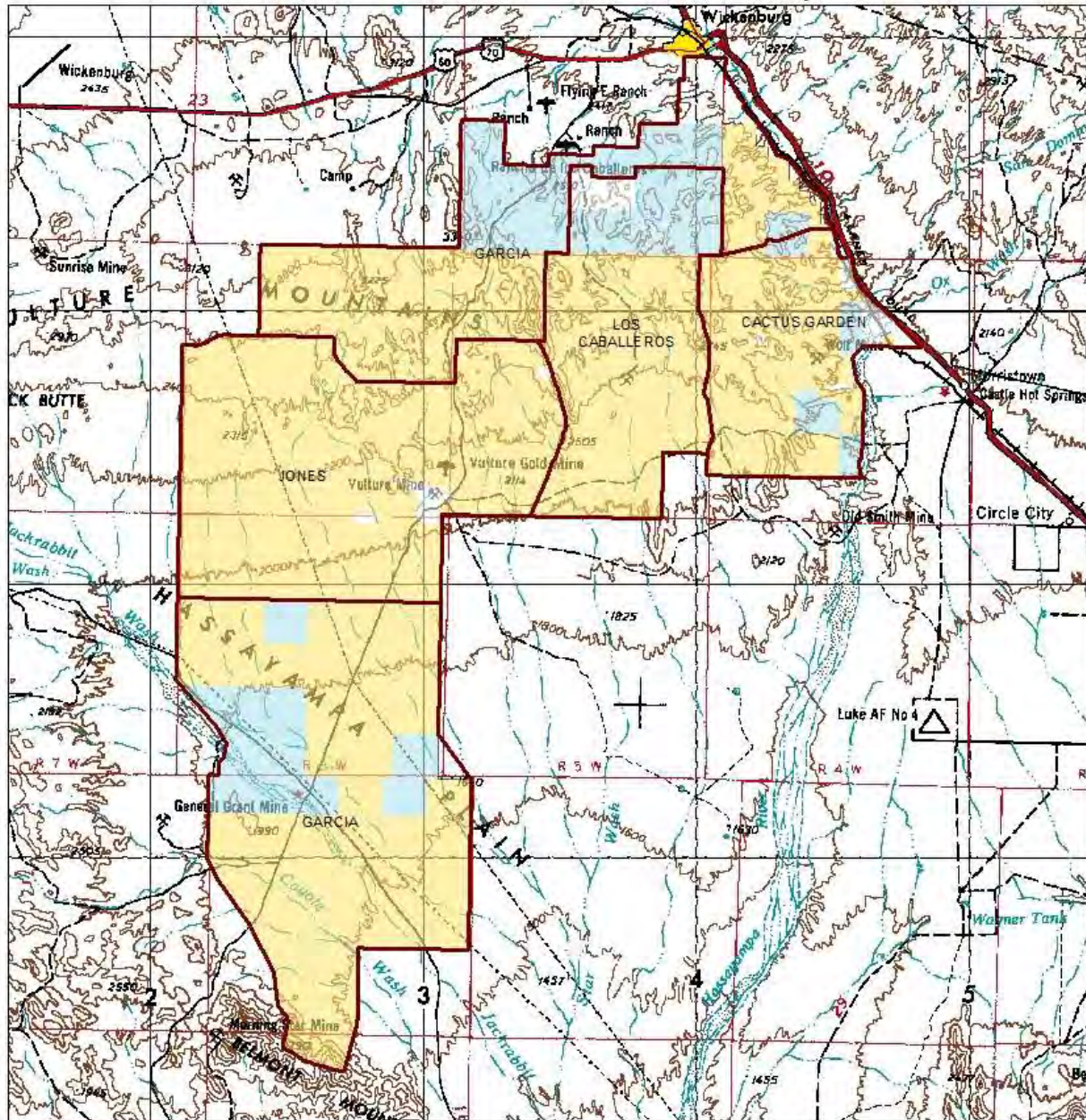
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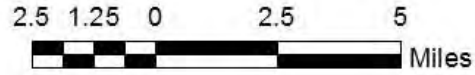
1.0 Complex Maps

Map 1, Vulture Complex Boundaries

Vulture Complex Land Status



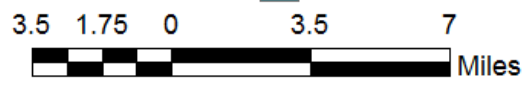
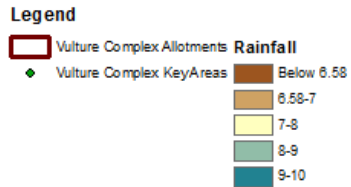
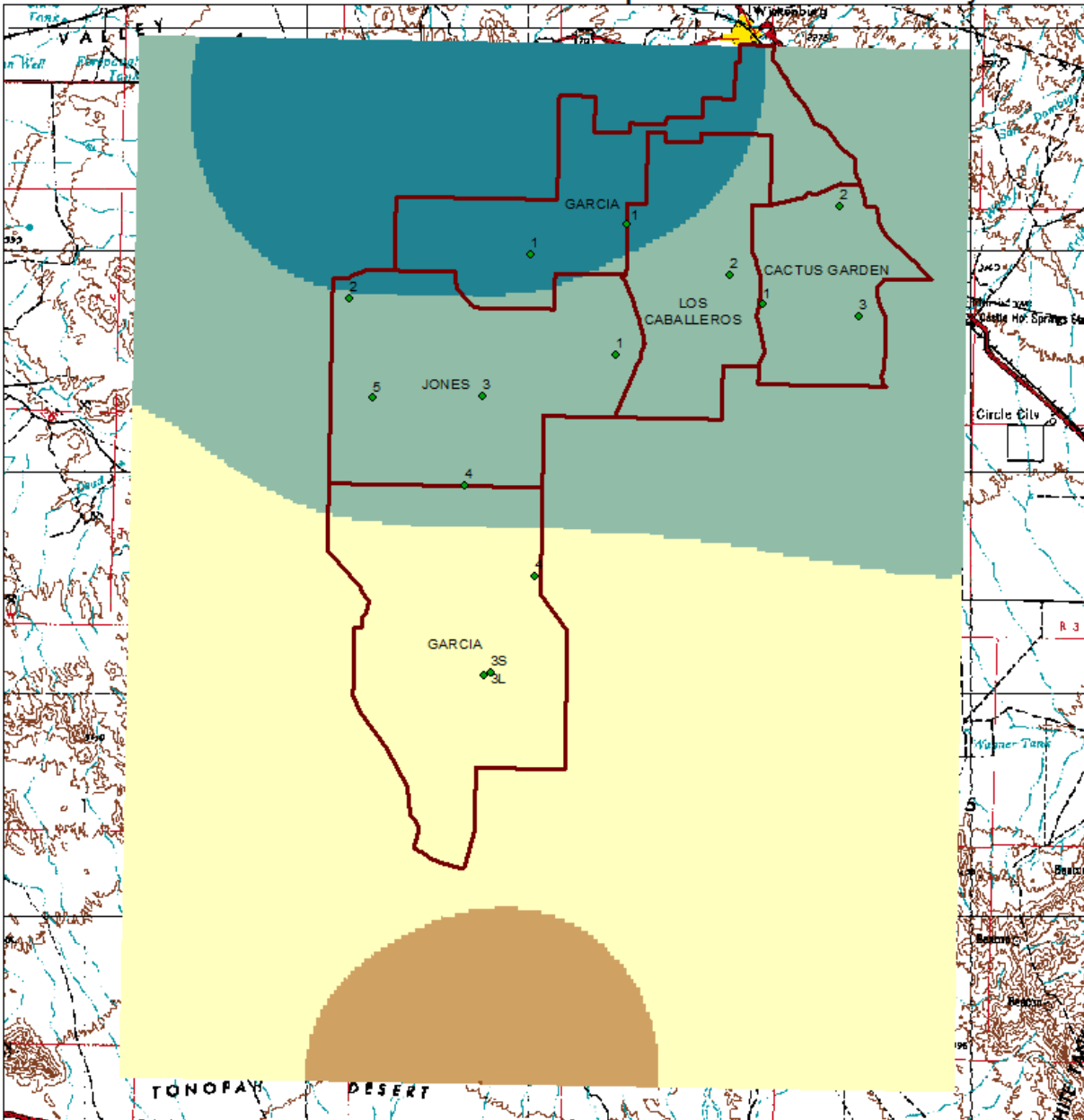
- Legend**
- Vulture Complex Allotments
 - Land Status**
 - BLM
 - Private
 - State; State Wildlife Area



The Bureau of Land Management (BLM) makes no representations or warranties regarding the accuracy or completeness of this map. This map does not address encroachments or questions of location, boundary, and area, which an accurate survey may disclose. This map is intended and is to be used as an illustration only. The map is merely representational, it and the data from which it was derived are not binding on the BLM and may be revised at any time in the future. The BLM shall not be liable under any circumstances for any direct, indirect, special, incidental, or consequential damages with respect to any claim by any user or any third party on account of or arising from the use of this map or the data from which it was derived.

