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Land Health Evaluation  
LEN Lease No. 6197  
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# 1. INTRODUCTION

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The purpose of this draft Land Health Evaluation (LHE) report is to evaluate whether the LEN Allotment is meeting the Arizona Standards for Rangeland Health (Standards). In the case of non-achievement of Standards, the LHE would also seek to determine if livestock are the causal factor for either not achieving or not making significant progress towards achieving the Standards. An evaluation is not a decision document, but a stand-alone report that clearly records the analysis and interpretation of the available inventory and monitoring data. As part of the LHE process, Desired Plant Community (DPC) objectives (also referred to as key area objectives in this document) were established for the biological resources within the allotment.

The Secretary of the Interior approved Bureau of Land Management (BLM) Arizona Standards for Rangeland Health and Guidelines for Grazing Administration (Standards and Guidelines) in April 1997. The Decision Record, signed by the Arizona BLM State Director (April 1997) provides for full implementation of the Standards and Guidelines in Arizona land use plans. The BLM implements Standards and guidelines through terms and conditions of grazing permits, leases, and other authorizations, grazing related portions of activity plans, and through range improvement-related activities. Land health standards are measurable and attainable goals for the desired condition of the biological resources and physical components/characteristics of desert ecosystems found within the allotment.

This evaluation seeks to ascertain:

If Standards are being achieved or not achieved, and, if not, if significant progress is being made towards achievement of the land health.

In the case of non-achievement of Standards, determine whether livestock grazing is a significant factor causing that non-achievement.

## 2. ALLOTMENT PROFILE

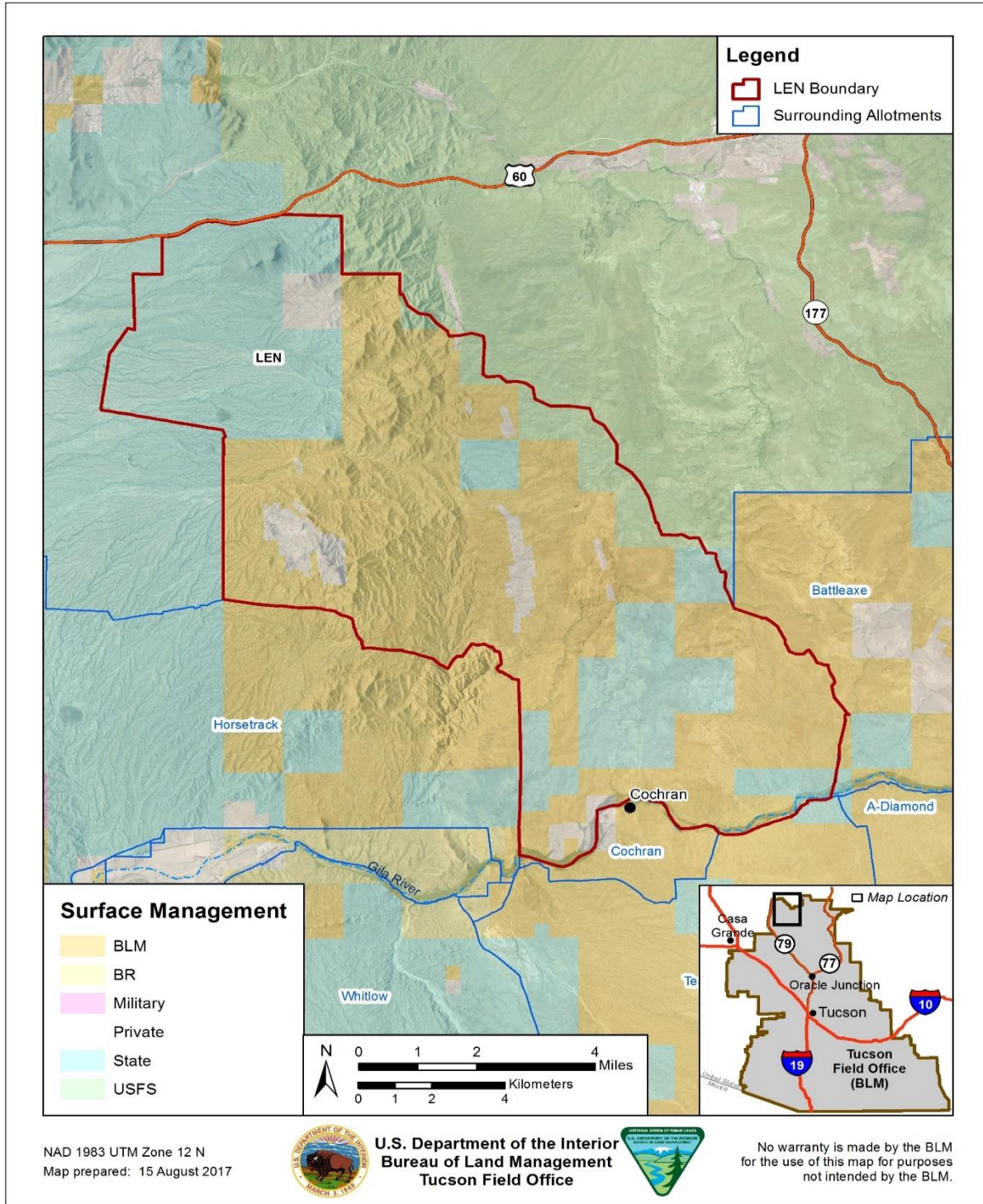
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### 2.1 Location

The LEN Allotment is located in Pinal County, Arizona, approximately 12 miles northeast of the town of Florence, and 20 miles southwest of Apache Junction. It is located 24 miles southeast and 20 miles northwest of the weather stations in Williams Field and Coolidge airports, respectively. The ranch is

bordered by the Horsetrack Allotment to the southwest, the Cochran and Teacup Allotments to the south, and the Battleaxe Allotment to the west (Figure 1).

Figure 1. Land Ownership of the LEN Allotment



## 2.2 Physical Description

### 2.2.1 Acreage

The LEN Allotment encompasses 42,747 acres (Table 1). Lands within the allotment are predominately BLM, with a smaller amount of State Trust and Private land. Public lands constitute about 62 percent of the allotment. Spatial distributions of land ownership are displayed in Figure 1. Public lands are located in the southeastern and central portions of the allotment.

**Table 1. Landownership**

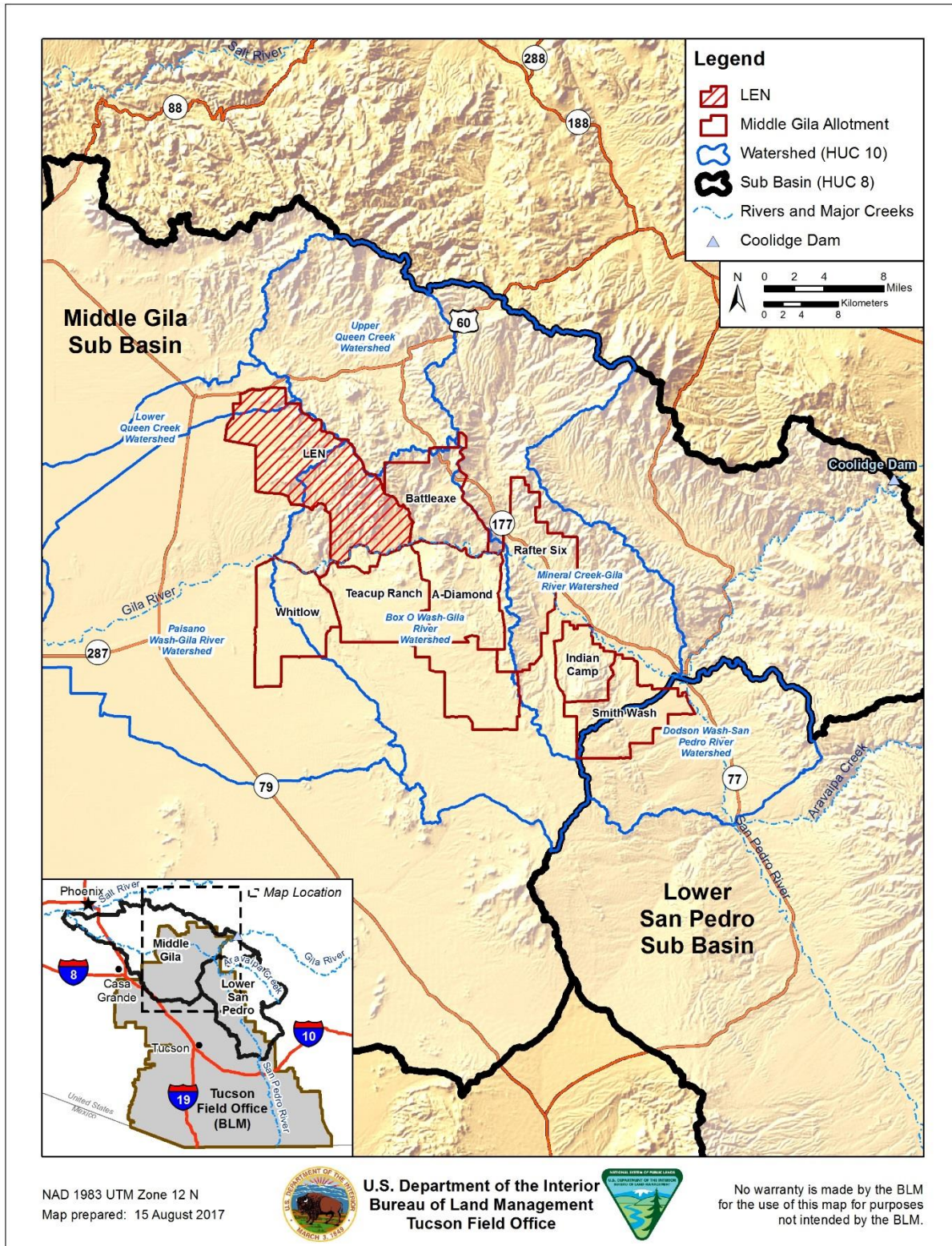
<b>Surface Manager</b>	<b>Acres</b>	<b>Percent</b>
Bureau of Land Management	24,554	57
US Forest Service	2,072	5
State	13,774	32
Private	15	0
Uncontrolled Private	2,332	6
<b>Total Acres</b>	<b>42,747</b>	<b>100</b>

### 2.2.2 Watershed

The LEN Allotment is located in the upper part of three separate watersheds. They are the Lower Queen Creek, the Paisano Wash, and Box-O Wash watersheds (Figure 2). The allotment is located in the upper part of these three watersheds with elevations ranging from 1,600 to 4,170 feet. Slopes in the watershed range from zero to 80% with an average slope of 31%. Part of the southern boundary of the LEN Allotment borders the Gila River. The three watersheds are located inside the Middle Gila Sub Basin. This sub basin encompasses an area of 3,350 square miles surrounding the Gila River from below Coolidge Dam to the Salt River confluence, including the confluence with the San Pedro River to the South. Additional information about watershed characteristics is located in Section 2.3.1.



Figure 2 Middle Gila Watershed



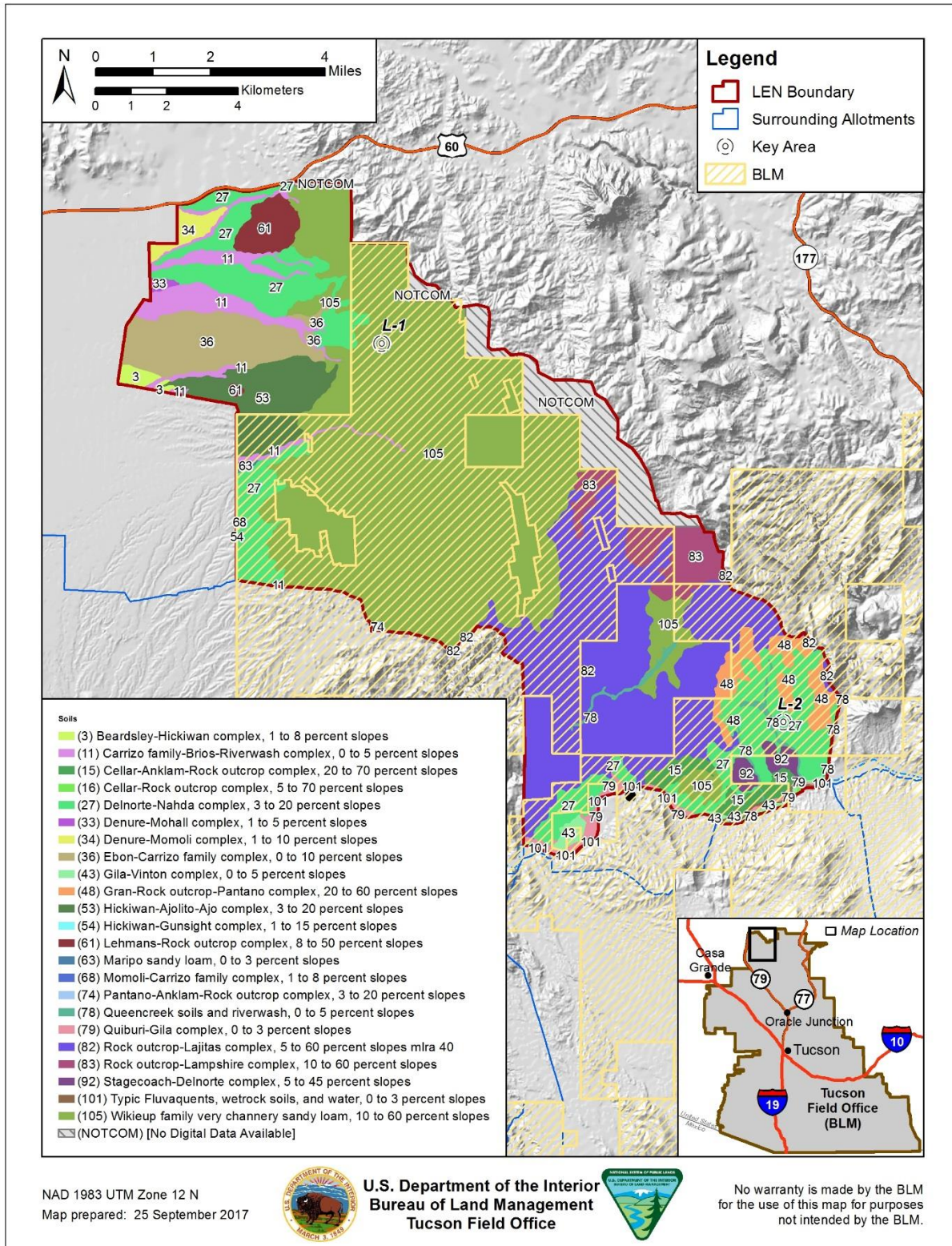
### 2.2.3 Soils

The soil composition on the LEN Allotment is varied as presented in Table 2 and Figure 3, and is derived from the Natural Resource Conservation Service (NRCS) Web Soil Survey system. The dominant soil orders in the MLRA are Aridisols and Entisols. The soils in the area dominantly have a thermic or hyperthermic soil temperature regime, an aridic soil moisture regime, and mixed mineralogy and formed in alluvium. They are very shallow to very deep and are well drained and somewhat excessively drained Haplocambids (Denure and Hayhook series), Haplocalcids (Gunsight and Stagecoach series), Calcargids (Mohall and Pinaleno series), and Natrargids (Casa Grande series) formed on fan terraces and relict basin floors. Torrifluvents (Antho and Comoro series) formed on alluvial fans and flood plains. Shallow or very shallow Torriorthents (Cellar and Quilotosa series) formed on hills and mountains.