Prepared by J. Holden

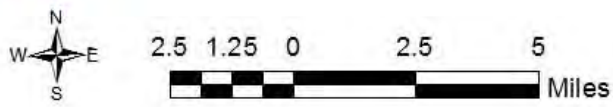
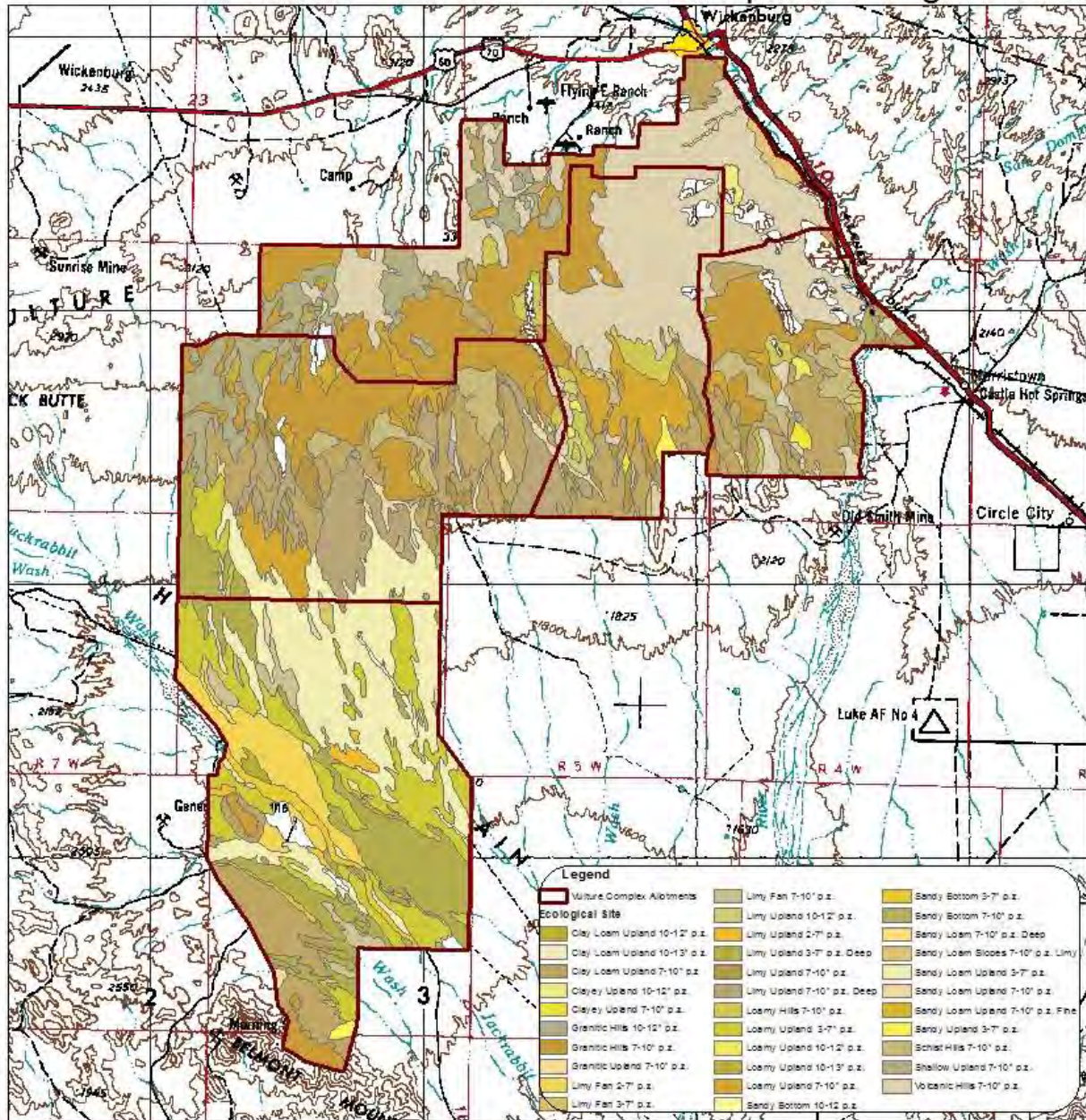
Vulture Complex Rainfall and Key Areas



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Prepared by J. Holden

Vulture Complex Ecological Sites



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Prepared by J. Holden

2.0 Key Area Data

The data for the Vulture Complex are presented below. Please note that the “-” symbol is used in Frequency, Composition, and Point Cover tables to denote that the species or cover type was not detected in the sampling frame or under the point. In Utilization transects, the “-” symbol indicates utilization was not conducted on that species in a given year.

2.1 Jones Allotment

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):	Slight to Moderate Departure. The observed indicators show negative effects to the plant community due to ongoing drought conditions

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 dry weight rank and frequency data in 2009 and 2018.

Year	Bare Ground	Foliar Cover	Basal Cover	Litter	Gravel (2mm-2")	Rock (>2")
2018	13.9	33.2	4.9	49.5	29.7	1.5
2009	8.3	36.6	N/A	26.8	28.2	-

Frequency and Composition Data:

Composition data is based on Dry Weight Rank.

Plant Species KA1	Symbol	Frequency (%)		Composition (%)	
		2018	2009	2018	2009
Tree and Shrub Species					
Ambrosia deltoidea	AMDE4	39.6	40.3	46.9	46.4
Carnegia gigantea	CAGI	0.5	-	0.5	-
Cylindropuntia bigelovii	CYBI9	8.9	5.1	10.6	4.9
Cylindropuntia versicolor	CYVE3	1.0	-	0.1	-
Ferocactus wislizeni	FEWI	0.5	-	0.7	-
Fouquieria splendens	FOSP2	1.0	0.9	0.7	0.6
Krameria erecta	KRER	6.9	4.6	8.5	5.7
Larrea tridentata	LATR2	19.3	25.9	24.7	27.3
Opuntia sp.	OPUNT	1.5	-	0.2	-
Parkinsonia microphylla	PAMI5	1.5	1.4	1.8	1.4
Phoradendron californicum	PHCA8	1.0	-	0.7	
Simmondsia chinensis	SICH	4.4	6.5	5.0	9.0
Grasses and Forbs					

Euphorbia sp.	EUPHO	-	3.7	-	4.7
Annuals					
Annual forbs	AAFF	8.9	N/A	N/A	N/A
Annual grasses	AAGG	0.5	N/A	N/A	N/A

Utilization data:

KA 1 Utilization	Utilization %	
	SICH	KRER
Year		
6/18	2.5	2.5
8/93	7.4	-
8/92	3.6	-
6/91	2.5	-
9/90	4.6	-
8/89	2.5	-

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):	Slight to Moderate Departure. The observed indicators show negative effects to the plant community due to ongoing drought conditions.

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 dry weight rank and frequency data.

Year	Bare Ground	Foliar Cover	Basal Cover	Litter	Gravel (2mm-2")	Rock (>2")	Cryptogam
2017	9.2	29.4	5.5	23.8	46.8	9.2	-
2011	3.2	24.2	N/A	33.1	37.1	N/A	2.4

Frequency and Composition Data:

Composition data is based on Dry Weight Rank.

Plant Species KA2	Symbol	Frequency (%)		Composition (%)	
		2017	2009	2017	2009
Tree and Shrub Species					
Acacia constricta	ACCO2	0.9	-	1.2	-
Ambrosia deltoidea	AMDE4	48.6	53.2	78.7	78.0

Cylindropuntia acanthocarpa	CYACA2	0.9	0.8	0.5	0.3
Eriogonum fasciculatum	ERFA2	10.9	0.8	1.7	1.3
Ephedra sp.	EPHED	1.8	2.4	1.7	2.6
Ferocactus wislizeni	FEWI	0.9	0.8	0.5	1.3
Fouquieria splendens	FOSP2	2.8	-	1.2	-
Krameria erecta	KRER	-	1.6	-	2.4
Larrea tridentata	LATR2	8.2	2.4	12.5	2.2
Parkinsonia microphylla	PAMI5	-	8.1	-	9.2
Viguiera dentata	VIDE3	0.9	-	1.5	-
Grasses and Forbs					
Eriogonum inflatum	ERIN4	-	1.6	-	2.6

Utilization data:

KA 2 Utilization	Utilization %			
Year	ERFA2	POGR	EPHED	SAME
11/2017	6.7	5.0	10.6	-
1/2011	9.9	7.8	11.8	-
8/93	-	-	8.4	5.6
8/92	-	-	4.6	2.5
8/91	-	-	3.6	2.5
9/90	-	-	7.8	2.5
8/89	-	-	2.5	2.5

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:

Year	Bare Ground	Foliar Cover	Basal Cover	Litter	Gravel (2mm-2")	Rock (>2")	Cryptogam
2018	12.0	64.0	2.0	53.0	4.0	29.0	-
2009	6.7	59.6	N/A	17.3	14.4	N/A	1.9

Frequency and Composition Data:

Composition data is based on Dry Weight Rank.

Plant Species KA3	Symbol	Frequency (%)		Composition (%)	
		2017	2009	2017	2009
Tree and Shrub Species					
Acacia greggii	ACGR	8	7.7	3.3	6.4
Ambrosia deltoidea	AMDE4	6	7.7	4.4	3.1
Ambrosia ambrosioides	AMAM2	34	27.9	23.8	17.4
Encelia farinosa	ENFA	-	1.0	-	0.1
Hymenoclea salsola	HYSA	9	7.7	6.9	6.9
Justicia californica	JUCA8	-	1.9	-	1.9
Larrea tridentata	LATR2	27	21.2	21.3	15.3
Lycium sp.	LYCIU	21	24.0	14.7	21.4
Parkinsonia florida	PAFL6	18	23.1	13.9	17.7
Parkinsonia microphylla	PAMI5	9	6.7	6.7	5.0
Phoradendron californicum	PHCA8	3	3.8	0.4	2.1
UNK		1	1.0	1.18	0.2
Viguiera dentata	VIDE3	4	1.9	2.7	1.2
Grasses and Forbs					
Aristida sp.	ARIST	-	1.0	-	0.1
Eragrostis sp.	ERAGR	1	-	0.8	-
Euphorbia sp.	EUPHO	-	1.0	-	1.1
Annuals					
Annual forbs	AAFF	1	N/A	N/A	N/A
Annual grasses	AAGG	1	N/A	N/A	N/A

Utilization data:

KA 3 Utilization	Utilization %
Year	HYSA
1/2018	4.0

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	Basal Cover	Litter	Gravel (2mm-2")	Cryptogam
2017	16.8	68.3	0.0	73.3	5.0	5.0
2009	9.8	62.7	N/A	19.6	4.9	2.9

Frequency and Composition Data:

Composition data is based on Dry Weight Rank.