**Table 2. NRCS web soil survey for LEN Allotment**

	Map Unit Name	Acres in Allotment	Percent of Allotment
3	Beardsley-Hickiwan complex, 1 to 8 percent slopes	156.81	0.37
11	Carrizo family-Brios-Riverwash complex, 0 to 5 percent slopes	1,353.20	3.17
15	Cellar-Anklam-Rock outcrop complex, 20 to 70 percent slopes	516.46	1.21
16	Cellar-Rock outcrop complex, 5 to 70 percent slopes	13.70	0.03
27	Delnorte-Nahda complex, 3 to 20 percent slopes	5,279.84	12.35
33	Denure-Mohall complex, 1 to 5 percent slopes	54.57	0.13
34	Denure-Momoli complex, 1 to 10 percent slopes	268.58	0.63
36	Ebon-Carrizo family complex, 0 to 10 percent slopes	1,872.88	4.38
43	Gila-Vinton complex, 0 to 5 percent slopes	243.45	0.57
48	Gran-Rock outcrop-Pantano complex, 20 to 60 percent slopes	897.80	2.10
53	Hickiwan-Ajolito-Ajo complex, 3 to 20 percent slopes	1,594.65	3.73
54	Hickiwan-Gunsight complex, 1 to 15 percent slopes	1.65	0.00
61	Lehmans-Rock outcrop complex, 8 to 50 percent slopes	560.53	1.31
63	Maripo sandy loam, 0 to 3 percent slopes	29.82	0.07
68	Momoli-Carrizo family complex, 1 to 8 percent slopes	1.73	0.00
74	Pantano-Anklam-Rock outcrop complex, 3 to 20 percent slopes	14.27	0.03
78	Queen creek soils and riverwash, 0 to 5 percent slopes	277.93	0.65
79	Quiburi-Gila complex, 0 to 3 percent slopes	326.49	0.76
82	Rock outcrop-Lajitas complex, 5 to 60 percent slopes mlra 40	8,438.41	19.74
83	Rock outcrop-Lampshire complex, 10 to 60 percent slopes	1,201.60	2.81
92	Stagecoach-Delnorte complex, 5 to 45 percent slopes	284.74	0.67
101	Typic Fluvaquents, wetrock soils, and water, 0 to 3 percent slopes	87.27	0.20
105	Wikieup family very channery sandy loam, 10 to 60 percent slopes	17,185.14	40.20
	[No Digital Data Available]	2,085.92	4.88
<b>Totals</b>		<b>42,747</b>	<b>100%</b>

Figure 3. LEN Allotment soils map.



## 2.3 Biological Resources

### 2.3.1 Major Land Resource Areas

Major Land Resource Areas (MLRAs) are geographically associated land resource units, usually encompassing several thousand acres. NRCS soil scientists in appropriate states wrote the descriptions of new MLRAs and MLRAs with changed boundaries. The National Soil Survey Center staff wrote the descriptions of MLRAs with no boundary changes since 1981. The information in the United States Department of Agriculture Handbook 296 Issued 2006 is current as of October 2005. A unit may be one continuous area or several separate nearby areas. MLRAs are characterized by particular patterns of soils, geology, climate, water resources and land use.

The LEN Allotment is in the Sonoran Desert Basin and Range MLRA. Many short, fault-block mountain ranges trending southeast to northwest rise abruptly from the smooth or gently sloping desert valley floors. Elevation ranges from 980 to 3,600 feet in most of this area, but it is as high as 4,590 feet in the mountains. The Gila River then flows west across the southern part of the MLRA to the Colorado River.

The average annual precipitation is 10 to 13 inches in most of this area. Rainfall can average 22 inches per year in the mountain ranges. Most of the rainfall occurs as high-intensity, convective thunderstorms, mainly from July to September, and as Pacific frontal storms from December to March. Snowfall is rare, except at the higher elevations. The average annual air temperature is 58 to 74 degrees. The freeze-free period averages 285 days and ranges from 205 to 365 days, decreasing in length with increasing elevation.

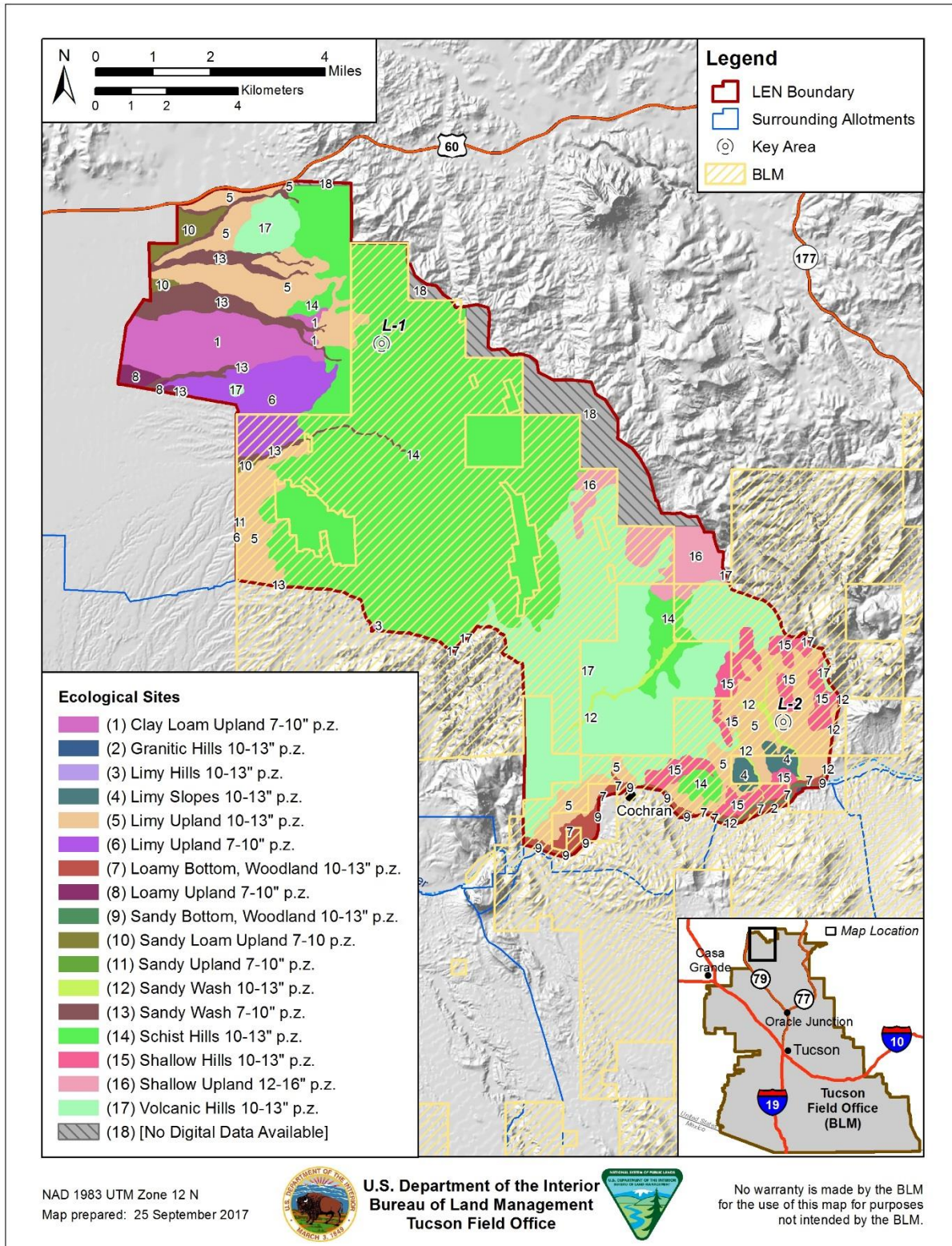
MLRAs are broken down further into ecological sites, which are associated units of soil and vegetation with quantifiable characteristics.

### 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 (TR 1734-07, Ecological Site Inventory). Ecological sites are named and classified based on soil parent material or soil texture and precipitation. Ecological sites provide a consistent framework for classifying and describing rangeland soils and vegetation thereby delineating land units that share similar capabilities to respond to management activities or disturbance. NRCS provides Ecological Site Descriptions online at <https://esis.sc.egov.usda.gov/>.

Fifteen ecological sites exist within the LEN Allotment. There are two key areas, L-1 established in 2011, and L-2 established in 2017 on BLM lands within the allotment. The key areas are based on their representative features that can be used to measure the long-term trend of vegetation and ground cover. These ecological sites constitute the majority of the BLM lands in the allotment (Figure 4).

Figure 4 Ecological Sites within LEN Allotment



**The Key Area L-1 is within the Schist Hills 10-13” precipitation zone (R040XA119AZ).** Key vegetative species for this site include foothill palo verde (*Parkinsonia microphylla*), saguaro (*Carnegiea gigantea*), white brittlebush (*Encelia farinose*), flattop buckwheat (*Eriogonum fasciculatum*) and Purple threeawn (*Aristida purpurea*). This site occurs in the upper elevations of the Sonoran Desert in southern Arizona. It occurs on hill-slopes and ridge-tops. Slope aspect is site differentiating at elevations near MLRA boundaries. The potential plant community is a diverse mixture of desert shrubs, trees, cacti, and perennial grasses and forbs. The vegetation characteristics are shrubland. Continuous, heavy grazing removes herbaceous forage species and palatable half shrubs from the plant community and replaces them by increases in shrubby species like littleleaf paloverde, white brittlebush, ocotillo (*Fouquieria splendens*), triangle bursage (*Ambrosia deltoids*), and cholla (*Cylindropuntia* ssp.). Gravel and channer covers are continuous but lack the size necessary to prevent erosion on steep slopes if the plant cover is depleted. This site lacks stone or cobble covers to protect forage species from heavy utilization. Cover of club moss (SEAR2) ranges from 10 to 50%, being heaviest on the cooler aspects and provides a great deal of stability on very steep slopes. Plant populations of major shrubs range from 75 to 150 per acre for littleleaf paloverde, 10 to 100 for ocotillo, 50 to 150 for creosotebush, 75 to 150 for wolfberry, 50 to 100 for Mormon tea, and 450 to 1000 plants per acre for the flattop buckwheat, brittlebush and bursage group.

North exposures have a higher percentage cover of perennial grasses and forbs than warm exposures. Grass canopy cover ranges from 0-5% on north slopes and 0-1% on south slopes. Forb cover ranges from 1-15% on north slopes and 0-2% on south slopes. Warm exposures have a higher percentage of trees and succulents than north slopes. The half shrub community on north slopes is dominated by species like calliandra (*Calliandra eriophylla*), goldeneye (*Heliomeris multiflora*), flattop buckwheat and Mormon tea (*Ephedra viridis*) while on south slopes brittlebush, ratany (*Krameria spp*) and bursage are dominant. Jojoba (*Simmondsia chinensis*) will have its higher cover on north aspects while southern aspects will have more ocotillo, creosotebush, whitethorn and wolfberry. The percent of annual forbs and grasses in the plant community can range from 5% in dry years to nearly 70% in very wet winters or summers. The yearly production of annuals ranges from 10 lbs. per acre to over 1200 lbs. per acre (from dry year to wet year).

Severe drought can reduce the cover of perennial grasses and suffrutescent forbs to less than 1%. Drought can also reduce the cover of sub-shrubs like brittlebush and bursage.

The dynamics of Saguaro on this site is unlike the 200-300 year cycle found on deep upland sites in the Upper Sonoran Desert. Saguaro recruitment can occur in any favorable year due to numerous rocky habitats favorable for establishment. Saguaro populations tend to be multi-aged and persistent on this site although very favorable years for establishment may result in very heavy stands on some slopes many years later.

**The Key Area L-2 is within the Limy Uplands 10-13” precipitation zone (R040XA123AZ).** Key vegetative species for this site include foothill palo verde (*Parkinsonia microphylla*), saguaro (*Carnegiea gigantea*), jojoba, (*Simmondsia chinensis*) and desert globemallow (*Sphaeralcea ambigua*). This site occurs in the upper elevations of the Sonoran Desert in southern Arizona. It occurs on hill-slopes and ridge-tops. Slope aspect is site differentiating at elevations near MLRA boundaries.

North exposures have a higher percentage cover of perennial grasses and forbs than warm exposures. Grass cover ranges from 0-10% on north slopes and 0-2% on south slopes. Forb cover ranges from 1-25% on north slopes and 0-6% on south slopes. Warm exposures have a higher percentage of trees and succulents than north slopes. The half shrub community on north slopes is dominated by species like calliandra, goldeneye, mintbush lippia and Mormon tea while on south slopes brittlebush, ratany, limber bush and bursage are dominant. Jojoba will have its higher cover on north aspects while southern

aspects will have more ocotillo, whitethorn and wolfberry. The percent of annual forbs and grasses in the plant community can range from 5% in dry years to nearly 70% in very wet winters or summers. The yearly production of annuals ranges from 20 lbs. per acre to over 1500 lbs. per acre (from dry year to wet year).

Severe drought can reduce the cover of perennial grasses and suffrutescent forbs to less than 1%. Drought can also reduce the cover of sub-shrubs like brittlebush and bursage.

The dynamics of saguaro on this site is unlike the 200-300 year cycle found on deep upland sites in the Upper Sonoran Desert. Saguaro recruitment can occur in any favorable year due to numerous rocky habitats favorable for establishment. Saguaro populations tend to be multi-aged and persistent on this site although very favorable years for establishment may result in very heavy stands on some slopes many years later.

### **2.3.3 Climate Data for Ecological sites**

The average annual precipitation is 10 to 13 inches in most of this area. Rainfall can average 22 inches per year in the mountain ranges. Most of the rainfall occurs as high-intensity, convective thunderstorms, mainly from July to September, and as Pacific frontal storms from December to March. Snowfall is rare, except at the higher elevations. The average annual air temperature is 58 to 74 degrees.

The freeze-free period averages 285 days and ranges from 205 to 365 days, decreasing in length with increasing elevation.

### **2.3.4 Vegetation Communities**

The Sonoran Desert Basin and Range MLRA supports desert grassland and desert shrub vegetation. Desert shrublands are at the higher elevations where saguaro, littleleaf palo verde, and mesquite (*Prosopis spp.*), not restricted to water courses - grow along with an understory of Rothrock's grama (*Bouteloua rothrockii*), bush muhly (*Muhlenbergia porteri*) threeawns (*Aristida spp.*), slim tridens, black grama (*Bouteloua eriopoda*), triangle-leaf bursage, creosotebush, whitethorn acacia, jojoba, desert zinnia, false mesquite, prickly pear, jumping cholla, staghorn cholla and needlegrass (*Achnatherum spp.*). Whitethorn acacia (*Vachellia constricta*), grow on the drier soils at the lower elevations.

Many of the plant species occur in various vegetation communities across the MLRA, with the vegetation communities being defined by the dominant species that occur in them such as Sonoran palo verde – Mixed Cacti desert Shrub and Sonoran Mid Elevation Desert Shrub. The BLM lands within the allotment are mainly composed of those two vegetation communities (figure 5).

Table 3 and Figure 5 below show the vegetation acreage and community types, respectively, based on Southwest Regional GAP Analysis Project within the LEN Allotment.