Plant Species KA4	Symbol	Frequency (%)		Composition (%)	
		2017	2009	2017	2009
Tree and Shrub Species					
Acacia greggii	ACGR	8.9	9.8	4.3	5.3
Ambrosia ambrosioides	AMAM	19.8	17.6	11.6	11.8
Ambrosia deltoidea	AMDE4	11.9	27.4	10.1	19.8
Ephedra sp.	EPHED	3.0	4.9	1.9	2.0
Hyptis emoryi	HYEM	1.0	-	0.8	-
Hymenoclea salsola	HYSA	15.8	7.8	13.3	6.9
Justicia californica	JUCA8	8.9	4.9	5.9	2.9
Larrea tridentata	LATR2	19.8	23.5	14.7	11.5
Lycium andersonii	LYAN	35.6	29.4	24.7	16.7
Parkinsonia microphylla	PAMI5	4.0	1.0	2.0	0.7
Phoradendron californicum	PHCA8	3.0	1.0	1.1	0.7
Stephanomeria	STEPH	-	1.0	-	0.1
Viguiera parishii	VIPA14	16.8	22.5	9.4	17.1
Grasses and Forbs					

Acouria nana	ACNA2	-	1.0	-	0.1
Muhlenbergia porteri	MUPO2	-	1.0	-	1.0
Pleuraphis rigida	PLRI3	1.0	2.9	0.1	1.6
Sphaeralcea ambigua	SPAM2	-	5.9	-	1.7

Utilization data:

KA 4 Utilization			
	Utilization %		
Year	HYSA	EPHED	JUCA8
11/2017	7.8	11.8	-
1/2011	-	72.9	54.2

2.1.5 Key Area 5

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:

Point cover data collected in conjunction with frequency and dry weight rank. Prior to 2018, the “Gravel” and “Rock” cover classes were combined.

Year	Bare Ground	Foliar Cover	Basal Cover	Litter	Gravel (2mm-2")	Rock (>2")	Cryptogams
2018	15.0	22.0	2.0	31.0	31.0	19.0	2.0
2009	6.6	20.9	N/A	20.3	51.1	N/A	1.1

Composition Data:

Composition data is taken from dry weight rank.

KA5 Plant Species	Symbol	Frequency (%)		Composition (%)	
		2018	2009	2018	2009
Tree and Shrub Species		2018	2009	2018	2009
Ambrosia deltoidea	AMDE4	34.0	23.6	71.9	53.6
Ambrosia dumosa	AMDU2	-	1.6	-	4.1
Ephedra sp.	EPHED	0.5	0.5	1.2	1.3
Fouquieria splendens	FOSP2	1.5	0.5	2.8	0.3
Janusia gracilis	JAGR	0.5	-	0.1	-
Krameria erecta	KRER	3.0	7.7	6.9	17.4

Larrea tridentata	LATR2	3.5	7.7	7.0	17.4
Parkinsonia microphylla	PAMI5	4.5	4.4	10.0	8.8
Grasses and Forbs					
Eriogonum inflatum	ERIN4	0.5	0.5	0.1	0.1
Annuals					
Annual Forbs	AAFF	80.0	N/A	N/A	N/A
Annual Grasses	AAGG	80.5	N/A	N/A	N/A

Utilization Data:

KA 5 Utilization	
	Utilization %
Year	KRER
1/2018	2.5

2.2 Garcia Allotment

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:

Point cover data collected in conjunction with frequency and dry weight rank. Prior to 2013, the 2mm-1/2" size class was included in the "Bare Ground" cover class. Prior to 1989, all non-basal cover classes were classified as "Bare Ground".

Year	Bare Ground	Foliar Cover	Basal Cover	Litter	Gravel (2mm-2")	Rock (>1/2")	Rock (>2")
2017	1.5	34.5	4.0	42.0	29.5	N/A	23.0
2013	0.5	45.0	1.0	29.5	7.0	N/A	17.0
1992	49.0	N/A	3.0	36.0	N/A	12.0	N/A
1989	31.0	N/A	1.5	36.5	N/A	31.0	N/A
1986	95.0	N/A	5.0	N/A	N/A	N/A	N/A
1983	95.5	N/A	4.5	N/A	N/A	N/A	N/A

Composition Data:

Composition data is taken from dry weight rank. Pleuraphis species on the site have been combined.

KA1 Plant Species	Symbol	Frequency (%)						Composition (%)	
		2017	2013	1992	1989	1986	1983	2017	2013
Tree and Shrub Species									
Acacia constricta	ACCO2	1.0	2.0	4.0	2.0	0.5	0.5	1.1	0.8
Acacia gregii	ACGR	0.5	1.0	-	2.0	1.5	2.0	0.1	0.5
Ambrosia deltoidea	AMDE4	43.0	39.0	29.0	17.5	11.5	12.0	45.4	39.6
Argythamnia neomexicana	ARNE2	-	2.0	-	-	-	-	-	1.8
Calliandra eriophylla	CAER	-	-	0.5	-	-	-	-	-
Canotia holacantha	CAHO3	0.5	1.5	-	0.5	-	-	0.6	1.2
Cylindropuntia acanthocarpa	CYACA2	1.5	3.5	-	-	-	-	1.1	2.4
Echinocereus	ECEN	-	2.0	0.5	-	-	-	-	1.0

engelmannii									
Encelia farinosa	ENFA	0.5	-	-	-	-	-	-	-
Ephedra sp.	EPHED	0.5	2.0	0.5	1.0	-	-	0.1	2.0
Eriogonum fasciculatum	ERFA2	14.5	9.5	24.5	19.5	1.5	14.0	10.2	7.0
Fouquieria splendens	FOSP2	1.5	4.0	0.5	1.0	2.0	1.5	0.6	2.2
Ferocactus wislizeni	FEWI	-	1.0	-	-	-	-	-	0.1
Janusia gracilis	JAGR	3.0	3.0	-	-	-	-	1.0	2.0
Krameria erecta	KRER	2.5	4.5	4.0	1.0	4.0	4.5	2.7	4.0
Larrea tridentata	LATR2	9.0	3.5	8.0	6.5	2.5	2.5	9.9	2.9
Lycium sp.	LYCIU	1.0	2.0	-	0.5	-		0.2	2.3
Menodora scabra	MESC	-	1.5	1.5	-	0.5	0.5	-	0.8
Opuntia sp.	OPUNT	1.0	-	2.5	1.5	-	-	0.7	
Parkinsonia microphylla	PAMI5	8.0	7.5	5.5	2.0	2.5	2.5	8.3	5.2
Porophyllum gracile	POGR5	1.0	3.5	-	-	-	-	0.2	3.3
Simmondsia chinensis	SICH	9.0	8.5	3.0	-	4.5	4.0	8.4	6.1
Grasses and Forbs									
Aristida sp.	ARIST	-	0.5	-	-	-	-	-	0.1
Dasyochloa pulchella	DAPU7	1.5	2.5	1.0	-	-	-	0.9	2.7
Pleuraphis sp.	PLEUR	9.5	11.0	7.5	16.0	20.0	18.5	7.6	11.2
Tridens muticus	TRMU	1.0	-	-	-	-	-	0.8	-
Annuals									
Annual Forbs	AAFF	0.5	N/A	45.5	N/A	N/A	N/A	N/A	N/A
Annual Grasses	AAGG	-	N/A	90.5	N/A	N/A	N/A	N/A	N/A

Utilization Data:

Pleuraphis utilization has been combined for P. ridgida and P. mutica.

Year	PLEUR	ERFA2	KRER	SICH	EPHED
12/2017	3.5	5.0	5.2	-	-
5/2013	14.5	-	-	-	-
8/1993	29.6/30.0	-	-	20.6	-
8/1992	8.2	-	-	6.7	-
9/1991	0	-	-	2.5	-
8/1990	5.2	-	-	-	-
3/1989	8.8	-	-	20.0	57.0
6/1988	8.0	-	-	24.0	48.0

6/1987	27.2	-	-	-	-
6/1986	11.2	-	-	-	-
7/1985	11.4	-	-	-	-
3/1983	16.0	-	-	-	-

2.2.2 Key Area 2

Garcia Key Area 2 is located on State Trust Lands and was not used in this analysis. Prior years' data is available on request at the Hassayampa Field Office.

2.1.3 Key Area 3

Garcia Key Area 3 includes 2 transect locations, a Sandy Wash (G3S) and a Loamy Upland (G3L).

Transect G3S

Interpreting Indicators of Rangeland Health:

Attribute Rating:	Rationale:
Soil and Site Stability (S):	Slight to Moderate Departure. Increased erosion signs, such as downcutting of the channel, surface rilling, and gully formation indicate a departure from reference conditions.
Hydrologic Function (H):	Slight to Moderate Departure. Increased erosion signs, such as downcutting of the channel, surface rilling, and gully formation indicate a departure from reference conditions.
Biotic Integrity (B):	Slight to Moderate Departure. The observed indicators show negative effects to the plant community due to ongoing drought conditions.

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	Basal Cover	Litter	Gravel (2mm-2")	Rock (>2")	Cryptogam
2018	10.6	76.6	-	87.2	-	1.1	1.1

Frequency and Composition Data:

Composition data is based on Dry Weight Rank.

Plant Species KA3-G3S	Symbol	Frequency (%)	Composition (%)
Tree and Shrub Species		2018	2018
Acacia constricta	ACCO2	4.2	4.6
Acacia greggii	ACGR	31.9	24.8
Ambrosia ambrosioides	AMAM2	21.3	13.6
Baccharis sarothroides	BASA2	2.1	2.1
Clematis drummondii	CLDR	2.1	0.2
Ephedra sp.	EPHED	1.1	0.8
Hyptis emoryi	HYEM	3.2	1.2
Krameria erecta	KRER	1.1	1.2
Larrea tridentata	LATR2	9.6	2.6
Lycium sp.	LYCIU	34.0	29.8
Parkinsonia microphylla	PAMI5	8.5	9.5
Phoradendron californicum	PHCA8	4.2	0.5

Prosopis velutina	PRVE	4.2	4.6
Trixis californica	TRCA8	1.1	1.4
Grasses and Forbs			
Marrubium vulgare	MAVU	3.2	3.1

Utilization data:

KA 3-G3S Utilization	Utilization %
Year	KRER
8/2018	2.5

Transect G3L

Interpreting Indicators of Rangeland Health:

Attribute Rating:	Rationale:
Soil and Site Stability (S):	Slight to Moderate Departure. Increased erosion signs, such as downcutting of the channel and surface rilling, and plant mortality indicate a departure from reference conditions.
Hydrologic Function (H):	Slight to Moderate Departure. Increased erosion signs, such as downcutting of the channel and surface rilling, and plant mortality indicate a departure from reference conditions.
Biotic Integrity (B):	Moderate Departure. The observed indicators show negative effects to the plant community due to ongoing drought conditions.

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	Basal Cover	Litter	Gravel (2mm-2")	Rock (>2")	Cryptogam
2018	34.7	27.9	-	64.7	0.6	-	-

Frequency and Composition Data:

Composition data is based on Dry Weight Rank.

Plant Species KA3-G3L	Symbol	Frequency (%)	Composition (%)
Tree and Shrub Species		2018	2018
Acacia constricta	ACCO2	6.8	10.6
Acacia greggii	ACGR	5.3	2.7
Ambrosia deltoidea	AMDE4	35.8	48.3
Brickellia coulteri	BRCO	1.0	0.7
Krameria erecta	KRER	2.1	3.4
Larrea tridentata	LATR2	12.1	15.0
Lycium sp.	LYCIU	0.5	0.8
Parkinsonia florida	PAFL6	2.1	2.4
Prosopis velutina	PRVE	4.2	5.9
Grasses and Forbs			

Argythamnia neomexicana	ARNE2	3.2	4.2
Euphorbia sp.	EUPHO	0.5	-
Pleuraphis rigida	PLRI3	1.6	1.8

Utilization data:

KA 3-G3L Utilization	Utilization %		
Year	KRER	PLRI	PAFL6
9/2018	7.8	15.6	-
9/1992	13.6	9.0	-
8/1991	2.5	0.8	-
11/90	-	2.5	-
8/1989	-	-	3.6

2.2.4 Key Area 4

Interpreting Indicators of Rangeland Health:

Attribute Rating:	Rationale:
Soil and Site Stability (S):	Slight to Moderate Departure. Increased erosion signs, such as plant pedestalling and gully formation, and low cover indicate a departure from reference conditions.
Hydrologic Function (H):	Slight to Moderate Departure. Increased erosion signs, such as downcutting of the channel, surface rilling, and gully formation indicate a departure from reference conditions.
Biotic Integrity (B):	Moderate to Extreme. The observed indicators show severely negative effects to the plant community due to ongoing drought conditions causing large canopy die-backs.

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	Basal Cover	Litter	Gravel (2mm-2")	Rock (>2")
2018	21.5	11.5	1.0	68.5	8.5	0.5

Composition Data:

Composition data is taken from dry weight rank.

Plant Species KA4	Symbol	Frequency (%)	Composition (%)
Tree and Shrub Species		2018	2018
Ambrosia deltoidea	AMDE4	5.0	12.3
Ambrosia dumosa	AMDU2	4.0	13.3
Larrea tridentata	LATR2	18.5	59.8
Grasses and Forbs			
Euphorbia sp.	EUPHO	0.5	
Pleuraphis rigida	PLRI3	4.5	14.5

Utilization Data:

KA 4 Utilization	
	Utilization %
Year	PLR13
8/2018	41.7
8/1993	14.2
9/1992	0
8/1991	0
11/1990	5.0
8/1989	12.8

2.3 Los Caballeros Allotment

2.3.1 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):	Slight to Moderate Departure. The observed indicators show negative effects to the plant community due to ongoing drought conditions.

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	Basal Cover	Litter	Gravel (2mm-2")	Rock (>2")
2018	1.2	52.8	5.6	55.9	11.2	26.1
2012	5.7	22.1	N/A	20.9	51.3	N/A
2009	2.6	32.0	N/A	41.2	24.2	N/A

Composition Data:

Composition data is taken from dry weight rank.

KA1 Plant Species	Symbol	Frequency (%)			Composition (%)		
		2018	2012	2009	2018	2012	2009
Tree and Shrub Species							
Acacia constricta	ACCO2	0.6	0.6	-	0.7	1.0	-
Acacia gregii	ACGR	1.2	-	-	0.7	-	-
Ambrosia deltoidea	AMDE4	13.0	16.4	13.1	9.6	23.1	14.2
Argythamnia neomexicana	ARNE2	-	0.6	2.0	-	1.0	1.9
Canotia holacantha	CAHO3	3.7	1.9	2.6	1.2	1.2	1.2
Cylindropuntia acanthocarpa	CYACA2	10.6	8.2	6.5	6.7	7.9	3.2
Cylindropuntia leptocaulis	CYLE8	1.2	-	1.3	0.1	-	0.9
Echinocereus engelmannii	ECEN	2.5	0.6	3.3	1.2	0.1	2.2
Encelia farinosa	ENFA	2.5	-		2.3	-	
Eriogonum fasciculatum	ERFA2	11.8	5.1	11.1	9.5	4.2	8.4
Fouquieria splendens	FOSP2	1.2	1.9	-	0.7	2.1	-
Janusia gracilis	JAGR	5.0	3.2	5.9	3.0	4.0	4.5
Krameria erecta	KRER	1.9	1.9	2.0	1.0	2.1	0.2
Larrea tridentata	LATR2	5.0	1.9	-	2.6	1.9	-

Lycium berlandieri	LYBE	1.2	0.6	1.3	0.1	0.3	1.2
Menodora scabra	MESC	-	0.6	-	-	1.0	-
Opuntia engelmannii	OPEN3	3.7	2.5	5.9	2.5	1.8	6.1
Parkinsonia microphylla	PAMI5	11.8	8.9	8.5	10.7	11.7	6.3
Porophyllum gracile	POGR5	-	-	1.3	-	-	1.6
Prosopis velutina	PRVE	-	-	0.6	-	-	0.9
Salazaria mexicana	SAME	0.6	-	-	0.7	-	-
Simmondsia chinensis	SICH	19.2	12.6	9.8	17.3	12.2	7.5
Thamnosma montana	THMO	3.7	0.6	0.6	2.5	0.7	0.1
Ziziphus obtusifolia	ZIOB	-	-	0.6	-	-	0.3
Grasses and Forbs							
Aristida sp.	ARIST	-	-	0.6	-	-	0.9
Dasyochloa pulchella	DAPU7	4.3	-	2.6	4.2	-	4.5
Pleuraphis sp.	PLEUR	23.6	17.8	25.5	18.2	18.7	30.1
Sphaeralcea ambigua	SPAM2	5.6	5.1	3.9	4.3	5.9	4.0
Annuals							
Annual Forbs	AAFF	21.1	-	-	N/A	N/A	N/A
Annual Grasses	AAGG	19.9	-	-	N/A	N/A	N/A

Utilization Data:

KA 1 Utilization	Utilization %		
	Year	PLRI3	SICH
6/2018	2.5	2.5	
6/2009	0	0	
9/1993	-	0	
9/1992	-	0	
9/1991	-	20.1	
9/1990	-	13.2	

2.3.2 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)

Ground Cover Data:

Year	Bare Ground	Foliar Cover	Basal Cover	Litter	Gravel (2mm-2")	Rock (>2")
2018	0.5	27.0	1.4	29.9	42.2	26.0

Composition Data:

Composition data is taken from dry weight rank.