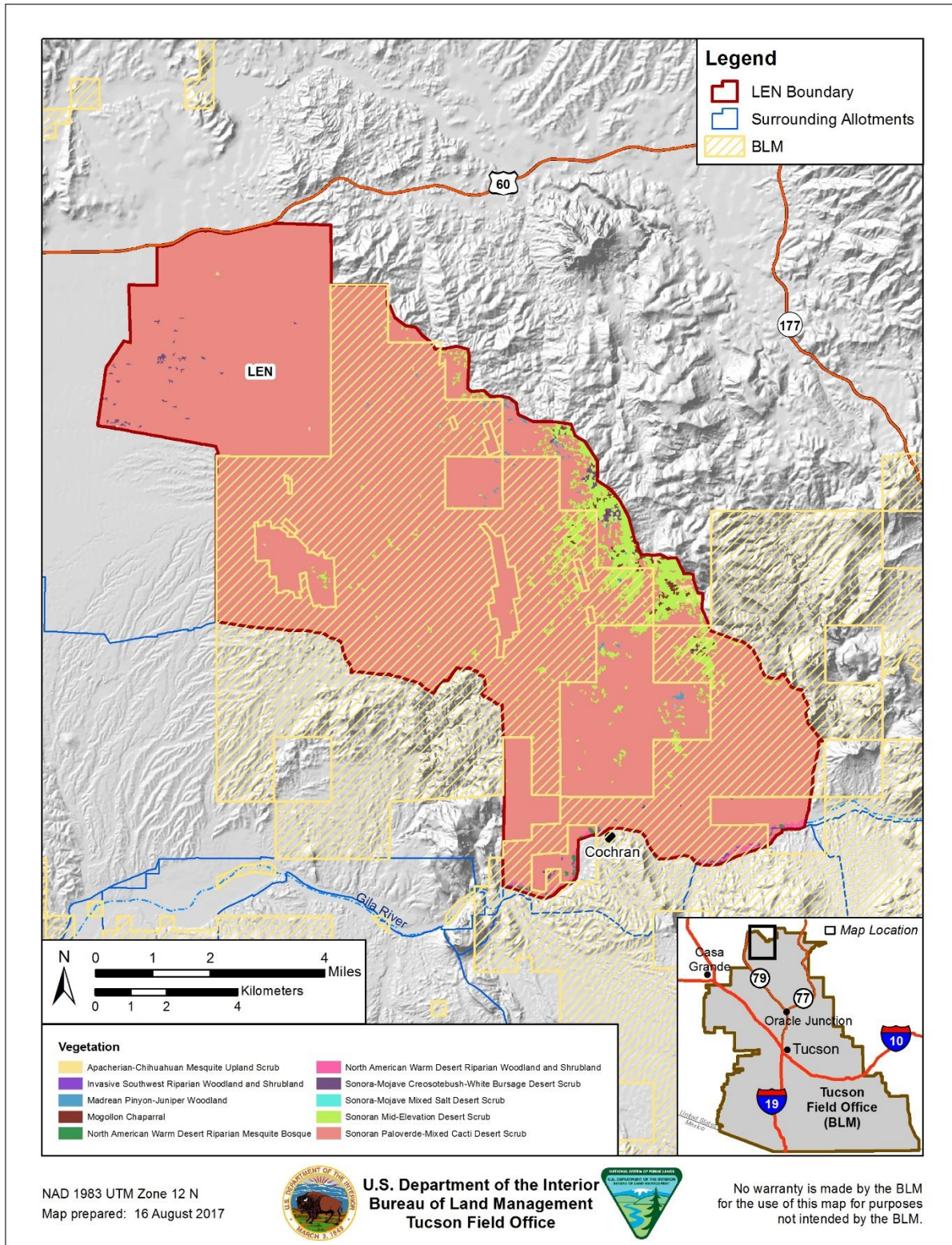
**Table 3. Vegetation Communities found Within the LEN Allotment.**

<b>Vegetation</b>	<b>Acres*</b>	<b>Percent</b>
Apacherian-Chihuahuan Mesquite Upland Scrub	76	0.18
Invasive Southwest Riparian Woodland and Shrubland	46	0.11
Madrean Pinyon-Juniper Woodland	76	0.18
Mogollon Chaparral	104	0.24
North American Warm Desert Riparian Mesquite Bosque	40	0.09
North American Warm Desert Riparian Woodland and Shrubland	134	0.31
Sonora-Mojave Creosotebush-White Bursage Desert Scrub	144	0.34
Sonora-Mojave Mixed Salt Desert Scrub	1	0.01
Sonoran Mid-Elevation Desert Scrub	1,960	4.59
Sonoran Paloverde-Mixed Cacti Desert Scrub	40,101	93.95
<b>TOTAL</b>	<b>42,682</b>	<b>100</b>

\*Vegetation total acreage may not match area of LEN Allotment due to rounding errors and data type differences. Percentages are based on vegetation total acreage.



Figure 5 Vegetation Communities within the LEN Allotment



### 2.3.5 General Wildlife Resources

Wildlife species composition expected to occur on this allotment are characteristic of the Sonoran Desert Basin and Range Province of the Intermontane Plateaus in Southeastern Arizona. Wildlife species expected to occur on this allotment include the following:

#### Mammals

- mule deer (*Odocoileus hemionus*),
- desert bighorn sheep
- mountain lion (*Puma concolor*),
- javelina (*Tayassu tajacu*),
- coyote (*Canis latrans*),
- bobcat (*Lynx rufus*),
- raccoon (*Procyon lotor*),
- striped skunk (*Mephitis mephitis*),
- white-throated woodrat (*Neotoma albigula*),
- white-footed mouse (*Peromyscus leucopus*);

#### Birds

- Red-Tailed Hawk (*Buteo jamaicensis*),
- Cooper's Hawk (*Accipiter cooperii*),
- Golden Eagle (*Aquila chrysaetos*),
- Prairie Falcon (*Falco mexicanus*),
- Raven (*Corvus corax*),
- Turkey Vulture (*Cathartes aura*),
- Meadowlark (*Sturnella neglecta*),
- Ladder-Back Woodpecker (*Dryobates scalaris*),
- Ash-Throated Flycatcher (*Myiarchus cinerascens*),
- Canyon Wren (*Catherpes mexicanus*),
- Rough-Winged Swallow (*Stelgidopteryx serripennis*);

#### Reptiles

- gopher snake (*Pituophis catenifer*),
- king snake (*Lampropeltis getula*),
- western diamondback rattlesnake (*Crotalus atrox*),
- prairie rattlesnake (*Crotalus viridis*),
- coachwhip (*Coluber flagellum*),
- patch-nosed snake (*Salvadora hexalepis*),
- tiger whiptail lizard (*Aspidoscelis tigris*),
- desert spiny lizard (*Sceloporus magister*),
- ornate tree lizard (*Urosaurus ornatus*),

#### Amphibians

- Mexican spadefoot (*Spea multiplicata*).

Livestock impact wildlife in a variety of ways: by their presence, through behavioral disturbance, and through competition for forage. Behavioral impacts resulting from inter-specific encounters (including human and livestock) are difficult to quantify, as they vary by species and by type of interaction. Wildlife currently present on the allotments have, to varying degrees, acclimated to the presence of livestock and associated human disturbances. Impacts to wildlife and habitat components include, but are not limited to cover and forage removal, soil disturbance and erosion, reduction of fine fuels available to carry fire (altered fire regime), addition of artificial water and mineral sources; habitat fragmentation, changes in hydrologic flow regimes, and long-term vegetative community conversion.

Current livestock management dictates habitat conditions relative to the stable state vegetative community that has developed on each site. Overall, this allotment provides all the components (food, water and shelter) of suitable habitat for the wildlife species that occur on the allotment.

### 2.3.6 Threatened & Endangered Species

A query conducted on the USFWS Information for Planning and Conservation (IPaC; USDI 2016) website showed that the following threatened, endangered and proposed (TEP) species may occur within the allotment:

- Lesser long-nosed bat (*Leptonycteris curasoae yerbabuena*),
- Ocelot (*Leopardus pardalis*),
- Southwestern Willow Flycatcher (*Empidonax traillii extimus*)
- Yellow-Billed Cuckoo (*Coccyzus americanus*),
- Northern Mexican garter snake (*Thamnophis eques megalops*),
- Gila chub (*Gila intermedia*)
- Acuna cactus (*Echinomastus erectocentrus var. acunensis*)

Review of habitat requirements for each species were conducted to determine its potential to occur on the allotment and to inform the Effects Determination for each species (Table 4). Two designated or proposed critical habitats overlap with this allotment.

**Table 4. Species indicated by 2016 USDI IPaC analysis for LEN Allotment.**

Species	Habitat	Potential for Occurrence on LEN Allotment and Effects Determination
<b>Lesser Long-nosed Bat</b>	Mainly desert scrub habitat in the U.S. portion of its range. In Mexico, the species occurs up into high elevation pine-oak and ponderosa pine forests. Altitudinal range is from 1,600-11,500 ft. Roosting is in caves, abandoned mines, and unoccupied buildings at the base of mountains where agave, saguaro, and organ pipe cacti are present. Forages at night on nectar, pollen, and fruit of paniculate agaves and columnar cacti.	Forage species for Lesser Long Nosed Bat may occur on LEN Allotment; however, forage availability to LLNB in the area will not be significantly reduced because of livestock grazing on the allotment, as LLNB are a mobile species, foraging up to 50 miles from roost sites. The nearest known maternity roost is over 50 miles away

Species	Habitat	Potential for Occurrence on LEN Allotment and Effects Determination
<b>Ocelot</b>	Desert scrub communities in Arizona	Several confirmed sightings of ocelots have been made in Arizona in recent years. Confirmed sightings of live ocelots made in 2009 and 2011 in Cochise County. One sighting was 10 miles away from the LEN Allotment area.
<b>Southwestern Willow Flycatcher with designated critical habitat</b>	Nests in willows along streams and rivers, with nearby cottonwoods serving as foraging sites. Critical habitat designated on LEN Allotment.	There is Southwestern willow flycatcher habitat on LEN Allotment. The proposed action would pose very little risk of disturbance to migration, feeding, breeding or riparian resources that support the Southwestern willow flycatcher.
<b>Yellow Billed Cuckoo with proposed critical habitat</b>	Nests in willows along streams and rivers, with nearby cottonwoods serving as foraging sites. Critical habitat designated on LEN Allotment.	There is Yellow-billed Cuckoo habitat on LEN Allotment. The proposed action would pose very little risk of disturbance to migration, feeding, breeding or riparian resources that support the yellow-billed cuckoo.
<b>Northern Mexican garter snake</b>	This species occurs up to about 8,500 feet in elevation, but is most frequently found between 3,000 and 5,000 ft. in the United States. It is found in both lotic and lentic habitats that include cienegas and stock tanks (in southern Arizona), as well as river habitat that includes pools and backwaters. It forages along the banks of waterbodies feeding primarily upon native fish and adult and larval leopard frogs.	The northern Mexican gartersnake has likely been extirpated in the San Pedro River and middle Gila river, but the status of this gartersnake remains uncertain (USFWS 2013c). The project area supports a large and widespread bullfrog population. Additionally, the aquatic habitat is occupied by green sunfish, channels catfish, largemouth bass, and northern crayfish that prey on small snakes. As a result, this species either is extirpated from the project area or survives at very low population levels.
<b>Gila chub</b>	Gila chub commonly inhabit pools in smaller streams, cienegas, and artificial impoundments ranging in elevation from 2,000 to 5,500 ft. Gila chub are highly secretive, preferring quiet deeper waters, especially pools, or remaining near cover including terrestrial vegetation, boulders, and fallen logs.	The Gila chub has likely been extirpated in the middle Gila river, but critical habitat is designated on Mineral Creek, which is a tributary to the Gila River approximately 10 miles upstream. The project area supports a large and widespread bullfrog population. Additionally, the aquatic habitat is occupied by green sunfish, channels catfish, largemouth bass, and northern crayfish, which prey on small fish. As a result, this species is either extirpated from the project area or survives at very low population levels.

Species	Habitat	Potential for Occurrence on LEN Allotment and Effects Determination
<b>Acuña Cactus</b>	This species is found in valleys, on small knolls and gravel ridges of up to 30 percent slope in the Palo Verde-Saguaro Association of the Arizona Upland subdivision of the Sonoran Desert scrub at 1,198 to 3,773 ft. in elevation.	Some potential for occurrence on allotment, though surveys have not been conducted. There is no designated critical habitat on the LEN Allotment.

### 2.3.7 BLM Sensitive Species

The BLM sensitive species that have suitable habitat present and are known or have the potential to exist within this allotment are:

- Monarch butterfly (*Danaus plexippus plexippus*)
- Sonoran talussnail (*Sonorella magdalenensis*)
- Allen’s Big-eared bat (*Idionycteris phyllotis*)
- Arizona myotis (*Myotis occultus*)
- spotted bat (*Euderma maculatum*),
- Townsend’s big-eared bat (*Corynorhinus townsendii*),
- California leaf-nosed bat (*Macrotus californicus*),
- cave myotis (*Myotis velifer*),
- greater western mastiff bat (*Eumops perotis californicus*),
- Mexican Long-tongued Bat (*Choeronycteris mexicana*)
- Pima Indian mallow (*Abutilon parishii*)
- Sonoran desert tortoise (*Gopherus morafkai*),
- American Peregrine Falcon (*Falco peregrinus*),
- Bald Eagle (wintering) (*Haliaeetus leucocephalus*),
- Desert Purple Martin (*Progne subis hesperia*),
- Gilded Flicker (*Colaptes chrysoides*),
- Golden Eagle (*Aquila chrysaetos*),

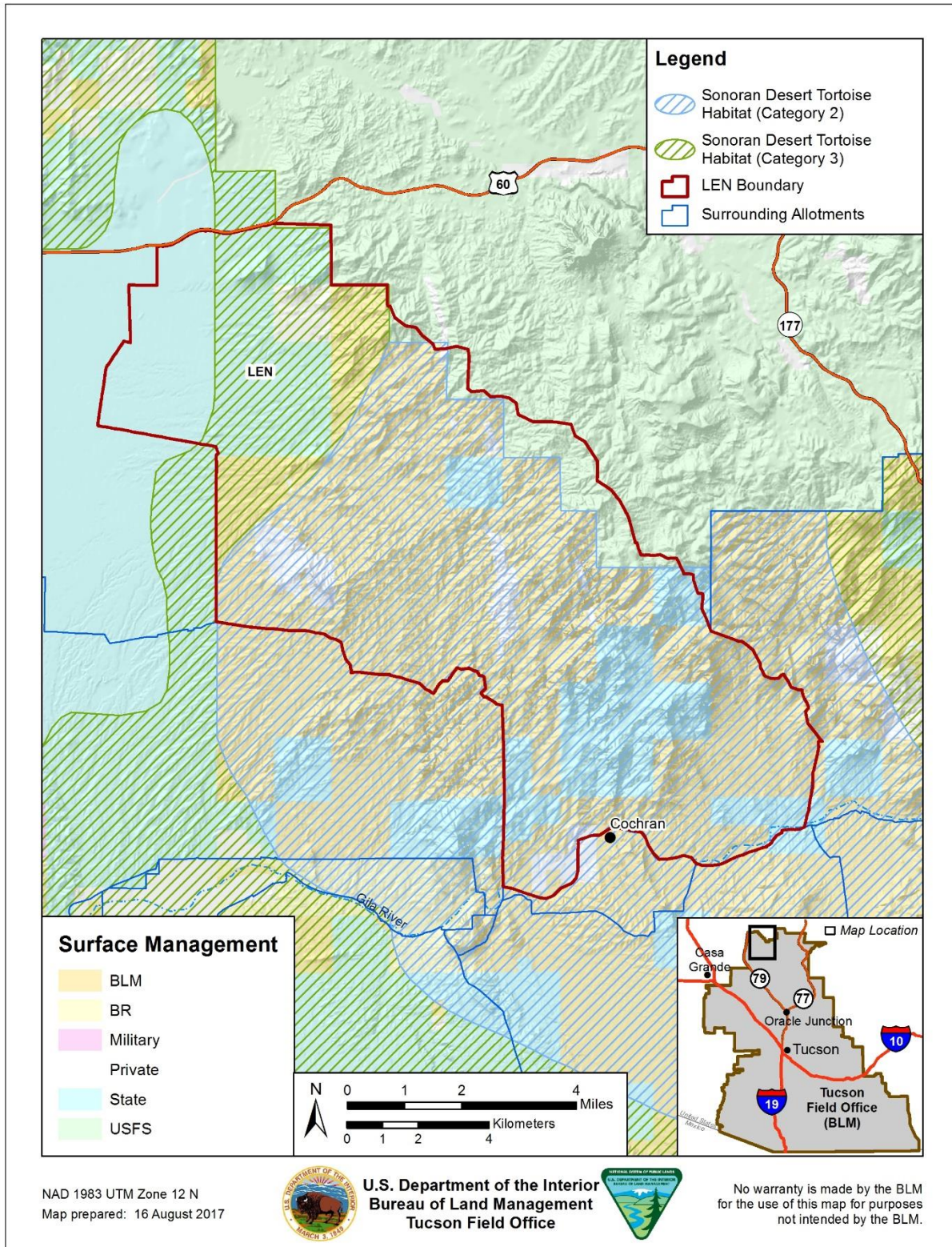
The bird species utilize the grassland, open shrub, and cliff habitat for nesting and foraging. The invertebrate, mammal, reptile and plants occur in grasslands, rocky and wooded hills, and/or areas along the edge of rain pools, wash bottoms, and areas near water in semi-arid mesquite-grassland, creosote bush desert, and upland saguaro-paloverde desert scrub.