KA2 Plant Species	Symbol	Frequency (%)	Composition (%)
Tree and Shrub Species		2018	2018
Ambrosia deltoidea	AMDE4	51.0	52.1
Argythamnia neomexicana	ARNE2	1.0	0.2
Brickellia coulteri	BRCO	1.0	0.9
Carnegia gigantea	CAGI10	0.5	0.1
Cylindropuntia acanthocarpa	CYACA2	2.4	0.5
Cylindropuntia leptocaulis	CYLE8	0.5	0.1
Echinocereus engelmannii	ECEN	0.5	0.5
Encelia farinosa	ENFA	0.5	0.7
Eriogonum fasciculatum	ERFA2	0.5	0.7
Gutierrezia sp.	GUTIE	1.0	0.7
Janusia gracilis	JAGR	6.4	4.6
Krameria erecta	KRER	3.9	3.9
Larrea tridentata	LATR2	0.5	0.5
Lycium berlandieri	LYBE	2.9	1.7
Olneya tesota	OLTE	1.5	1.3
Parkinsonia microphylla	PAMI5	9.8	8.3
Senna covesii	SECO10	7.8	9.0
Simmondsia chinensis	SICH	6.4	5.4
Grasses and Forbs			
Aristida sp.	ARIST	1.5	1.4
Leptochloa dubia	LEDU	3.9	1.6
Pleuraphis rigida.	PLRI3	4.9	6.1
Annuals			
Annual Forbs	AAFF	4.9	N/A
Annual Grasses	AAGG	0.5	N/A

Utilization Data:

KA 2 Utilization	Utilization %	
Year	PLRI3	SICH
6/2018	2.5	2.5

2.4 Cactus Garden 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)

Ground Cover Data:

Year	Bare Ground	Foliar Cover	Basal Cover	Litter	Gravel (2mm-2")	Rock (>2")	Cryptogam
2018	9.8	71.6	2.9	67.6	11.8	6.9	1.0
2012	9	41	N/A	35	15	N/A	0
2009	2	70	N/A	10	18	N/A	0

Composition Data:

Composition data is taken from dry weight rank.

KA1 Plant Species	Symbol	Frequency (%)			Composition (%)		
		2018	2012	2009	2018	2012	2009
Tree and Shrub Species							
Acacia greggii	ACGR	18.6	25	26	10.8	22.0	16.9
Ambrosia ambrosioides	AMAM	42.2	16	28	23.1	10.3	16.7
Ambrosia deltoidea	AMDE4	21.6	10	17	12.7	6.6	7.9
Argythamnia neomexicana	ARNE2	2.9	-	-	2.0	-	-
Brickellia coulteri	BRCO	8.8	4	3	3.5	1.2	0.3
Cylindropuntia acanthocarpa	CYACA2	2.0	1	2	0.2	1.2	1.2
Encelia farinosa	ENFA	-	-	1	-	-	0.7
Gutierrezia sp.	GUTIE	2.9	5	5	1.0	3.4	3.3
Larrea tridentata	LATR2	4.9	4	9	2.4	1.7	5.8
Lycium sp	LYCIU	15.7	-	6	9.1	-	2.6
Olneya tesota	OLTE	3.9	2	7	1.4	0.2	2.6
Parkinsonia florida	PAFL6	41.2	45	36	26.7	39.4	27.1
Phoradendron californicum	PHCA8	1.0	-	1	0	-	0.7
Prosopis velutina	PRVE	2.9	4	3	2.3	3.6	2.0
Salazaria mexicana	SAME	1.0	-	-	0.3	-	-
Senna covesii	SECO10	1.0	-	-	0.1	-	-

Simmondsia chinensis	SICH	9.8	8	15	7.0	7.0	8.8
Unknown sp.	UNK	-	-	1	-	-	0.7
Vigueria dentata	VIDE3	2.9	-	-	0.3	-	-
Grasses and Forbs							
Acouria nana	ACNA2	2.9	1	1	0.6	1.2	0.7
Ayenia insulicola	AYIN2	1.0	-	-	0.9	-	-
Euphorbia sp.	EUPHO	8.8	-	-	3.1	-	-
Funastrum cynancoides	FUCY	2.0	-	-	0.3	-	-
Malva sp.	MALVA	1.0	-	-	0.8	-	-
Nicotiana obtusifolia	NIOB	3.9	-	-	0.4	-	-
Sphaeralcea ambigua	SPAM2	7.8	3	6	3.9	1.9	1.8

Utilization Data:

KA 1 Utilization		
	Utilization %	
Year	SICH	PARKI
8/2018	3.2	6.7
9/93	10.5	7.5
10/91	38.3	19.8
11/90	34.4	11.3
10/87	58.1	12.2

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):	Slight to Moderate Departure. The observed indicators show negative effects to the plant community due to ongoing drought conditions..

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	Basal Cover	Litter	Gravel (2mm-2")	Rock (>1/2")	Rock (>2")
2018	4.0	31.5	4.5	28.0	40.0	N/A	23.5
1988	38.0	N/A	0.0	44.0	N/A	18.0	N/A
1983	47.5	N/A	3.5	0.5	N/A	48.5	N/A

Composition Data:

Composition data is taken from dry weight rank.

KA2 Plant Species	Symbol	Frequency (%)			Composition (%)
		2018	1988	1983	2018
Tree and Shrub Species					
Acacia constricta	ACCO2	2.5	-	-	2.5
Ambrosia deltoidea	AMDE4	56.0	34.0	38.0	63.4
Cylindropuntia acanthocarpa	CYACA2	13.5	5.5	6.5	9.5
Cylindropuntia leptocaulis	CYLE8	0.5	-	-	0.2
Echinocereus engelmannii	ECEN	0.5	5.5	1.0	0.6
Eriogonum fasciculatum	ERFA2	-	-	0.5	-
Gutierrezia sp.	GUTIE	-	0.5	1.0	-
Krameria erecta	KRER	2.5	-	0.5	2.5
Larrea tridentata	LATR2		1.0	1.5	-
Lycium sp.	LYCIU	1.0	1.0	1.0	1.2
Opuntia sp.	OPUNT	-	-	0.5	-
Parkinsonia microphylla	PAMI5	6.0	2.5	3.0	6.3
Prosopis juliflora	PRJU	2.5	5.5	4.0	2.5
Senna covesii	SECO10	0.5	-	0.1	0.7
Grasses and Forbs					
Pleuraphis sp.	PLEUR	16.5	14.5	16.5	10.5
Sphaeralcea ambigua	SPAM2	0.5	-	0.5	0.1
Annuals					
Annual Forbs	AAFF	6.5	N/A	N/A	N/A
Annual Grasses	AAGG	0.5	N/A	N/A	N/A

Utilization Data:

KA 2 Utilization	
Year	Utilization % PLEUR
8/2018	2.5
11/91	28
11/90	18.4
10/89	0.0
6/88	11.0
6/87	34.6
6/86	12.4
6/85	30.2

2.4.3 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)

Ground Cover Data:

Year	Bare Ground	Foliar Cover	Basal Cover	Litter	Gravel (2mm-2")	Rock (>2")	Cryptogam
2018	2.9	31.1	1.9	32.0	46.6	16.0	0.5
2012	3.5	21.5	N/A	17.0	57.5	N/A	0.5
2009	0.5	18.1	N/A	34.8	46.6	N/A	0.0

Composition Data:

Composition data is taken from dry weight rank.

KA3 Plant Species	Symbol	Frequency (%)			Composition (%)		
		2018	2012	2009	2018	2012	2009
Tree and Shrub Species							
Acacia constricta	ACCO2	1.4	1.5	0.5	1.9	1.8	0.3
Acacia gregii	ACGR	0.5	1.5	-	0.9	2.4	-
Ambrosia deltoidea	AMDE4	27.2	28.5	27.0	38.3	44.2	39.6
Argythamnia neomexicana	ARNE2		-	2.9		-	4.7
Cylindropuntia acanthocarpa	CYACA2	16.5	10.5	11.3	16.8	9.1	9.3
Cylindropuntia leptocaulis	CYLE8	1.4	0.5	2.4	1.4	0.3	0.7
Echinocereus engelmannii	ECEN	1.0	1.5	0.5	1.2	0.9	0.1
Ephedra sp.	EPHED	1.0		0.5	0.5		0.7
Eriogonum fasciculatum	ERFA2	1.0	2.0	1.5	1.1	1.3	1.2
Fouquieria splendens	FOSP2	-	-	1.5	-	-	1.2
Funastrum cynanoides	FUCY	1.0	-	0.5	0.7		0
Janusia gracilis	JAGR	4.8	-	1.5	3.0		1.5

Krameria erecta	KRER	4.8	4.5	4.4	7.2	5.6	5.7
Larrea tridentata	LATR2	1.9	1.0	1.0	3.2	1.6	2.0
Lycium berlandieri	LYBE	0.5	-	-	0.2	-	-
Mammillaria sp.	MAMMI	-	0.5	-	-	0.1	-
Opuntia engelmannii	OPEN3	-	0.5	-	-	0.9	-
Parkinsonia microphylla	PAMI5	11.2	17.0	12.2	16.2	27.3	20.0
Porophyllum gracile	POGR5	8.2	-	2.4	7.3	-	2.6
Viguera dentata	VIDE3	-	1.0	-	-	0.3	-
Grasses and Forbs							
Eriogonum inflatum	ERIN4	-	0.5	1.5	-	0.9	2.9
Euphorbia sp.	EUPHO	0.5	2.0	5.4	0.1	0.9	6.5

Utilization Data:

KA 3 Utilization		
	Utilization %	
Year	JAGR	KRER
8/2018	2.5	2.5
2009	0	0

3.0 Vulture 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
Whitethorn Acacia	Acacia constricta	ACCO2		X	
Catclaw Acacia	Acacia greggii	ACGR	X	X	
Desert peony	Acourtia nana	ACNA2	X		
Big bursage	Ambrosia ambrosioides	AMAM			
Triangle leaf bursage	Ambrosia deltoidea	AMDE4	X	X	
White bursage	Ambrosia dumosa	AMDU2	X	X	
Bursage	Ambrosia sp.	AMBRO	X	X	

N/A	Annual forbs	AAFF	X	X	X
N/A	Annual grasses	AAGG	X	X	X
New Mexico silverbush	<i>Argythamnia neomexicana</i>	ARNE2	X	X	X
Three-awn	<i>Aristida</i> sp.	ARIST	X		X
Dwarf ayenia	<i>Ayenia insulicola</i>	AYIN2			
Desert Broom	<i>Baccharis sarothroides</i>	BASA2			
Coulter's brickellbush	<i>Brickellia coulteri</i>	BRCO	X	X	
fairyduster	<i>Calliandra eriophylla</i>	CAER	X	X	X
Crucifixion thorn	<i>Canotia holacantha</i>	CAHO3			
Saguaro	<i>Carnegia gigantea</i>	CAGI10	X	X	
Drummond's clematis	<i>Clematis drummondii</i>	CLDR			
Buckhorn cholla	<i>Cylindropuntia acanthocarpa</i>	CYACA2	X	X	X
Teddybear cholla	<i>Cylindropuntia bigelovii</i>	CYBI9			
Christmas cactus	<i>Cylindropuntia leptocaulis</i>	CYLE8			
Staghorn cholla	<i>Cylindropuntia versicolor</i>	CYVE3	X	X	
Fluffgrass	<i>Dasyochloa pulchella</i>	DAPU7	X		X
Engelmann's hedgehog	<i>Echinocereus engelmannii</i>	ECEN	X		
Brittlebush	<i>Encelia farinosa</i>	ENFA	X	X	
Mormon tea	<i>Ephedra</i>	EPHED	X	X	X
lovegrass	<i>Eragrostis</i> sp.	ERAGR			
Turpentine bush	<i>Ericameria laricifolia</i>	ERLA12			
Desert Trumpet	<i>Eriogonum inflatum</i>	ERIN4	X	X	X
Buckwheat	<i>Eriogonum</i> sp.	ERIOG	X	X	X
Eastern Mohave buckwheat	<i>Eriogonum fasciculatum</i>	ERFA2	X	X	X
Spurge	<i>Euphorbia</i> sp.	EUPHO	X	X	
Barrel cactus	<i>Ferocactus wislizeni</i>	FEWI	X	X	
ocotillo	<i>Fouquieria splendens</i>	FOSP2	X	X	
Arrowleaf milkvine	<i>Funastrum cynanoides</i>	FUCY			
snakeweed	<i>Gutierrezia</i> sp.	GUTIE			
burrobrush	<i>Hymenoclea salsola</i>	HYSA			X
Desert lavender	<i>Hyptis emoryi</i>	HYEM		X	
Slender janusia	<i>Janusia gracilis</i>	JAGR	X	X	X
Beloperone	<i>Justicia californica</i>	JUCA8		X	X
Range ratany	<i>Krameria erecta</i>	KRER	X	X	X
Creosote bush	<i>Larrea tridentata</i>	LATR2	X	X	

Green sprangletop	<i>Leptochloa dubia</i>	LEDU	X	X	X
Wolfberry	<i>Lycium</i>	LYCIU	X	X	
Cheeseweed	<i>Malva sp.</i>	MALVA			
Pincushion cactus	<i>Mammillaria sp.</i>	MAMMI	X	X	
Horehound	<i>Marrubium vulgare</i>	MAVU			
Rough menodora	<i>Menodora scabra</i>	MESC		X	X
Bush muhly	<i>Muhlenbergia porteri</i>	MUPO2	X	X	X
Desert tobacco	<i>Nicotiana obtusifolia</i>	NIOB			
Desert ironwood	<i>Olneya tesota</i>	OLTE	X	X	
Prickly pear	<i>Opuntia</i>	OPUNT	X	X	X
Cactus apple	<i>Opuntia engelmannii</i>	OPEN3	X	X	
Blue palo verde	<i>Parkinsonia florida</i>	PAFL6	X	X	X
Little leaf palo verde	<i>Parkinsonia microphylla</i>	PAMI5	X	X	X
Mesquite mistletoe	<i>Phoradendron californicum</i>	PHCA8			
Galleta	<i>Pleuraphis sp.</i>	PLEUR	X		X
Big galleta	<i>Pleuraphis rigida</i>	PLRI3	X		X
Yerba de venado	<i>Porophyllum gracile</i>	POGR5	X		X
Mesquite	<i>Prosopis juliflora</i>	PRJU3	X	X	X
Velvet mesquite	<i>Prosopis velutina</i>	PRVE	X	X	X
Mexican bladdersage	<i>Salazaria mexicana</i>	SAME		X	
Cassia	<i>Senna covesii</i>	SECO10			
jojoba	<i>Simmondsia chinensis</i>	SICH	X	X	X
Globemallow	<i>Sphaeralcea ambigua</i>	SPAM2	X	X	X
Sand dropseed	<i>Sporobolus cryptandrus</i>	SPCR	X		X
dropseed	<i>Sporobolus sp.</i>	SPORO	X		X
Wirelettuce	<i>Stephanomeria</i>	STEPH		X	
Turpentine broom	<i>Thamnosma montana</i>	THMO			
Slim tridens	<i>Tridens muticus</i>	TRMU	X		X
Threefold	<i>Trixis californica</i>	TRCA8		X	
Toothleaf goldeneye	<i>Viguiera dentata</i>	VIDE3	X	X	
Parish's goldeneye	<i>Viguiera parishii</i>	VIPA14	X	X	
Graythorn	<i>Ziziphus obtusifolia</i>	ZIOB			

4.0 Vulture Complex Soils List

Highlighted soils are described in detail in section 2.2.4 of the Vulture Complex RHE.

Soil Name	Allotment Percent			
	Jones	Garcia	Los Caballeros	Cactus Garden
Antho-Carrizo-Mariposa complex	1.6	-	1.2	0.2
Antho-Carrizo-Mariposa complex, low precipitation	0.2	0.8	-	-
Antho sandy loams	-	0.2	-	-
Anthony-Ariza complex, low precipitation	T	T	-	-
Ariza cobbly sandy loam	-	-	-	T
Brios-Carrizo complex, 1 to 5% slopes	-	-	-	T
Brios-Carrizo complex, low precipitation, 1 to 5% slopes	-	1.5	-	-
Carefree-Beardsley complex	-	-	0.3	0.9
Carrizo very gravelly sand	-	0.3	1.3	-
Chuckawalla-Gunsight complex, low precipitation, 1 to 8% slopes	-	1.0	-	-
Contine clay loam	-	-	-	1.0
Continental clay loam, 0 to 3% slopes	-	-	-	0.5
Continental-Ohaco complex	-	0.6	-	-
Denure-Momoli-Carrizo complex	0.2	-	T	0.3
Denure-Momoli-Carrizo complex, low precipitation	9.0	19.1	-	-
Dixaleta-Rock outcrop complex, low precipitation, 25 to 56% slopes	5.0	T	1.3	11.6
Eba-Continental-Cave association, low precipitation, 3 to 20% slopes	2.5	0.1	0.7	3.1
Eba-Pinaleno complex, low precipitation, 20 to 40% slopes	0.4	0.9	7.1	2.3
Eba-Pinaleno complex, low precipitation, 3 to 20% slopes	-	1.0	16.6	3.0
Eba very gravelly loam, 1 to 8% slopes	-	-	0.2	2.4
Eba very gravelly loam, 8 to 20% slopes	-	0.1	-	1.2
Eba very gravelly loam, low precipitation, 8 to 20% slopes	-	1.1	-	-
Ebon-Contine complex, 1 to 8% slopes	-	-	-	1.5
Ebon-Gunsight-Cipriano association, 3 to 25% slopes	7.1	4.8	-	T
Ebon-Pinamt complex, 3 to 20% slopes	8.4	2.8	11.8	3.2
Ebon-Pinamt complex, 20 to 40% slopes	-	-	0.6	0.8
Ebon very gravelly loam, 1 to 8% slopes	-	-	-	T
Ebon very gravelly loam, 8 to 20% slopes	0.7	-	-	-
Estrella loams	-	0.1	-	-
Gachado-Lomitas-Rock outcrop complex, 7 to 55% slopes	0.3	-	1.2	2.7
Gilman loams, low precipitation	-	0.2	-	-
Glenbar loams	-	0.2	-	-
Gran-Wickenburg-Rock outcrop complex, 10-65% slopes	0.2	-	-	T

Gran-Wickenburg-Rock outcrop complex, low precipitation, 10 to 65% slopes	19.6	13.1	6.7	22.8
Gran-Wickenburg complex, low precipitation, 1 to 10% slopes	8.6	4.8	-	-
Greyeagle-Suncity variant complex, 1 to 7% slopes	0.1	T	1.7	-
Gunsight-Cipriano complex, 1 to 7% slopes	1.7	T	-	-
Gunsight-Cipriano complex, low precipitation, 1 to 7% slopes	-	10.8	-	-
Gunsight-Rillito complex, 1 to 25% slopes	-	-	0.6	0.7
Gunsight-Rillito complex, low precipitation, 1 to 40% slopes	5.0	-	-	-
Lehmans-Rock outcrop complex, low precipitation, 8 to 65% slopes	0.5	9.6	34.1	17.0
Luke-Cipriano association, 1 to 15% slopes	1.0	-	3.0	11.9
Mohall-Tremant complex, low precipitation, 1 to 8% slopes	-	2.1	-	-
Mohall clay loam, calcareous solum	-	0.9	-	-
Mohall loam, calcareous solum	-	0.9	-	-
Momoli-Carrizo complex	6.1	T	-	-
Momoli-Carrizo complex, low precipitation	-	4.5	-	-
Nickel-Cave complex, low precipitation 8 to 30% slopes	0.3	0.5	1.2	0.9
Ohaco gravelly loam	-	-	0.5	0.9
Pinaleno-Tres Hermanos complex, low precipitation, 1 to 10% slopes	0.3	0.2	0.2	-
Pinamt-Tremant complex, 1-10% slopes	9.3	0.1	5.3	-
Pinamt-Tremant complex, low precipitation, 1 to 10% slopes	0.2	0.5	-	-
Quilotosa-Vaiva-Rock outcrop complex, 20 to 65% slopes	-	1.9	0.7	1.1
Rillito gravelly loam, 1 to 8% slopes	-	0.8	-	-
Rock outcrop-Gachado complex 5 to 55% slopes	0.4			
Rock outcrop-Lehmans complex, low precipitation, 15 to 65% slopes	0.9	1.4	0.5	8.7
Schenco-Rock outcrop complex, 3 to 25% slopes	0.6			
Suncity-Cipriano complex, 1 to 7% slopes	1.5	-	3.0	1.2
Tremant-Gunsight-Rillito complex, 1 to 5% slopes	4.0			
Tremant-Gunsight-Rillito complex, low precipitation, 1 to 3% slopes	2.7	10.2	-	-
Tremant-Suncity complex, 1 to 8% slopes	-	2.1	-	-
Tremant gravelly loams, low precipitation	T	0.3	-	-
Tremant gravelly sandy loams	-	0.1	-	-
Tres Hermanos-Anthony complex, 1 to 5% slopes	1.2			
Vaiva very gravelly loam, 1 to 20% slopes	0.5	0.2	-	-