In order to monitor long-term condition and trend of wildlife habitats, particularly for Sonoran desert tortoise, key areas are established within mapped suitable tortoise habitat on the BLM lands. Sonoran desert tortoise occur most commonly on rocky, steep slopes and bajadas (lower mountain slopes) often formed by the coalescing of several alluvial fans and in paloverde-mixed cacti associations. Washes and valley bottoms may be used in dispersal. Sonoran desert tortoises in Arizona occur between 900 to 4,200 feet in elevation. There are 37,264 total acres of Sonoran Desert Tortoise category 2 and 3 habitat (USDI 1988 Table 1. Pg 12) within the LEN Allotment of which 21,965 acres of category 2 habitat and 2,570.69, acres of category 3 habitat overlap BLM managed lands (Figure 6).

## LEN Allotment Land Health Evaluation

The bat species may occur on the allotment if roosting habitat is available in cliffs, caves, or mines. The bat species utilize the desert habitats for foraging for nectar, pollen, insects or fruits.

Figure 6 Sonoran Desert Tortoise Category 2 and 3 habitat within LEN Allotment



### 2.3.8 Migratory Birds

The LEN Allotment, which includes the BLM, managed public lands, and other land jurisdictions, offer diverse habitats for migratory birds, providing valuable food, water, and cover. Migratory species that utilize the area include but are not limited to:

- Arizona Woodpecker (*Leuconotopicus arizonae*),
- Bendire's Thrasher (*Toxostoma bendirei*),
- Canyon Towhee (*Melospiza fusca*),
- Golden Eagle (*Aquila chrysaetos*)
- Red-Tailed Hawk, (*Buteo jamaicensis*)
- Raven, (*Corvus corax*)
- Turkey Vulture, (*Cathartes aura*),
- Western Meadowlark, (*Sturnella neglecta*)
- Ladder-Back Woodpecker, (*Dryobates scalaris*)
- Ash-Throated Flycatcher, (*Myiarchus cinerascens*)
- Canyon Wren, (*Catherpes mexicanus*)
- Costa's Hummingbird (*Calypte costae*),
- Gilded Flicker (*Colaptes chrysoides*),
- Phainopepla (*Phainopepla nitens*),

No surveys have been conducted specifically within this allotment for this project to determine presence but these species have the potential of occurring within the vegetation communities located on this allotment (Figure 4).

## 2.4 Special Management Areas

### 2.4.1 Wilderness Areas

The LEN Allotment contains approximately 1,071 acres of the existing 5,800-acre White Canyon Wilderness area. This Wilderness was designated by Congress in the Arizona Desert Wilderness Act of 1990 (P.L. 101-628), and is managed by the BLM according to current regulations (43CFR 6300-Management of Designated Wilderness Areas) and BLM Manual 6340. The Wilderness area includes rugged canyons and steep slopes in the eastern part of the allotment. The Arizona National Scenic Trail passes near the Wilderness boundary and provides access to it on a reclaiming route. A wilderness management plan has not been prepared for this Wilderness. All motorized and mechanized use is prohibited within the Wilderness, and any proposed facilities and improvements require specific assessment to comply with wilderness management requirements. Other than existing fence, there are no other range improvements in the wilderness portion of the allotment.

### 2.4.2 National Trail System

The LEN Allotment includes approximately 14.1 miles of the Arizona National Scenic Trail. The Trail was designated by Congress as part of the National Trail System in 2009 (P.L. 111-11). The trail is a single-track non-motorized trail managed by to provide hiking, mountain biking, and equestrian riding opportunities. Most of the trail is constructed single track, with approximately 0.3 miles of the Trail on a single lane primitive road, and shares the route with motorized vehicles. Approximately 7.7 miles of the Trail is under a BLM held trail right of way across State Trust land in the allotment. A primitive trailhead is located along the Rincon Road near Cochran. The National Forest Service, the overall trail-administering agency, is preparing a trail corridor management plan in consultation with the BLM, Pinal County, Arizona Trail Association and other trail partners.



### **2.4.3 Gila River Riparian Management Area**

The LEN Allotment includes part of the Gila River Riparian Management Area established in the Phoenix RMP. The Riparian Management Area consists of the Gila River and bottomland, totaling approximately 1,490 acres of BLM land from the Florence-Kelvin Highway Bridge to the Ashurst Hayden Dam. The bottomland is covered by mesquite riparian bosque and desert scrub, with cottonwood-willow on the riverbanks. Extensive tamarisk infestation is found throughout the area. The riparian management area provides critical habitat for spikedeace and Southwestern willow flycatcher, both listed threatened and endangered species.

### **2.4.4 Cultural Resource Management Areas**

The LEN Allotment includes part of the Gila River Cultural Resource Management Area (CRMA), established in the Phoenix RMP, which includes a total of approximately 22,920 acres of public land. The area consists of the river valley and adjacent slopes where extensive cultural resources have been discovered. The area is significant in the region’s prehistoric habitation and agriculture, historic mineral development, transportation, ranching and homesteading. The allotment also includes the 20-acre Reymert Townsite CRMA, established in the Phoenix RMP. This CRMA includes the remnants of the historic mining town of Reymert-DeNoon.

## **2.5 Recreation Resources**

### **2.5.1 Recreation Resources**

The LEN Allotment includes approximately 24,554 acres of public land administered by the BLM available for public recreational use, comprising approximately 57% of the allotment as shown on Table 5 below, and on the map in Figure 1. BLM land is available for public use subject to BLM recreation and OHV regulations. Approximately 13,774 acres, or 32% of the allotment, is State Trust land available for public use subject to a hunting license or recreational permit from the Arizona State Land Department. Approximately 2,347 acres, or 5% of the allotment, is private land not open to public use without the landowner’s permission, and fences or locked gates block access in some places. The allotment is within Game Management Unit 37B, and the area is in an Extensive Recreation Management area with essentially custodial visitor services and no facilities. Public lands in the allotment are heavily used for recreation, and portal information sites are provided at the public land entrances on Mineral Mountain road, Cottonwood Canyon Road, Sandman Road, and Box Canyon Road; all access routes leading to the allotment. The allotment includes approximately 1,017 acres of the White Canyon Wilderness area. The proposed Ray land exchange would reconvey approximately 151 acres along the Gila River near Cochran, increasing the land base available for public use in that area; the land exchange would transfer approximately 430 acres to private ownership along Rincon Road, with a net reduction of 279 acres in the land base available for public use in the allotment.

**Table 5. Land base in the Len Ranch Allotment available for public recreational use**

Category	Acres	Description
Bureau of Land Mgmt.	24,554	Available for public recreation
Forest Service	2,071	Available for public recreation
State Trust Land	13,774	Available for recreation with a permit
Private Land	2,347	Not available
<b>Total</b>	<b>42,747</b>	

The land base in the allotment provides recreational opportunities primarily related to OHV recreation, hunting (mule deer, javelina, desert bighorn sheep, upland birds and small game, and predators), and sightseeing, driving OHVs for pleasure, primitive camping, hiking, mountain biking, equestrian riding, and target shooting. Opportunities for primitive recreation are available in the White Canyon Wilderness, and semi-primitive opportunities in upper Martinez Canyon, which is limited to non-motorized access. The area receives primarily day use, with a substantial amount of overnight use. Numerous camping areas have been identified in the allotment, including backcountry dispersed campsites, and RV/Motor home camping areas along Mineral Mountain Road. Staging areas used by OHV recreational visitors are also found along Mineral Mountain Road near US60, and along Cottonwood Canyon Road and Price Road near State Highway 79. Recreational off highway vehicle (OHV) driving occurs on an extensive network of existing primitive routes (4WD, ATV, motorcycle riding), and in some of the washes. The natural drainages attract OHV use (4WD, ATV) for access and recreational riding due to their relatively wide and unobstructed sand/gravel beds. Several of the washes with rock beds and outcrops attract technical OHV driving for challenge and skill. The Arizona National Scenic Trail crosses the southeastern part of the allotment along the Gila River and through the Red Mountain area, providing opportunities for hiking, mountain biking and equestrian riding on a single-track trail. Overall, recreational use in the allotment is relatively high, and has been increasing during the past decade. Visitation is estimated at approximately 50,000 visits annually. Recreational use originates in the local area and region, with a significant amount by of out of state Arizona winter residents. Use occurs throughout the year, but typically peaks during the fall through spring. Recreational use at activity areas (i.e. staging areas, campsites, parking areas) precludes vegetative cover and may impair soil function, and could be a contributing factor on the condition of rangeland health at the sites. However, even though widespread and relatively abundant, the localized and small-scale nature of the recreation impacts, the effects on overall rangeland health on public lands in the allotment are considered insignificant.

### ***2.5.2 Access/Transportation:***

The LEN Allotment includes approximately 231.4 miles of secondary and primitive roads identified in an interagency route inventory completed for the area in 2003, as shown the map in Figure 7 and summarized on Table 6 below. Approximately 13.1 miles of the single-track non-motorized Arizona National Scenic Trail are in the allotment, and several routes managed for non-motorized travel are found in the upper Martinez Canyon area. Two primitive roads totaling approximately 0.4 mile were constructed to provide access to mining claims for exploration activities in the past five years. The existing primitive roads provide access for the use, maintenance and operation of the grazing allotment and range improvements, for access to private land inholdings, active mining claims, public recreational use, and other uses. The primitive routes are accessed from SR79 via Price Road, Cottonwood Canyon Road, and Cottonwood Canyon Road, and US60 via Mineral Mountain Road. A few routes across private property lack legal public access. Most of the access routes are single lane, mostly unmaintained, natural soil surfaced, with surface material ranging from fine-grained soil to gravel, and rock. Routes in the flats on the eastern part of the allotment are on soils that are highly prone to fugitive dust. The primitive routes vary in width from 10 feet to 20 feet, though for analysis purposes, an average width of 12 feet was used. A section of Cottonwood Canyon Road and Sandman Road are maintained for haul truck traffic related to quarry operations on private lands on Mineral Mountain. Approximately 57 miles of the routes are in the channel of natural drainages, including sections of some main access routes. Route proliferation has been an issue on the flats in the State Trust lands in the allotment.

The current Off Highway Vehicle designations established in the current Resource Management Plan close the White Canyon Wilderness Area to the use of motorized vehicles, and limit use of motor vehicles to 'Existing Roads and Trails' on other lands in the allotment. Wilderness regulations prohibit use of mechanized equipment in the White Canyon Wilderness. The Arizona National Scenic Trail is managed

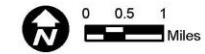
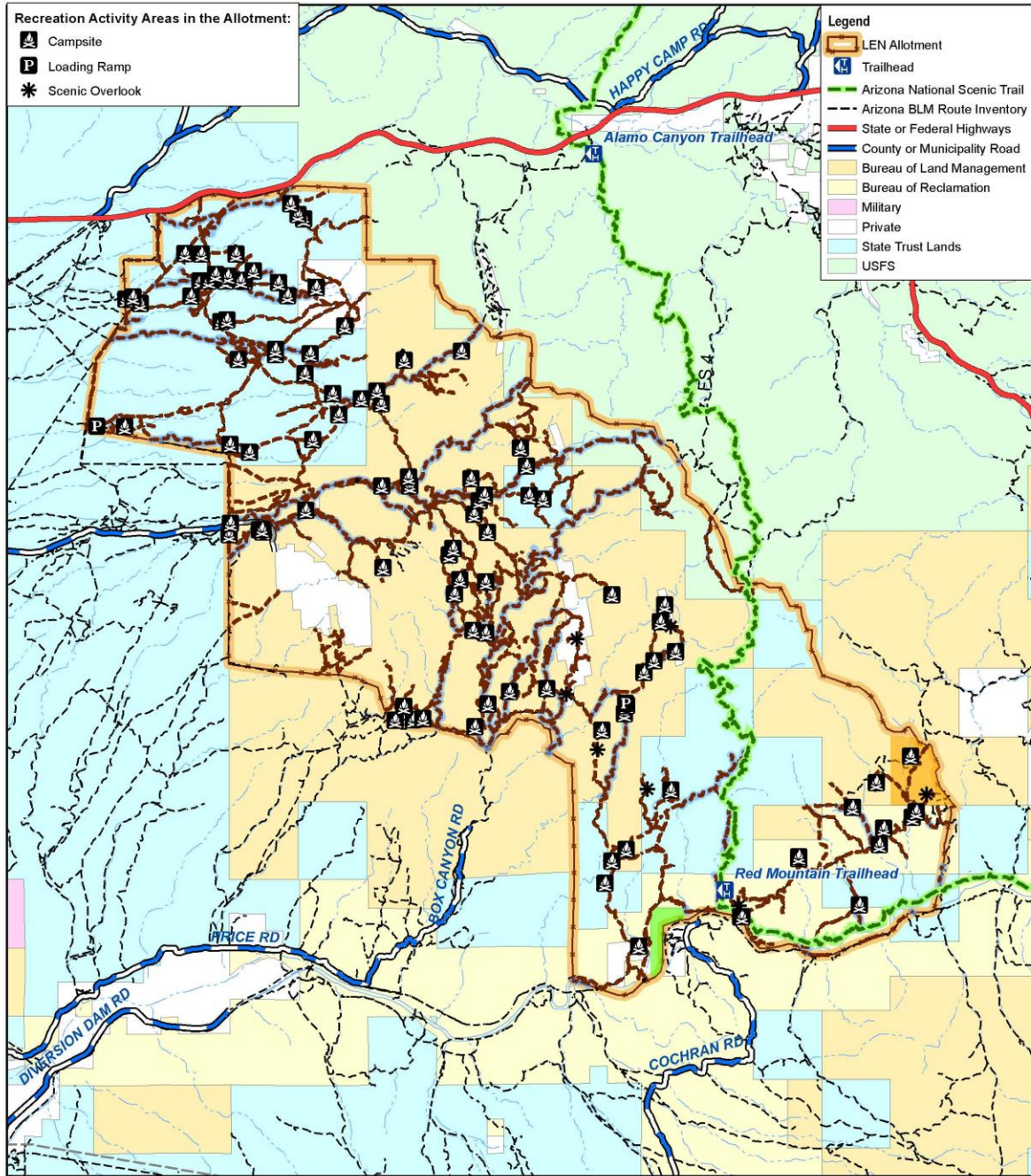
for non-motorized travel to accommodate hiking, bicycling and equestrian riding, with a 0.3-mile section of the trail on Rincon Road shared with motorized vehicles. The 2003 route inventory was evaluated in 2006, and a comprehensive travel management plan was completed in 2010. The travel management plan identified the existing motorized route network, and motor vehicle use restrictions on some of the routes in the allotment, including upper Martinez Canyon, and a section of Cottonwood Canyon.

The existing primitive roads typically alter natural drainage patterns by intercepting surface runoff in the roadway and ditches, and sometimes by intercepting small side drainages and diverting runoff along the road. The intercepted runoff may prevent some moisture from reaching soils and vegetation down slope from the route, potentially reducing vegetative production in localized areas. The routes that receive the heavier traffic volume typically preclude vegetative cover and organic litter on the roadway entirely. Routes that receive very low traffic volume, particularly those on stable sites, support vegetation growth between the wheel tracks while allowing passage by vehicles. Most of the primitive routes are poorly drained, and intercepted runoff is causing soil and roadbed erosion, which is severe on some of the routes. The natural soil surface and subgrade on most of the primitive routes allows water infiltration to occur, but is limited by compaction of the soils on the roadway, and by rapid runoff on routes with relatively steep grades. The routes in the wash bottoms may prevent vegetative growth in the streambed, and cause channelization in the vehicle tracks and potential erosion of the streambed. Because of the relatively small area affected, the impact on land health from the primitive routes in the allotment is considered insignificant. Although insignificant, impacts from travel routes and OHV use could be minimized by travel management, including route maintenance and implementation of the Arizona Resource Advisory Council Guidelines for Off-Highway Vehicle (OHV) Recreation Management.

**Table 6. Existing route inventory in the LEN Allotment, on all land ownership**

ROUTE_TYPE	Miles	Acres Disturbed
Secondary_Road_Unpav	1.0	2.9
Tertiary_Road_Unpav	231.4	335.1
Non-motorized route	13.5	8.2
Total	244.9	346.2

Figure 7. Recreation resources, route inventory and recreation activity areas



UNITED STATES DEPARTMENT OF THE INTERIOR  
Bureau of Land Management  
Gila District, Tucson Field Office

**Route Inventory in the Allotment**  
 — Secondary Road Unpaved  
 - - - Single Track Route  
 - - - Tertiary Road Unpaved  
 — Routes in Washes

**LEN RANCH GRAZING ALLOTMENT (#6197)**

Map 1. Recreation Resources- Land Base, Route Inventory and Activity Areas

## 2.6 Heritage Resources & the Human Environment

### 2.6.1 Cultural Resources

#### Cultural Assessment/Background Data

Tucson Field Office Archaeologist completed a Class I cultural resource file search on August 1, 2017. The Class I survey consisted of an office file search in the Tucson Field Office cultural resource files and an additional file search including the cultural resource data base AZSite Arizona Statewide cultural resource database

The file search consists of the following data:

1. A previous Land Health Evaluation was completed in 2009 under the direction of the Tucson Field Office Archaeologist for the LEN Allotment.
2. SWCA Consultants completed a Class III survey for the BLM in August 2000. The survey covered a 36-acre survey for a proposed fence line segment. The survey recorded no new historic properties. The legal area where the survey occurred is Township 4 South, Range 11 East, Sections 11 and 12 and Township 4 South, Range 12 East, Sections 7, 6, 5, 4, 9, 10 and 3.
3. A Class III survey was completed in January 2011 for an allotment fence. No historic properties were recorded. The survey covered 13 acres. The legal description for the survey is Township 3 South, Range 11 and 12, Sections 6, and 7.

Background data indicates no additional prior surveys or sites documented.

#### Statement of Effect Determination

As a result of this cultural resources assessment, no historic properties or areas likely to contain historic properties were identified that also coincide with areas of potential impacts from concentrated livestock use on the BLM administered portion of the LEN Allotment. Additionally, when new range improvement projects are proposed in the future the range improvement project will require a Class III cultural resource survey meeting the requirements of Section 106 NHPA.

As a routine undertaking with no identified impacts to historic properties within the BLM administered portion of the allotment, lease issuance for continued livestock use of the LEN Allotment is appropriate under a finding of "no adverse effect", with the following Conditions of Approval (COAs) applied as lease stipulations. Any subsequent cultural resources inventory should focus on identified areas of livestock concentration within the BLM administered portion of the allotment, as appropriate. Proposed range improvements would be subject to individual project review and assessment for compliance with Section 106 and the Statewide Protocol. If, as a result of any new assessment or monitoring, historic properties are identified and found to exhibit potential for or actively occurring grazing impacts, mitigation measures would be developed in coordination with the SHPO and any other applicable consulting parties.

#### Cultural Resources Stipulations / Standard Conditions of Approval (COAs)

*The operator is responsible for informing all persons who are associated with the allotment operations that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts. Any cultural (historic/prehistoric site or object) or paleontological resource (fossil remains of plants or animals) discovered during operations shall be immediately reported to the Authorized Officer (AO) or his/her designee. All operations in the immediate area of the discovery shall be suspended until written authorization to proceed is issued. An evaluation of the discovery shall be made*

*by a qualified archaeologist or paleontologist to determine appropriate actions to prevent the loss of significant cultural or scientifically important values.*

*If in connection with this work any human remains, funerary objects, sacred objects or objects of cultural patrimony as defined in the Native American Graves Protection and Repatriation Act (P.L. 101-601; 104 Stat. 3048; 25 U.S.C. 3001) are discovered, operations in the immediate area of the discovery shall cease, the remains and objects shall be protected, and the operator shall immediately notify the BLM Tucson Field Manager. The immediate area of the discovery shall be protected until notified by the BLM Tucson Field Manager that operations may resume.*

## **2.6.2 Native American Concerns**

Native American religious concerns are legislatively considered under several acts and Executive Orders including the American Indian Religious Freedom Act (AIRFA; 42 U.S.C. 1996), the Native American Graves Protection and Repatriation Act (NAGPRA; 25 U.S.C. 3001), and Executive Order 13007 (Indian Sacred Sites). In sum, and in concert with other provisions such as those found in the NHPA and Archaeological Resources Protection Act (ARPA; 16 U.S.C. 470aa-470mm), these acts and orders require the federal government to carefully and proactively consider the traditional and religious values of Native American culture and lifeways to ensure, to the greatest degree possible, that access to sacred sites, treatment of human remains, the possession of sacred items, conduct of traditional religious practices, and the preservation of important cultural properties are not unduly infringed upon. In some cases, these concerns are directly related to *historic properties* and/or archaeological resources, such as those considered under Section 106 of the NHPA. Likewise, elements of the landscape without archaeological or human material remains also may be involved.

The BLM initiated government-to-government consultation with four Native American tribes who claim cultural affiliation to and/or traditional use of the area by sending letters summarizing the results of the cultural resources assessment and rangeland monitoring data for the LEN Allotment. Tribes consulted include the Hopi Tribe, Pascua Yaqui Tribe, Tohono O'odham Nation, and the White Mountain Apache Tribe.

Currently, there are no known adverse impacts to any culturally significant plants, items, sites, or landscapes (see prior Cultural Resources section). Additionally, because lease issuance does not include authorization for new construction, ground disturbance, or the direct sale/exchange of federally managed lands, the undertaking will not prevent access to any known sacred sites, prevent the possession of sacred objects, or otherwise interfere with the performance of traditional ceremonies and/or rituals.

If new information is provided by consulting tribes, additional or edited terms and conditions of land-use and/or mitigation may be required to protect or restore resource values. Future assessment and/or consultations would occur during the BLM's review of any additional proposed actions within the subject allotment such as range improvement projects. Should the BLM identify adverse impacts, additional consultations regarding potentially significant sites and possible protection or mitigation strategies would be warranted.

## 3. GRAZING MANAGEMENT

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### 3.1 Grazing History

LEN is located approximately 12 miles northeast of the town of Florence, and 20 miles southwest of Apache Junction, Pinal County, Arizona. It is located 24 miles southeast and 20 miles northwest of the weather stations in Williams Field and Coolidge airports, respectively. The ranch is bordered by the Horsetrack allotment to the southwest, the Cochran and Teacup allotments to the south, and the Battleaxe allotment to the west (Figure 1).

The LEN Allotment was fenced from the surrounding allotments in the 1950s. Before that, the area was open range, mostly divided by natural barriers. The current configuration of the allotment includes the old LEN ranch and the 15 ranch, with both ranches named for the brands that they used. The ranch was improved throughout the 1960s and 1970s with water developments and corrals for working the livestock.

In the 1860s and 1870s, ranchers began moving large numbers of cattle and sheep into the region (Bahre 1991). By 1891, cattle in southeast Arizona reached nearly 400,000, before the severe drought of 1891-1893 caused a massive die-off (Bahre 1991). After the drought, major changes in the grasslands became apparent, many of which persist to the present in the form of increased shrubs and reduced perennial plant populations. In 1902, the American Forestry Association reported, "My experience forces me to the assertion that the diminution of the flow of springs and streams in Arizona is due more to the destruction of brush, grass or herbage, than the destruction of forests proper. I would not be understood as opposing the pasturing of public lands as a principle, but it cannot be denied that the free ranging of stock on public domain is measurably responsible for the unfavorable conditions which we find on the watershed today." (American Forestry Association. 1902)

The management category given to the LEN Allotment is maintain (M). By definition, M category allotments have no serious resource conflicts and range condition and present management is satisfactory. Under this management BLM management actions are limited to licensing livestock use based on the AUMs available on the public lands, and the individual ranch operator determines the grazing system (if any) to be used. BLM checks these grazing units to ensure that the utilization on public lands is not excessive, that range condition and trend are being maintained, and that applicable regulations are being followed. If utilization is found to be excessive or the range trend to be down, BLM will work with the operator to adjust livestock numbers on the total grazing unit.

#### Grazing System

There is currently one lease issued for 2956 AUMs on public lands for the LEN Allotment. An AUM is the amount of forage required by one animal unit for a period of 30 days or one month. Within the allotment, yearlong grazing from March 1 to February 28 is allowed under the terms and conditions of the lease. The BLM lands associated with this allotment are used in conjunction with the private and state in a rotational grazing system. An Animal Unit (AU) is considered to be one mature cow of about 1,000 pounds either with or without a calf up to six months of age or one bull, consuming about 20 pounds of forage per day. The BLM land, however, is not fenced off from State Trust lands. AUM totals for the LEN Allotment leases are in Table 7.

**Table 7 LEN Leases and AUMs**

<b>Grazing Lease</b>	<b>Animal Unit Months</b>	<b>Authorized Animal Units</b>
State Trust #005-25958	1,303 AUMs	109 Animal Unit (AU) Yearlong
BLM #06197 LEN	2,956 AUMs	246 AU Yearlong
<b>Total</b>	<b>4,259 AUMs</b>	<b>357 AU Yearlong</b>

### ***3.1.1 Existing Range Improvements***

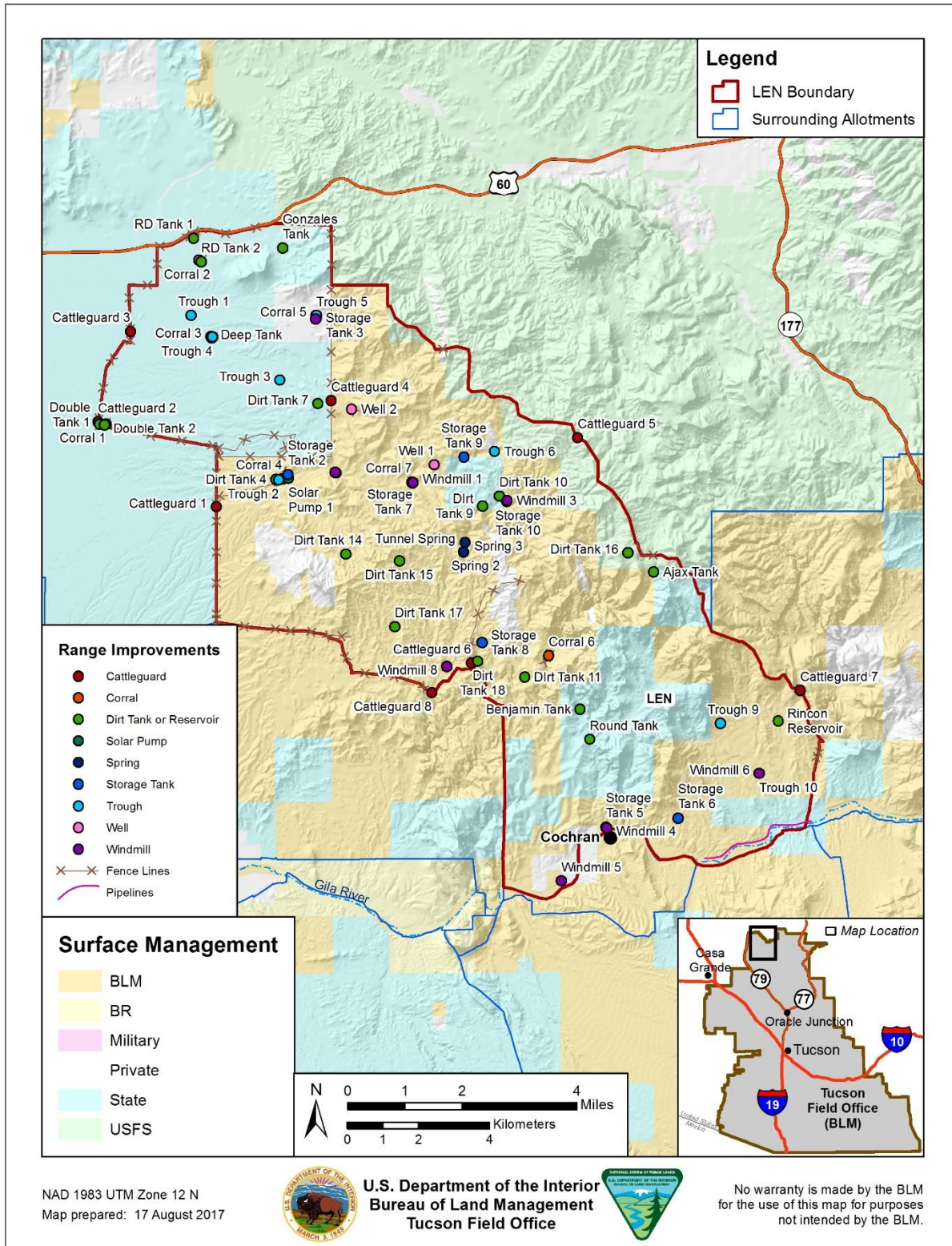
The allotment is divided into three pastures: State, LEN and 15 (Figure 1). Allotment case file records, augmented by direct field observations and project inspections conducted November 5 and December 11, 2014, document existing range improvements on the LEN Allotment as follows:

- Ten wells
- Rincon Well
- Headquarters Well
- NE 23 Well
- Box Canyon Well
- Johns Well
- Sunset Mine Well
- Tall Windmill
- Cottonwood Well
- Cottonwood # 2 Well
- Reymert Junction Well
- 7 storage tanks (pumped/perennial water storage)
- 13 troughs
- 20 dirt tanks (ephemeral water storage)
- Three corrals
- Three cattle guards
- Allotment boundary and pasture fences

Figure 8 is a map of the existing range improvements throughout the entire allotment. This mapping exercise was completed using aerial imagery as well as verification from the leaseholder.