*T- Trace soils present at less than 0.1% of the soil series present on Public Lands

**"- Soil not present on public lands within the allotment.

5.0 Vulture Complex Ecological Sites

Highlighted ecological sites are described in detail in section 2.3.2 of the Vulture Complex RHE. Multiple ecological sites may be present in soil associations and complexes, this list shows the most dominant ecological site in the soil series as mapped by NRCS. Ecological site rainfall regimes may not reflect observed rainfall patterns on the allotments.

Ecological Site	Allotment Percent			
	Jones	Garcia	Los Caballeros	Cactus Garden
Clay Loam Upland 7-10	17.4	9.1	15.9	24.7
Clay Loam Upland 10-13	-	0.1	-	-
Clayey Upland 7-10	-	-	0.3	0.9
Clayey Upland 10-12	-	0.6	-	-
Granitic Hills 7-10	19.6	15.0	7.4	23.9
Granitic Hills 10-12	0.2	-	-	T
Granitic Upland 7-10	0.5	0.2	-	-
Limy Fan 3-7	T	2.4	-	-
Limy fan 7-10	-	1.9	-	-
Limy upland 2-7	-	0.8	-	-
Limy Upland 7-10	3.2	T	3.7	1.9
Limy upland 10-12	0.1	T	1.7	-
Limy Upland 3-7 Deep	5.2	15.8	-	-
Limy Upland 7-10 Deep	15.4	0.1	5.3	-
Loamy Hills 7-10	0.4	0.9	7.7	3.2
Loamy Upland 3-7	2.7	12.6	-	-
Loamy Upland 7-10	6.6	1.1	16.6	-
Loamy Upland 10-13	1.2	-	0.5	0.9
Rock Outcrop	1.3	2.5	0.5	8.7
Sandy Bottom 7-10	-	1.5	-	T
Sandy Bottom 10-12	-	-	-	T
Sandy Loam 7-10 Deep	0.2	0.3	T	0.3
Sandy Loam Slopes 7-10 Limy	0.3	0.5	1.2	0.9
Sandy Loam Upland 3-7	9.2	19.9	-	-
Sandy Loam Upland 7-10	1.6	0.1	1.2	0.2
Sandy Upland 3-7	-	0.3	1.3	-
Schist hills 7-10	5.6	T	1.3	11.6
Shallow Upland 7-10	8.6	4.8	-	-
Volcanic Hills 7-10	0.8	9.6	35.3	19.8

*T- Trace ecological sites present at less than 0.1%

**"- Ecological site not mapped on public lands within the allotment.

Comment party	Comment	Agency Response
WWP	The following comments are submitted on behalf of Western Watersheds Project with regard to the Land Health Evaluation (LHE) for the Garcia, Jones, Los Caballeros, and Cactus Garden allotments, also called the Vulture Complex. As you are certainly aware, Western Watersheds Project is keenly interested in the ecological health of the public lands in the Hassayampa Field Office and has a long history of advocating for protection from livestock damage to these public lands.	Comment noted.
WWP	The data provided in the LHE are from 2017 and 2018. As this is now the beginning of 2020, we are curious as to the data from 2019. Were any data collected? If not, why not? If data were collected in 2019, why are they not included in this LHE?	The BLM did not collect data on these allotments in 2019. The BLM does not collect data on all allotments annually.
WWP	For the Jones allotment there is no information on the grasses and forbs from 2009 and only partial information for 2018. Given that forbs and grasses are the species consumed by livestock, how has the BLM made any determination regarding the impacts of livestock grazing on this Key Area? Additionally, there is no utilization data for ratany (<i>Krameria erecta</i>) except for 2018. Again, how is BLM making determinations about land health with such paltry data? These data are similarly missing from most of the Key Areas for the entire project area.	The annual grasses and forb data are collected just in frequency, and not as part of Dry Weight Rank composition data in accordance with the methods in the referenced Technical Reference. Because annual species production is highly variable based on volume and timing of rainfall, these species are not used to make determinations of stocking rates. Section 3 of the Appendix to the RHE includes a palatability list for species of concern and livestock.

WWP	<p>Jones allotment Key Area 1, slight to moderate departure for biotic integrity with observations showing negative effects to the plant community and an increase in bare ground from 8.3 in 2009 to 13.9 in 2018. Jojoba (<i>Simmondsia chinensis</i>) has decreased in composition by nearly 50%, cholla (<i>Cylindropuntia bigelovii</i>) have increased more than 50%, and there are. [sic]</p>	<p>Monitoring methods for point cover were modified between 2009 and 2018. The 2018 point cover measurement separates the Foliar Cover measurement from the soil surface cover measurement, where the 2009 point cover data included Foliar cover. The newer method more accurately represents the soil surface cover measurements on the NRCS Ecological Site Guides and Reference Sheets.</p> <p>Composition measurements on these sites is based on the Dry Weight Rank method, which gives percent composition relative to the other species in the plot. When species, such as <i>Krameria</i> or <i>Cylindropuntia</i>, increase on the plot, other species will show a decrease in composition. To establish trend on a plot for a single species, frequency data is the appropriate data set, not composition. For example, the frequency of <i>Krameria</i>, or the number of times that <i>Krameria</i> was present in the sampling frame, has increased approximately 50%, as has the Composition of <i>Krameria</i>. While the composition of Jojoba has decreased by approximately 45%, the frequency has decreased by approximately 35%.</p>
WWP	<p>Jones allotment Key Area 2, slight to moderate departure for biotic integrity with observations showing negative effects to the plant community and an increase in bare ground from 3.2 in 2011 to 9.2 in 2017. Gravel cover increased, litter cover decreased, and cryptogram[sic] is not recorded at all in 2017. There is no data reported for grasses and forbs – just a dash (-) for 2017. Utilization data were not reported at all for Mexican bladdersage (<i>Salazaria Mexicana</i>) in 2011 or 2017.</p>	<p>Please see response to Jones Key Area 1 for a discussion on point cover measurements and methods. Cryptogams were not observed in 2017.</p> <p>The only forb present on this site in 2011 was <i>Eriogonum inflatum</i>. This species is generally classified as a short-lived perennial or annual and was not present in the sampling frames in 2017. It is likely the individual plants along the transect lines had completed their life cycles.</p> <p>Utilization measurements seek to gauge the level of use that the landscape can support. Generally, higher palatability plants give a greater indicator of the use levels in an area</p>

		<p>than lower palatability species. Discontinuing utilization on <i>Salazaria</i> species for the significantly more palatable <i>Eriogonum fasciculatum</i> species is a stronger indicator for utilization levels by both livestock and wildlife.</p>
WWP	<p>Jones allotment Key Area 3, there is a significant increase in bare ground, from 6.7 to 12.0 and a lack of cryptogram. Again, the information on grasses and forbs is only reported for one of the years included in Appendix A – either 2009 or 2017, but not for both. How was a comparison made? The utilization data includes only information from 2018 and only for cheesebush (<i>Hymenoclea salsola</i>).</p>	<p>Please review prior response regarding point cover measurements.</p> <p>Data for grasses and forbs is reported for all years. The (-) symbol indicates the species was not present in the sampling frame.</p> <p>Utilization was conducted on the species most likely to show negative effects from grazing animals. In this site, this species, based on the palatability list given in the appendix, was <i>Hymenoclea</i>.</p>
WWP	<p>Jones allotment Key Area 4, bare ground has increased from 9.8 to 16.8, and again, the information on grasses and forbs is only reported for one of the years included in Appendix A – either 2009 or 2017, but not for both with the exception of big galleta (<i>Pleuraphis rigida</i>). Utilization data is also only provided for either 2011 or 2017 for two of the three species listed. How was a comparison made to establish land health?</p>	<p>Please review prior response regarding point cover measurements.</p> <p>Please review prior response regarding data reporting.</p> <p>Please review prior response regarding Utilization measurements.</p> <p>Utilization measurements are an indicator for land health regardless of species. Using the guidelines set in Heffelfinger for woody species utilization, the actual species is generally irrelevant to the measurements themselves.</p>

WWP	Jones allotment Key Area 5, bare ground has increased from 6.6 in 2009 to 15.0 in 2018, several tree and shrub species have declined significantly, and there is no information about annuals or utilization prior to 2018.	Please see prior response regarding point cover measurements.
WWP	Garcia Allotment Key Area 1, there is much more data for this Key Area for bare ground, but there were changes in how the data was collected and categorized prior to 2013, making comparisons of the data difficult. The frequency and composition data is sporadically reported, even for 2013 and 2017 and provides no basis for an accurate comparison. Data for grasses, forbs, and annuals is also sporadic and provided for just a single species group over time (Pleuraphis sp.) and utilization data is extremely sparse. It is not clear how BLM has made an assessment of land health based on this data.	Please see prior response for data reporting. Common species, including several indicator species such as Eriogonum, Krameria, and Pleuraphis are reported in all years. Pleuraphis species in this area exhibit similar growth form, palatability, and growth season, as well as the potential for hybridization (Reeder, 1977), allows these species to be grouped together. Please see prior response for Utilization measurements
WWP	Garcia Allotment Key Area 2, no data provided because this area is located on state trust lands. Please verify whether or not the Arizona State Land Department has prohibited BLM from accessing this site to collect data.	The BLM does not monitor lands outside of its management. The State Land Department sets its own stocking rates and standards for land health. Applying BLM standards to those lands is inappropriate and outside the jurisdiction of the agency.