Figure 8. Existing range improvements on the LEN Allotment



### 3.2 Mandatory Terms and Conditions for Permitted Use

There is currently one lease issued for 2956 AUMs on public lands. The Mandatory Terms and Conditions of the lease are listed below:

**Table 8 Mandatory Terms and Conditions of the Lease**

Livestock Kind	Grazing Period of Use	Percent Public Land*	Type Use	AUMs
Cattle	3/1 to 2/28	69	Active	2956

\* Percent Public Land is used for calculating AUMs on the BLM acreage. This is not stating the percent of public land within the total allotment.

## 4. OBJECTIVES

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### 4.1 Relevant Planning and Environmental Documents

- Eastern Arizona Grazing Environmental Impact Statement (1987)
- Phoenix District Resource Management Plan (1989)
- Gila District Livestock Grazing Program Biological Opinion, (2012)

### 4.2 Allotment Specific Objectives

#### 4.2.1 Land Health Standards

**Standard 1: Upland Sites**

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

Criteria for meeting Standard 1:

Soil conditions support proper functioning of hydrologic, energy, and nutrient cycles. Many factors interact to maintain stable soils and healthy soil conditions including appropriate amounts of vegetative cover, litter, soil porosity, and organic matter. Under proper functioning conditions, rates of soil loss and infiltration are consistent with the potential of the site.

Ground cover in the form of plants, litter or rock is present in pattern, kind, and amount sufficient to prevent accelerated erosion for the ecological site; or ground cover is increasing as determined by monitoring over an established period of time.

Signs of accelerated erosion are minimal or diminishing for the ecological site as determined by monitoring over an established period of time.

**As indicated by such factors as:**

- Ground Cover
  - Litter
  - Live vegetation, amount and type (e.g. grass, shrubs, trees, etc.)
  - Rock

- Signs of erosion
  - Flow pattern
  - Gullies
  - Rills
  - Plant pedestaling

**Standard 2: Riparian-Wetland Sites**

“Riparian-wetland areas are in proper functioning condition.”

**Criteria for meeting Standard 2:**

Stream channel morphology and functions are appropriate for proper functioning condition for existing climate, landform, and channel reach characteristics. Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high water flows.

Riparian-wetland functioning condition assessments are based on examination of hydrologic, vegetative, soil and erosion-deposition factors. BLM has developed a standard checklist to address these factors and make functional assessments. Riparian-wetland areas are functioning properly as indicated by the results of the application of the appropriate checklist.

As indicated by such factors as:

- Gradient
- Width/depth ratio
- Channel roughness and sinuosity of stream channel
- Bank stabilization
- Reduced erosion
- Captured sediment
- Ground-water recharge
- Dissipation of energy by vegetation

**Standard 3: Desired Resource Conditions**

“Productive and diverse upland and riparian-wetland plant communities of native species exist and are maintained.”

**Criteria for meeting Standard 3:** As part of the LHE process, Desired Plant Community (DPC) objectives were established for important biological resources. DPC objectives address the desired resource conditions based on vegetation attributes, such as composition, structure, and cover that are desired within the allotment. These include establishing vegetative characteristics necessary for soil protection, providing forage and habitat for both livestock and wildlife.

**Key Area L-1 DPC Objectives Schist Hills 10-13” precipitation zone (pz) ecological site.**

Maintain plant species diversity such that the potential plant community is a diverse mixture of desert shrubs, trees, cacti, and perennial grasses and forbs. The aspect is shrubland.

Maintain Grasses/Grass like plants composition of  $\geq 5\%$

Maintain annual grass and forb composition of  $\geq 5\%$

Maintain a palatable shrub composition of  $\geq 30\%$

Maintain vegetative foliar cover at  $\geq 10\%$

Maintain current vegetative diversity in the area.

This key area is located on a northern facing hillslope at an approximate elevation of 2400’.

**Rationale:** The rationale for the DPCs listed above is taken from the NRCS Reference Sheet. NRCS has not developed an ecological site reference key for the Schist Hills 10-13” pz ecological site. The reference sheet used for this Key Area is the Schist Hills 7-10” pz with higher expected vegetative cover values due to the increased rainfall.

Maintaining a perennial grass composition of 5% on this site complies with Sonoran desert tortoise habitat requirements and is appropriate for the site based on its aspect and elevation. Palatable shrub composition of 30% or greater is appropriate for the site based on its aspect and elevation and complies with the expected ranges of shrub production in the Ecological Site Guide. Foliar cover is expected to be between 10% and 15% as per the reference sheet. A vegetative foliar cover of 10% or greater should serve to prevent accelerated erosion beyond what is expected in the reference state. The range of bare ground cover class on the site ranges from 1-2% (Low values due to high rock and gravel cover) based on the reference sheet. Maintaining a bare ground cover class of 10% or less will ensure that soil erosion on the site is consistent with the expected erosion rate of the reference state.

## 5. PLANT LIST

This section includes the list of plant species present or potentially present within the Schist Hills 10-13” pz (Table 10), and Limey Upland 10-13” pz (Table 12) ecological sites located on the public lands within the LEN Allotment. These plant species provide key forage and cover for wildlife species and livestock.

Tables 11 and 13 present lists of species collected at L-1 and L-2 key areas respectively.

**Table 9. Key Plant Species from the Schist Hills 10-13” pz ecological site description.**

Common name	Scientific name
purple threeawn	<i>Aristida purpurea</i>
false mesquite	<i>Calliandra eriophylla</i>
slender janusia	<i>Janusia gracilis</i>
Narrowleaf silverbush	<i>Argythamnia lanceolata</i>
bush muhly	<i>Muhlenbergia porter</i>
yerba de venado	<i>Porophyllum gracile</i>
jojoba	<i>Simmondsia chinensis</i>
desert globemallow	<i>Sphaeralcea ambigua</i>
rough jointfir	<i>Ephedra fasciculata(syn)</i>
flattop buckwheat	<i>Eriogonum fasciculatum</i>
fluffgrass	<i>Dasyochloa pulchella</i>
cane cholla	<i>Cylindropuntia spinosior</i>
buck-horn cholla	<i>Cylindropuntia acanthocarpa</i>
jumping cholla	<i>Cylindropuntia fulgida</i>
dollarjoint pricklypear	<i>Opuntia chlorotica</i>
fishhook barrel cactus	<i>Ferocactus wislizeni</i>
desert lavender	<i>Hyptis emoryi</i>
slender janusia	<i>Janusia gracilis</i>
Engelmann pricklypear	<i>Opuntia engelmannii</i>
desert agave	<i>Agave deserti</i>

foothill palo verde	<i>Parkinsonia microphylla</i>
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Table 10 Summary of plant species on L- 1 Key Area

<b>Species List for LEN Allotment collected May 2014</b>	
<b>Common Name</b>	<b>Scientific Name</b>
<b>Perennial Grasses</b>	
Bush muhly *	<i>Muhlenbergia porteri</i>
<b>Perennial Forbs</b>	
Beetle spurge *	<i>Euphorbia eriantha</i>
Globemallow *	<i>Sphaeralcea spp.</i>
Rough menodora	<i>Menodora scabra</i>
Scorpionweed *	<i>Phacelia</i>
Slender Janusia *	<i>Janusia gracilis</i>
White margin sandmat *	<i>Chamaesyce albomarginata</i>
<b>Trees and Shrubs</b>	
Brittlebush	<i>Encelia farinosa</i>
Catclaw acacia	<i>Senegalia (Acacia) greggii</i>
Calliandra (False mesquite) (Fairy duster) *	<i>Calliandra eriophylla</i>
Creosote *	<i>Larrea tridentata</i>
Desert senna *	<i>Senna armata</i>
Flat top buckwheat *	<i>Eriogonum fasciculatum</i>
Fishhook barrel cactus	<i>Ferocactus wislizenii</i>
Foothills Palo verde	<i>Parkinsonia microphylla</i>
Hedgehog cactus *	<i>Echinocereus spp.</i>
Ironwood	<i>Olyea tesota</i>
Jojoba	<i>Simmondsia chinensis</i>
Ocotillo	<i>Fouquieria splendens</i>
Prickly pear *	<i>Opuntia spp.</i>
Ragweed	<i>Ambrosia ambrosioides</i>
Range ratany	<i>Krameria spp.</i>
Saguaro *	<i>Carnegia gigantea</i>
Staghorn cholla	<i>Opuntia versicolor</i>
Trixis	<i>Trixis californica</i>
Triangle bursage	<i>Ambrosia deltoides</i>
Yerba de venado	<i>Porophyllum gracile</i>

\*Denotes documented desert tortoise plant selection

**Table 11 Key Plant Species from the Limey Upland 10-13” pz ecological site description.**

Common name	Scientific name
purple threeawn	<i>Aristida purpurea</i>
false mesquite	<i>Calliandra eriophylla</i>
slender janusia	<i>Janusia gracilis</i>
Narrowleaf silverbush	<i>Argythamnia lanceolata</i>
bush muhly	<i>Muhlenbergia porteri</i>
yerba de venado	<i>Porophyllum gracile</i>
jojoba	<i>Simmondsia chinensis</i>
desert globemallow	<i>Sphaeralcea ambigua</i>
rough jointfir	<i>Ephedra fasciculata(syn)</i>
flattop buckwheat	<i>Eriogonum fasciculatum</i>
fluffgrass	<i>Dasyochloa pulchella</i>
cane cholla	<i>Cylindropuntia spinosior</i>
buck-horn cholla	<i>Cylindropuntia acanthocarpa</i>
jumping cholla	<i>Cylindropuntia fulgida</i>
dollarjoint pricklypear	<i>Opuntia chlorotica</i>
fishhook barrel cactus	<i>Ferocactus wislizeni</i>
desert lavender	<i>Hyptis emoryi</i>
slender janusia	<i>Janusia gracilis</i>
Engelmann pricklypear	<i>Opuntia engelmannii</i>
desert agave	<i>Agave deserti</i>
foothill palo verde	<i>Parkinsonia microphylla</i>

**Table 12 Summary of plant species on L-2 Key Area**

Species List for LEN Allotment collected May 2014	
Common Name	Scientific Name
<b>Perennial Grasses</b>	
Bush muhly *	<i>Muhlenbergia porteri</i>
fluffgrass*	<i>Dasyochloa pulchella</i>
slim tridens*	<i>Tridens muticus</i>
<b>Annual Forbs</b>	
desert Indianwheat	<i>Plantago ovata</i>
<b>Perennial Forbs</b>	
Rough menodora	<i>Menodora scabra</i>
Slender Janusia *	<i>Janusia gracilis</i>
<b>Trees and Shrubs</b>	
Desert zinnia *	<i>Zinnia acerosa</i>
Fishhook barrel cactus	<i>Ferocactus wislizenii</i>
Foothills Palo verde	<i>Parkinsonia microphylla</i>
Range ratany	<i>Krameria spp.</i>

\*Denotes documented desert tortoise plant selection

## 6. INVENTORY AND MONITORING DATA

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The following information is the inventory and monitoring protocols that were used on the LEN Allotment over the last several years. The dates for monitoring were for L-1 March 2011, and June 2015 and for L-2, July 2017. A Land Health evaluation was completed at L-1 in December 2013 and a Proper Functioning Condition (PFC) was completed at the Cochran crossing in July 2015

### 6.1 Evaluation Protocol

#### 6.1.1 Indicators of Rangeland Health

A rangeland health evaluation provides information on the function of ecological processes (water cycle, energy flow, and nutrient cycle) relative to the reference state for the ecological site or other functionally similar unit for that land area. This evaluation provides information that is not available with other methods of evaluation. It gives an indication of the status of the three attributes chosen to represent the health of the “evaluation area” (i.e., the area where the evaluation of the rangeland health attributes occurs). The three attributes are:

1. Soil/Site Stability (S)
2. Hydrologic (H)
3. Biotic Integrity (B)

The following are the 17 indicators of rangeland health that are evaluated during an evaluation and the attribute(s) they measure:

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

The three attributes of rangeland health (soil/site stability, hydrologic function, and biotic integrity) are evaluated and assigned rating categories for each of the 17 attributes (Technical Reference 1734-6).

Attribute ratings reflect the degree of departure from expected levels for each indicator per the Reference Sheet. The degree of departure may be categorized as:

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

### **6.1.2 Proper Functioning Condition**

Riparian areas are complex, dynamic ecosystems incorporating biological, physical, and chemical processes. The proper functioning condition (PFC) assessment method was created to qualitatively evaluate the foundation of these processes—specifically the functionality of the physical processes occurring on a stream. These physical processes include the interactions of hydrology, stabilizing vegetation, and geomorphology (soils and landform). A quality assessment requires that an interdisciplinary (ID) team with expertise in these subjects assess the stream together. Because the PFC assessment compares each stream to its own potential, it is universally applicable to all but the most highly modified perennial and intermittent streams.

The abbreviation PFC describes both the assessment method and a defined, on-the-ground condition of a riparian area. The on-the-ground condition termed PFC refers to how well physical processes are functioning. A system in PFC has a high likelihood of withstanding a moderately high flow event (such as the 5-, 10- or 25-year flow). If impairment does occur with higher magnitude events, a system in PFC can recover more quickly.

The PFC assessment method refers to a consistent approach for considering hydrologic, vegetative, and geomorphic attributes and processes to assess the condition of riparian areas at a point in time. Information pertaining to 17 attributes and processes of a riparian system is foundational to determining its physical function and is synthesized on an assessment form (appendix A). Based on the responses and comments on the assessment form, an ID team places the stream reach in one of three rating categories:

Proper functioning condition (PFC): A lotic riparian area is considered to be in PFC, or “functioning properly,” when adequate vegetation, landform, or woody material is present to:

- Dissipate stream energy associated with high waterflow, thereby reducing erosion and improving water quality.
- Capture sediment and aid floodplain development.
- Improve floodwater retention and ground-water recharge.
- Develop root masses that stabilize streambanks against erosion.
- Maintain channel characteristics.

A riparian area in PFC will, in turn, provide associated values, such as wildlife habitat or recreation opportunities.

Functional—at risk (FAR): These riparian areas are in limited functioning condition; however, existing hydrologic, vegetative, or geomorphic attributes make them susceptible to impairment.



Nonfunctional (NF): These riparian areas clearly are not providing adequate vegetation, landform, or woody material to dissipate stream energy associated with moderately high flows, and thus are not reducing erosion, improving water quality, etc.

## 6.2 Monitoring Protocols

The standards were assessed for the LEN Allotment by a contracted U.S. Forest Service interdisciplinary team consisting of rangeland management specialists and wildlife biologists (both with additional resource backgrounds in soils and botany).

The interdisciplinary team used rangeland monitoring data, professional observations, and photographs to assess achievement of the Land Health Standards. All study sites were recorded with a GPS using projection of NAD 83.

Quantitative cover, and species composition, collected along each transect (Line Point Intercept) was used in conjunction with qualitative indicators of soil quality, hydrologic function, and biological health (Indicators of Rangeland Health) in order to assess existing condition of ecological sites at L-1 and L-2 within the LEN Allotment. Existing condition was compared to site-specific reference conditions (thought to represent relatively undisturbed states within a given soil--plant community type) in order to determine the level of departure from the potential natural community. Other data collected at L-1 and L-2 was the 17 indicators of rangeland health (NRCS 2005) and utilization.

### 6.2.1 Line Point Intercept (species composition and ground cover)

The method used to obtain transect data pertaining to species composition, and soil cover is the line point intercept (LPI). This method consists of a horizontal, linear measurement of plant intercepts along the course of a line (tape) 100' in LEN. It is designed for measuring grass or grass-like plants, forbs, shrubs, and trees. This method is a rapid, accurate method for quantifying soil cover, including vegetation, litter, rocks and biotic crusts. These measurements are related to wind and water erosion, water infiltration and the ability of the site to resist and recover from degradation. The LPI method measures vegetation cover along a given distance and from that composition is extrapolated.

Table 13 Key-1, LEN Allotment, Percent cover compared from June 2011 to June 2015.

Cover (T = trace)	2011	2015
	%	%
<b>Perennial grasses</b>		
Perennial threeawn	T	T
<b>Perennial forbs</b>		
Bluedicks	T	0
Convolvulus spp. (vine)	T	T
Erigeron spp.	1	0
Globemallow	T	0
Rough mendora	T	0
Slender janusia	0	T
<b>Trees and shrubs</b>		
Barrel cactus	T	0
False mesquite	4	1
Catclaw acacia	1	0

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Flat top buckwheat	0	7
Jojoba	4	2
<b>Cover (T = trace)</b>	<b>2011</b>	<b>2015</b>
	%	%
Ocotillo	4	1
Lycium spp.	0	1
Mesquite	3	2
Palo verde	5	10
Paperflower	1	0
Pincushion cactus	T	0
Prickly Pear	1	0
Range ratany	21	T
Staghorn cholla	2	1
Teddy bear cholla	1	0
Triangle leaf bursage	6	11
Trixis californica	0	T

Table 14 Key-1, LEN Allotment, Percent composition compared from June 2011 to June 2015.

<b>Composition (T – trace)</b>	2011	2015
	%	%
<b>Perennial grasses</b>		
Perennial threeawn	T	T
<b>Perennial forbs</b>		
Bluedicks	T	0
Convolvulus spp. (vine)	1	T
Erigeron spp.	1	0
Globemallow	T	0
Rough mendora	T	0
Slender janusia	0	1
<b>Trees and shrubs</b>		
Barrel cactus	T	0
False mesquite	7	3
Catclaw acacia	1	0
Flat top buckwheat	0	20
Jojoba	8	6
Ocotillo	7	3
Lycium spp.	0	2
Mesquite	5	4
Palo verde	9	29
Paperflower	1	0
Pincushion cactus	T	0

Prickly Pear	2	0
Range ratany	41	T
Staghorn cholla	3	1
Teddy bear cholla	1	0
Triangle leaf bursage	12	29
Trixis californica	0	1

### 6.2.2 Pace Frequency

Pace frequency is the number of times a plant species is present within a given number of uniformly sized sample quadrats (plot frames placed repeatedly across a stand of vegetation). Plant frequency is expressed as percent presence for each species encountered within total number of quadrat placements, therefore, frequency reflects the probability of encountering a particular plant species within a specifically sized area (quadrat size) at any location within the key area. The total number of frequency hits among all species will not equal the total number of quadrat placements and frequency is insensitive to the size or number of individual plants. Frequency is a very useful monitoring method but does not express species composition, only species presence. Frequency is an index that integrates species' density and spatial patterns.

A 40 x 40 cm. (0.16 square meter) quadrat is used for pace frequency applied as follows:

1. Species present within the bounds of the sample quadrat are recorded with a single tally.
2. If no species are present, no frequency data are recorded.
3. Perennial or annual grasses and forbs must be rooted within the quadrat to be counted.
4. A grass or forb plant base present under the quadrat frame is considered "in."
5. Annual plants, grasses and forbs, are counted whether green or dried.
6. Tree/shrub canopy and basal hits are recorded separately. Over time, these parameters can indicate changes in tree/shrub size (canopy) or plant numbers (basal).
7. A canopy hit is any part of the tree or shrub that overhangs the quadrat (enters an imaginary vertical projection of the plot frame).
8. Quadrat placements are placed at one-pace intervals (2-steps), patterned in transects (straight lines) and are run parallel to each other, generally contouring slope, within the area of one ecological site (vegetation and soil type).

### 6.2.3 Fetch

Fetch is the distance from the nearest perennial plant base within 360 degrees of the quadrats ground cover point. Fetch, reported with descriptive statistics, relates to plant distribution and watershed characteristics. Perennial plant cover can reduce soil erosion by creating an obstruction, slowing the rate of overland flow. A shorter distance between perennial plant bases lessens the opportunity for flowing water to acquire the necessary energy to remove soil and litter from a site. Overtime, fetch data can be used to assess changes in the spatial distribution and connectivity of vegetation patches plus document trends in the fragmentation of plant cover for rangeland health evaluation. One-hundred distances were measured in conjunction with pace frequency as baseline data for future monitoring.

### 6.2.4 Dry Weight Rank

Dry weight rank estimates plant composition on a dry weight production basis. This data collection was made using a 40 cm x 40 cm plot frame and 100 placements. The three perennial species within a vertical projection of quadrats placed repeatedly (100 times) comprising the most annual biomass production on a dry weight basis are ranked (first, 2nd, and 3rd most biomass). Multiple ranks are given when less than three species are present. For example, if species A and species B are the two species present, ranks of 1 and 3, 1 and 2, or 2 and 3 are given to species A; if only species B is present, it receives a tally for each rank. No tally was recorded at quadrat placements void of perennial species.

### 6.2.5 Utilization

Utilization is the proportion or degree of the current year's forage production that is consumed or destroyed by animals (including insects). Utilization may refer to either a single plant species, a group of species, or the vegetation as a whole. Utilization is a comparison of the amount of vegetation left compared with the amount of vegetation produced during the year (USDA, NRCS, and USDO, 1996).

**Table 15. Herbaceous (grasses and forbs) utilization classes**

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

Source: Interagency Technical Reference, *Utilization Studies and Residual Measurements*, 1996.

Seven utilization classes show relative degrees of use of available current year's growth (leaders) of key browse plants (shrubs, half shrubs, woody vines, and trees). Each class represents a numerical range of percent utilization. Utilization classes are as follows:

**Table 16. Browse (shrubs, half shrubs, woody vines, and trees) utilization classes**

Rating	Description
0-5%	The key browse plants show no evidence of grazing use or only negligible use.
6-20%	The key browse plants have the appearance of very light use. The available leaders are little disturbed.
21-40%	There is obvious evidence of leader use. The available leaders appear cropped or browsed in patches and 60 to 80% of the available leader growth remains intact.
41-60%	Key browse plants appear rather uniformly utilized and 40 to 60% of the available leader growth remains intact.

Rating	Description
61-80%	The key browse plants are hedged and some plant clumps may be slightly broken. Nearly all available leaders are used and few terminal buds remain. Between 20 and 40% of the available leader growth remains intact.
81-94%	There are indications the key browse species have been utilized repeatedly. There is no evidence of terminal buds and usually less than 20% of available leader growth remains intact. Some, and often much, of the second and third years' growth has been utilized. Hedging (the appearance of browse plants that have been browsed to appear artificially clipped or consistent browsing of terminal buds of browse species that result in excessive lateral branching and a reduction in upward and outward growth) is readily apparent. Key browse plants frequently have broken branches.
95-100%	Less than 5% of the available leader growth on the key browse plants remain intact. Most of the second and third years' growth have been utilized. All key browse plants have major portions broken.

Source: Interagency Technical Reference, *Utilization Studies and Residual Measurements*, 1996.

## 7. MANAGEMENT EVALUATION AND SUMMARY OF STUDIES DATA

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### 7.1 Actual Use

Actual use information will be submitted within 15 days of the end of the grazing year in accordance with 43 CFR 4130.3-2(d). According to billed use the current lessee has paid for the full 2,956 AUMs on the lease since their acquisition in 2015. The previous lessee would occasionally take partial use due to drought.

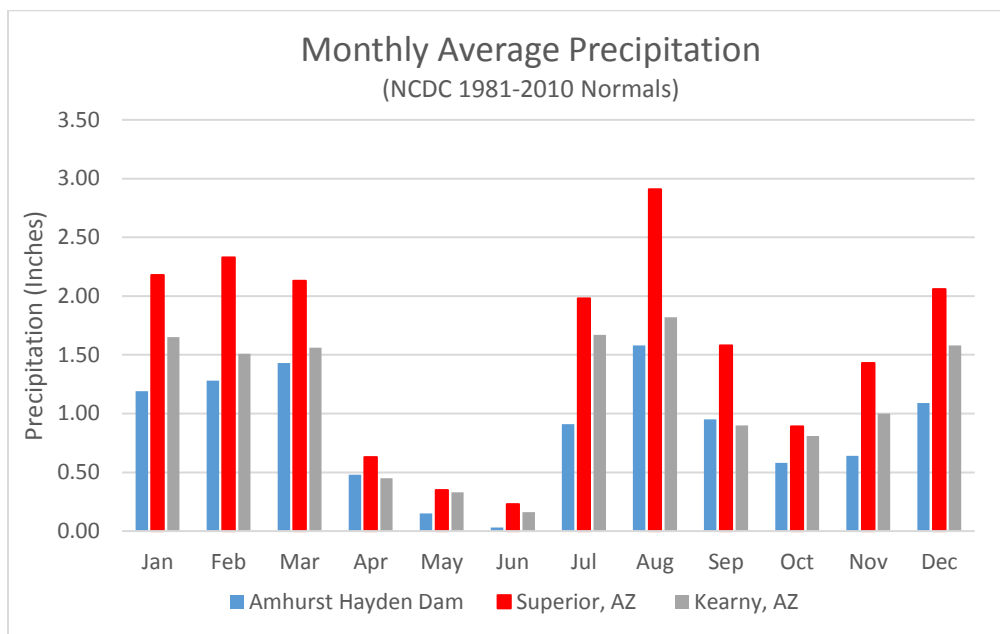
### 7.2 Precipitation

There are three climate-recording stations near the LEN Allotment with sufficient period of records to represent local climate conditions. They are located at the Ashurst Hayden Dam, the town of Superior, and the town of Kearny. Table 18 and Table 19 display the National Climatic Data Center 30-year Normal (1981-2010) from the Western Regional Climate Center.

**Table 17 Climate-recording stations near the LEN Allotment**

	Elev. (ft.)	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep	Oct.	Nov.	Dec.	Total
Ashurst Hayden Dam	1,640	1.19	1.28	1.43	0.48	0.15	0.03	0.91	1.58	0.95	0.58	0.64	1.09	10.31
Superior, AZ	3,000	2.18	2.33	2.13	0.63	0.35	0.23	1.98	2.91	1.58	0.89	1.43	2.06	18.70
Kearny, AZ	1,840	1.65	1.51	1.56	0.45	0.33	0.16	1.67	1.82	0.9	0.81	1.00	1.58	13.44

**Table 18 Monthly Average Precipitation chart.**



### 7.3 Key Area Data

Upland range health was evaluated at two key areas (L-1, L-2 ) and one reach of the Gila River at Cochran crossing (PFC). These key areas were selected for consistency with average livestock use within the allotment. A quantitative and qualitative evaluation of rangeland health indicators was conducted in order to determine if any gaps existed between existing condition and the ecological reference condition. Using these evaluations, it was determined whether or not applicable resource standards were being met within the LEN Allotment and whether adequate perennial grass were present.

#### 7.3.1 Utilization

Utilization measured at the two key areas on LEN Allotment at the time of the study (L-1 2015 and L-2 2017) was 0 percent.

#### 7.3.2 Rangeland Health Evaluations

Tables 20 through 28 below show the results from the evaluation completed in December 2013 through July 2017 on the LEN Allotment at L-1, L-2 and Cochran crossing respectively. Every attribute for L-1 ranked none to slight from the departure of the Schist Hills 10-13” pz reference sheet.

**Table 19. December 13, 2013 summary results from Rangeland Health Evaluation for L-1.**

Rangeland Health Attribute	Departure From Ecological Site Description				
	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Soil/Site Stability	0	0	0	0	10
Hydrologic Function	0	0	0	0	10
Biotic Integrity	0	0	0	0	9

**Table 20. Summary of 17 indicators for Schist Hills 12-16" pz ecological site for L-1.**

17 Indicators Reference Sheet	Rationale from January 2014
1. <b>Number and extent of rills:</b> None	None to slight. None observed
2. <b>Presence of water flow patterns:</b> Uncommon; probably cover no more than 10% of area, discontinuous, very short, usually less than 1 foot in length; broken primarily by high rock and gravel cover.	None to slight. None observed
3. <b>Number and height of erosional pedestals or terracettes:</b> Most perennial grass and shrub plants have accumulated pedestals 1-2 inches in height, respectively. Terracettes are 15-20 feet apart along water flow paths with a 2-inch elevation difference from above to below the terracete. Terracettes are not as stable as those observed in 12-16" pz, in that they are breached more often on this site.	None to slight. None to minor due to wind.
4. <b>Bare ground from Ecological Site Description or other studies (rock, litter, standing dead, lichen, moss, plant canopy are not bare ground):</b> 40-45%, some areas have higher cover on gentler slopes and lower cover on steeper slopes.	None to slight. Almost no bare ground 1%
5. <b>Number of gullies and erosion associated with gullies:</b> none	None to slight. None observed.
6. <b>Extent of wind scoured, blowouts and/or depositional areas:</b> none	None to slight. None observed.
7. <b>Amount of litter movement (describe size and distance expected to travel):</b> Herbaceous litter transported in water flow paths 30-50 feet in length and herbaceous litter moving from bare soil areas.	None to slight. Litter at plant base.
8. <b>Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):</b> No slake test done. Expect ratings of 2-3 in bare areas, and 4-5 under shrub and perennial grass canopies.	None to slight. Soil is naturally armored with rock.
9. <b>Soil surface structure and SOM content (include type and strength of structure, and A-horizon color and thickness):</b> Weak angular to subangular blocky; color is 10YR7/3 dry, 10YR5/3 moist; thickness to 13 inches.	None to slight. None observed.
10. <b>Effect on plant community composition (relative proportion of different functional groups) and spatial distribution on infiltration and</b>	None to slight. Good Plant cover.