WWP	Garcia Allotment Key Area 3,1 for all attributes shows increased erosion, downcutting, rilling, gully formation, and negative effects to the plant community includes point cover data, frequency and composition data, and utilization data only for 2018. There is nothing for BLM or the public to compare this data to. BLM notes a moderate departure from biotic integrity for transect G3L for this Key Area and claims this is due to drought; grasses and forbs appear to be sparse and utilization data are from 2018 then 1992. Clearly, monitoring on this part of these allotments is not adequate to make a land health determination.	Garcia Key Area 3S was established as a new monitoring plot in 2018. No prior data would be available. Key Area 3L was originally established as a utilization plot only. The BLM has increased the level of monitoring on this plot as of 2018 to include point cover, frequency, and composition.
WWP	Garcia Allotment Key Area 4, shows a moderate to extreme departure from biotic integrity, with indicators showing severely negative effects to the plant community, reportedly due to drought and large canopy die-backs. Once again, data are provided only for 2018 for most metrics recorded and grasses and forbs are not well represented (from 0.5% to less than 5% frequency). Utilization data is reported as 41.7% for 2018, and the next closest year for which utilization data are available is 1993.	Key Area 4 was originally established as a utilization plot only. The BLM has increased the level of monitoring on this plot as of 2018 to include point cover, frequency, and composition. No prior point cover, frequency, or composition data would be available. Forbs and grasses on the site are within the expected ranges on the NRCS ecological site guides.
WWP	Los Caballeros allotment Key Area 1, shows a slight to moderate departure for biotic integrity, shows large gaps in the composition and frequency data (2018, then 2012, 2009 with some data missing from either 2012 or 2009), and data for grasses, forbs and annuals is incomplete or entirely absent. Utilization data for 2018 is stated as 2.5%, but was zero for 2009 and at least a decade prior.	Please review prior responses for data reporting. The low level of utilization in this area indicates that the rangeland can support an increase in permitted livestock numbers. This will be addressed in the EA.

WWP	<p>Los Caballeros allotment Key Area 2, again, data are only available for 2018, if at all and the dominant species is triangle bursage (<i>Ambrosia deltoidea</i>) at over 50% composition and frequency. Triangle bursage and several other species found in this Key Area are indicative of overgrazing.² There are not many grasses, forbs or annuals.</p> <p>²Whitfield, Charles J.; Anderson, Hugh L. 1938. Secondary succession in the desert plains grassland. <i>Ecology</i>. 19(2): 171-180. [5252]</p>	<p>Whitfield and Anderson refers to the increase of <i>Ambrosia</i> species on disturbed low desert grasslands, specifically in the <i>Bouteloua-Hilaria</i> Faciation. These areas are markedly different in elevation, rainfall regime, climax plant communities, and plant species when compared to the western desert scrub communities present on this complex of allotments. (Clements, F. 1920. <i>Plant Indicators; The Relation of Plant Communities to Process and Practice</i>. 170-177)</p> <p>Key Area 2 was established in 2018, as stated in the RHE. No prior data would be available.</p> <p>Shrub composition on this key area is within the guidelines set by NRCS for the historic climax plant community (HCPC). Additionally, the BLM has set a grass composition standard greater than the HCPC, due to a grass composition significantly greater than what is expected in this ecological site. This is not indicative of an area that is overgrazed.</p>
WWP	<p>Cactus Garden allotment Key Area 1, again, abrosia [sic] species are dominant and increasing, data for grasses and forbs is from only 2018, and utilization data is from 2018, then 1993 and years prior. There is insufficient information upon which to base a land health evaluation.</p>	<p>Nearly all species on this site have increased from 2009 to 2018, including several palatable forb species. <i>Gutierrizia</i>, a common indicator species for land disturbance, has decreased by nearly 50% on this site. The <i>Ambrosia</i> species that is increasing on this site is <i>Ambrosia ambrosioides</i>, which is not considered an increaser or disturbance indicator, is a common species along washes, and within the guidelines set by NRCS. Given the increase in frequency of many species, as well as the recruitment of new species as shown in the data sets between 2009 and 2018, there is more than sufficient information to not only evaluate land health, but argue that the trend on this site is upward.</p>

WWP	Cactus Garden allotment Key Area 2, there is a slight to moderate departure for biotic integrity, ground cover data is from 2018, then from 30 years prior in 1998 (!), but even this data is sporadic. The information on annuals is from only 2018 and utilization data is for a single species.	Please see prior responses.
WWP	Cactus Garden allotment Key Area 3, data for desert trumpet (<i>Eriogonum inflatum</i>) is missing for 2018 and shows a significant downward trend for (<i>Euphorbia</i> sp.)	Please see prior response for data reporting. Many spurge species in Arizona are short-lived perennials or annuals. None of the species are listed as palatable by livestock.
WWP	For all key areas there seems to be a significant lack of grasses and forbs. What are livestock consuming on these allotments?	Please review the palatability list provided in section 3 of the appendix to the RHE.
WWP	As the BLM is well aware, the area called the Vulture Complex is home to desert bighorn sheep, Southwestern willow flycatcher, yellow billed cuckoo, the Sonoran desert tortoise (with both Category II and III habitat present), and includes Areas of Critical Environmental Concern. Given the important and imperiled species found on these public lands, the BLM should be monitoring vegetation conditions closely, and certainly more often than once or twice a decade.	Comment noted.

WWP	<p>As noted in the LHE, the Bradshaw-Harquahala Resource Management Plan (2010 RMP) has a desired condition for Sonoran desert tortoise: “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.”</p> <p>As noted above, there are multiple Key Areas where grasses and forbs are not present as at least 5 percent of the entire vegetation in the area, much less as 5 percent native grasses or 10 percent native forbs and subshrubs. The BLM should be reducing livestock grazing in the project area to ensure that habitat for species such as the Sonoran desert tortoise are moving towards the necessary metrics, instead of away from them (or in an unknown direction due to lack of monitoring).</p>	<p>The RHE states which key areas lie within desert tortoise habitat, and the majority of sites, regardless of being within or without tortoise habitat, have Desired Plant Community (DPC) objectives that meet or exceed the requirements set forth in the RMP. In areas that do not have DPC objectives that meet or exceed the requirements set forth in the RMP, the NRCS ecological site guides and reference sheets do not include a HCPC which allows for this DPC standard. These limits to the DPC objectives are explained by Key Area in Section 4.2.2 of the RHE.</p>
WWP	<p>Given that the Arizona Standards for Rangeland Health are floor, not a ceiling, for determining impacts of livestock grazing on public lands, the BLM should be actively monitoring areas where livestock grazing occurs to ensure full compliance with the standards. Unfortunately, it seems that monitoring is sporadic at best, and the result is that the public lands that make up the Vulture Complex are not in great shape, resulting in negative impacts to wildlife and native plants.</p>	<p>The DPC objectives on these allotments were developed by an interdisciplinary team to assure continued forage availability for all species, with particular attention to Sonoran desert tortoise and mule deer. In several cases, these DPC objectives exceed the RMP requirements for habitat or the HCPC as described by NRCS.</p>

WWP	While this LHE indicates that just one Key Area on the Garcia allotment is failing to meet Standard 3, WWP wonders whether the entire project area is in much worse shape than reported due to the lack of monitoring and an inability to compare data from the past with the “current” 2018 data (and we continue to wonder whether there is any 2019 data)? We ask here that the BLM do more than strive to simply meet the standards and instead work to improve the ecological integrity of these lands.	The data available do not show this. Please provide any additional data you have showing these impacts.
WWP	We are concerned that the number of AUMs authorized (2977) on the Garcia allotment was exceeded in 2019 (3150 AUMs). Given that this allotment is also the allotment that was failing to meet land health standards based on 2017 and 2018 data, the condition of the allotment after the excessive 2019 grazing season is very likely worse. This information should be collected and provided to the public.	The authorized use for the Garcia allotment is 3150 AUMs. This error has been corrected in the RHE.
WWP	The LHE for the Vulture Complex indicates that Rangeland Health Standard 3, Desired Resource Conditions, is not being met for one Key Area on the Garcia allotment.	This is stated in the document multiple times.
WWP	Thank you for your full consideration of our comments and concerns. We look forward to reviewing future NEPA documents for this project. Please ensure that we are advised of the availability of any AMP or EA and that WWP remains on the contact list/interested party list for this project.	

WWP	Sincerely, Cyndi C. Tuell Arizona and New Mexico Director Western Watersheds Project 520-272-2454 cyndi@westernwatersheds.org	
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