17 Indicators Reference Sheet	Rationale from January 2014
<p><b>runoff:</b> 30% canopy cover of large shrubs, succulents, half shrubs and grasses; 50-55% litter cover; approximately 2.5% basal cover; 25% of cover is perennial grasses; 30% of cover is trees and shrubs; cover is well dispersed throughout the site. Note: reference area has a higher cover of mesquite than expected for the site.</p>	
<p>11. <b>Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):</b> No compaction layer on this site; bare soil areas have thin laminar crust from raindrop impact; penetrometer tests with weight drop distance from top of weight to top of impact ring = 2.24 feet were: average = 3.92 inches, s.d. = 1.19 inches. Tests outside IBP enclosure on SRER were average = 2.17, s.d. = 0.4.</p>	<p>None to slight. None observed.</p>
<p>12. <b>Functional/Structural Groups (list in order of descending dominance by above-ground weight using symbols: &gt;&gt;, &gt;, = to indicate much greater than, greater than, and equal to) with dominants and sub-dominants and "others" on separate lines:</b>                      Dominant: large shrubs (mesquite #1, desert hackberry #2, blue paloverde #3, and Mormon tea) &gt; perennial grasses &gt; succulents &gt; half shrubs = annual forbs &amp; grasses.</p>	<p>None to slight. Vegetation community within ESD parameters.</p>
<p>13. <b>Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):</b> Approximately 50% basal cover of perennial grass species and 50% basal cover of sub shrub species has been lost due to prolonged drought.</p>	<p>None to slight. Even age class distribution.</p>
<p>14. <b>Average percent litter cover (50%) and depth (0.5 inch):</b></p>	<p>None to slight. Good litter component.</p>
<p>15. <b>Expected annual production (this is TOTAL aboveground production, not just forage production):</b> 175 lbs. /ac unfavorable precipitation; 750 lbs. /ac normal precipitation; 1340 lbs. /ac favorable precipitation.</p>	<p>None to slight. Good Plant vigor.</p>
<p>16. <b>Potential invasive (including noxious) species (native and non-native). List Species that BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their</b></p>	<p>None to slight. None observed.</p>



17 Indicators Reference Sheet	Rationale from January 2014
<p><b>future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicator, we are describing what is NOT expected in the reference state for the ecological site: mesquite, Opuntia, burroweed, &amp; snakeweed are increasing not invading. Buffleggrass and Lehmann lovegrass.</b></p>	
<p><b>17. Perennial plant reproductive capability:</b> Not affected even following several years of drought period for the region. Good age class distribution of plants.</p>	<p>Good seed production.</p>

**Table 21. A comparison of canopy cover by species or groups of species between the state and transition model in the ESD and the LPI data collected in December 2013 at L-1.**

<i>State in Transition of Native tree, grass, forb, shrub, cacti (Drought/El Nino/Grazing interaction)</i>	<i>LPI Data</i>
Perennial grasses – 0 to 5% Canopy cover	Perennial grasses – 0% Canopy cover
Perennial forbs – 1 to 15% Canopy cover	Perennial forbs – 0% Canopy cover, but JAGR present and abundant outside of the LPI transect
Club moss (SEAR2) – 10 to 50% Canopy cover	SEAR2 - 39% Canopy cover
Other shrubs and succulents – 5 to 20% Canopy cover	Other shrubs and succulents - 31% Canopy cover
Annual forbs and grasses – 5 to 70%	Annual grasses – 18% Canopy cover Annual forbs – 2% Canopy cover

**Table 22. Functional/structural plant groups at L-1.**

Ranking	Species List for Functional/Structural Groups at L-1
D	ERFA2
D	SEAR2
S	AMDE4
S	CAER
S	PAMI5
S	PRVE
S	CAGI10
M	JAGR
M	CYBI
M	SICH
M	Aristida spp.
M	FOSP2
M	Cholla spp.

Dominant (D) roughly 40-100% composition, Sub-dominant (S) roughly 10-40% composition, Minor Composition (M) roughly 2-5% composition, or Trace (T) roughly <2% composition.

**Table 23, July 6, 2017 summary results from Rangeland Health Evaluation for L-2.**

Rangeland Health Attribute	Departure From Ecological Site Description				
	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Soil/Site Stability	0	0	0	0	10
Hydrologic Function	0	0	0	1	9
Biotic Integrity	0	1	0	0	8

**Table 24. Summary of 17 indicators for Limy Uplands 10-13” pz ecological site for L-2.**

17 Indicators Reference Sheet	Rationale from March 2016
1. <b>Number and extent of rills:</b> Waterflow patterns will often generate weakly-defined rills due to low cover on the site. May be continuous from top to bottom of slope.	None to slight. None observed
2. <b>Presence of water flow patterns:</b> Common and widespread, covering up to 35% of bare ground on the site. Gravel armoring helps protect site and limit evidence of waterflow patterns.	None to slight. Natural drainages due to topo features.
3. <b>Number and height of erosional pedestals or terracettes:</b> Pedestals will be common at the base of long-lived perennial grasses and shrubs. Exposed roots should be very rare, and the root-shoot interface should still be protected by the soil.	None to slight. None observed.
4. <b>Bare ground from Ecological Site Description or other studies (rock, litter, standing dead, lichen, moss, plant canopy are not bare ground):</b> 30-40%. Will be lower on sites with high rock cover (needs to be verified). Most areas that have low rock cover on this site will have corresponding higher lichen cover.	None to slight. None observed.
5. <b>Number of gullies and erosion associated with gullies:</b> none	Slight to moderate. Due to topo features.
6. <b>Extent of wind scoured, blowouts and/or depositional areas:</b> none due to high gravel content	None to slight. None observed.
7. <b>Amount of litter movement (describe size and distance expected to travel):</b> Herbaceous and fine woody material may move 1-meter downslope in rills and waterflow patterns. Coarser woody material (>1 cm in diameter) should move little if at all, and only in concentrated waterflow patterns and rills.	None to slight. Litter in place.
8. <b>Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):</b> Average 5-6 under shrub and grass canopies, and 4.5-5.5 in plant	None to slight. Naturally armored.

17 Indicators Reference Sheet	Rationale from March 2016
interspaces due to high microbiotic crust cover (including cyanobacteria) on these sandy loam - fine sandy loam surface textured soils with high carbonate content.	
9. <b>Soil surface structure and SOM content (include type and strength of structure, and A-horizon color and thickness):</b> Weak, fine granular structure in interspaces and weak to moderate fine granular under perennial canopies Very limited evidence of A-horizon development except under perennial canopies.	None to slight. None.
10. <b>Effect on plant community composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:</b> Limited perennial grass basal cover and litter/soil accumulation under shrubs should increase flow path length and infiltration. Higher plant density and cover often associated with the rills, allowing greater retention of water than would otherwise occur on this site.	None to slight. Good litter and perennial plant composition.
11. <b>Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site.</b> None. Will see approximately 1-2 cm. surface crusting in interspaces.	None to slight. None.
12. <b>Functional/Structural Groups (list in order of descending dominance by above-ground weight using symbols: &gt;&gt;, &gt;, = to indicate much greater than, greater than, and equal to) with dominants and sub-dominants and "others" on separate lines:</b> Dominant: Long-lived large shrubs (creosote, bursage) > [short-lived subshrubs< > succulents <> shrub-like perennial grasses with above-ground growing points (e.g. bush muhly and black grama) <> long-lived perennial bunchgrasses (e.g. Aristida sp.)] >> (annual and perennial forbs, short-lived perennial grasses (fluffgrass) , annual grasses, trees, and tree-like shrubs.	Moderate to Extreme. Perennial grass component is missing at this site.
13. <b>Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):</b> Would normally expect to see some mortality in all functional groups in response to drought, especially short-lived perennial grasses and some of the	None to slight. Good age class distribution.

17 Indicators Reference Sheet	Rationale from March 2016
<p>bunchgrasses. Creosote and bursage will lose some branches during drought, and there may be limited dieback of subshrubs, however, there should not be widespread mortality, even during drought, on this drought-adapted site, except for short-lived perennial grasses (fluffgrass).</p>	
<p><b>14. Average percent litter cover ( ) and depth (inches): Near 0% in interspaces, and 10-90% under canopies, depending on time since significant production on the site. This site is extremely dynamic due to high rates of removal in runoff, and high decomposition rates associated with favorable conditions and termite activity.</b></p>	<p>None to slight. Litter production per ESD.</p>
<p><b>15. Expected annual production (this is TOTAL aboveground production, not just forage production):</b> 73 lbs/ac unfavorable precipitation; 285 lbs/ac normal precipitation; 560 lbs/ac favorable precipitation.</p>	<p>None to slight. production estimated at 511 lbs/ac from measurements</p>
<p><b>16. Potential invasive (including noxious) species (native and non-native). List Species that BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicator, we are describing what is NOT expected in the reference state for the ecological site:</b> None. May want to watch Malta starthistle and buffelgrass, but unlikely to move onto this droughty site.</p>	<p>None to slight.</p>
<p><b>17. Perennial plant reproductive capability:</b> Will only see reproduction during favorable years. Significant reproduction will only occur for most perennial species during 10-15 of every 50 years.</p>	<p>None to slight. Per ESD.</p>

**Table 25. A comparison of canopy cover by species or groups of species between the state and transition model in the ESD and the L-2 data collected in July 2017**

<b>State in Transition of Native tree, grass, forb, shrub, cacti (Drought/El Nino/Grazing interaction)</b>	<b>L-2 Data</b>
Perennial grasses, forbs – 1 to 10% Canopy cover	Perennial grasses, forbs – 0% Canopy cover
Creosote bush, 10-20% Canopy	Creosote bush, 12% Canopy
Other shrubs and succulents 5-15% Canopy	SEAR2 - 35% Canopy cover
Annual forbs and grasses – fluctuates with climate (drought/El Nino)	Annual grasses – 0% Canopy cover Annual forbs –0% Canopy cover

**Table 26. Functional/structural plant groups at L-2.**

<b>Ranking</b>	<b>Species List for Functional/Structural Groups at L-2</b>
D	Triangle bursage AMDE4
D	Creosote LATR
S	Jojoba SICH
S	Jumping cholla
S	White rataney
S	Ocotillo
M	Range rataney
M	Christmas cactus
M	Buckhorn cholla

Dominant (D) roughly 40-100% composition, Sub-dominant (S) roughly 10-40% composition, Minor Composition (M) roughly 2-5% composition, or Trace (T) roughly <2% composition.

An ID team consisting of A Range Management Specialist, vegetation monitoring specialist, Hydrologist, Hydrological technician and an Natural Resource Specialist Conducted a PFC assessment on the Gila River at the Cochran crossing on the LEN allotment on 7/30/2015 in accordance with Technical Reference 1737-15 (2015). The PFC assessment method refers to a consistent approach for considering hydrologic, vegetative, and geomorphic attributes and processes to assess the condition of riparian areas at a point in time. Information pertaining to 17 attributes and processes of a riparian system is foundational to determining its physical function and is synthesized on an assessment form.

**Table 27 Summary of Proper Functioning Condition Assessment at Cochran Crossing**

Proper Functioning Condition Assessment at Cochran Crossing – July 2015			
Yes	No	N/A	Hydrology
X			Floodplain above bankfull is inundated in “relatively frequent” events
		X	Where beaver dams are present, they are active and stable. <i>No beaver dams present</i>
X			Sinuosity, width/depth ratio, and gradient are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region)
X			Riparian-wetland area is widening or has achieved potential extant. <i>Has achieved potential extant</i>
X			Upland watershed is not contributing to riparian-wetland degradation. <i>Stable</i>
Vegetation			
	X		Diverse age-class distribution of riparian-wetland vegetation (recruitment for maintenance/recovery). <i>Few young willows</i>
	X		There is diverse composition of riparian-wetland vegetation (recruitment for maintenance/recovery). <i>Dominated by Salt Cedar and Bermuda grass</i>
X			Species present indicate maintenance of riparian-wetland soil moisture characteristics
X			Streambank vegetation comprised of those plants or pant communities that have root mass capable of withstanding high streamflow events
X			Riparian-wetland plants exhibit high vigor
X			Adequate riparian-wetland vegetative cover is present to protect banks and dissipate energy during high flows
X			Plant communities are an adequate source of coarse and/or large woody material (for maintenance/recovery)
Erosion/Deposition			
X			Floodplain and channel characteristics (i.e., rocks, overflow channels, coarse and/or large woody material) are adequate to dissipate energy
		X	Point bars are revegetating with riparian-wetland vegetation. <i>No point bars present</i>
		X	Lateral stream movement associated with natural sinuosity. <i>No lateral stream movement, locked in</i>
X			System is vertically stable (not incising)
X			Stream is in balance with water and sediment being supplied by watershed (i.e., no excessive erosion or deposition).

**Summary Determination**

**Functional rating (check one)**

- Proper functioning condition
- Functional–at risk
- Nonfunctional

**Trend (check one)**

**Monitored trend**

**Apparent trend**

- |                                   |  |
|-----------------------------------|--|
| <input type="checkbox"/> Upward   | <input type="checkbox"/> Upward                  |
| <input type="checkbox"/> Downward | <input type="checkbox"/> Downward                |
| <input type="checkbox"/> Static   | <input checked="" type="checkbox"/> Not apparent |

### **Rationale for rating:**

Regulated flow from Coolidge Dam/San Carlos Reservoir. River is used to transport irrigation water to farmlands downstream. Upstream dam that regulates flow, affecting regeneration of cottonwood and willow trees.

### **7.3.3 Summary of Standards Data**

#### **Standard 1: Upland Sites**

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

#### **Criteria for meeting Standard 1:**

Soil conditions support proper functioning of hydrologic, energy, and nutrient cycles. Many factors interact to maintain stable soils and healthy soil conditions including appropriate amounts of vegetative cover, litter, soil porosity, and organic matter. Under proper functioning conditions, rates of soil loss and infiltration are consistent with the potential of the site.

Ground cover in the form of plants, litter or rock is present in pattern, kind, and amount sufficient to prevent accelerated erosion for the ecological site; or ground cover is increasing as determined by monitoring over an established period of time.

Signs of accelerated erosion are minimal or diminishing for the ecological site as determined by monitoring over an established period of time.

The below indicators were applied to the potential of the ecological site.

#### **As indicated by such factors as:**

- Ground cover
  - Litter
  - Live vegetation, amount and type (e.g. grass, shrubs, trees, etc.)
  - Rock
- Signs of erosion
  - Flow pattern
  - Gullies
  - Rills
  - Plant pedestaling

#### **Evaluation:**

In general, the composition, structure and distribution are present as described within the ESDs throughout a majority of the allotment. However, line point intercept (LPI) cover data collected at both of the key areas indicates that primary plant species, such as tanglehead (*Heteropogon contortus*), sideoats grama (*Bouteloua curtipendula*), bush muhly (*Muhlenbergia porteri*), and native *Aristida* grasses are significantly reduced. These warm season grammanoid species are desirable/preferred species by livestock and wildlife and are decreaseers within a range site because of herbivory. These species were observed within the allotment though at significantly reduced frequencies. Only one of these species occurred within the established monitoring site. Historical livestock grazing combined with drought has caused a significant decrease of primary species within these ecological sites resulting in the annual

native and non-native species to become dominate in many cases. The current vegetative composition of both perennial and annual native species within the allotment, even though shifted from a Climax Community is appropriate for the range site and is conducive to meet the requirements of the Taylor Grazing Act, Federal Land Policy and Management Act, Endangered Species Act, Clean Water Act, and other applicable laws, regulations, and policies. Designated critical habitat for Southwestern willow flycatcher and yellow-billed cuckoo proposed critical habitat overlap BLM-administered lands on the southern border of the allotment. Fences, other control devices, and topography are functioning to exclude cattle from the Gila River on BLM lands (USDI FWS 2012).

The ecological site for the L-2 key area is R040XA111AZ *Limy Uplands 10-13" precipitation zone* ecological site. The ecological site guide indicates litter should be in the range of 5 to 45 percent, with 25 to 85 percent surface fragments. A tolerable range of bare ground would be between 5 and 45 percent.

In 2017, it was observed that overall; the soil on the allotment is stable. The allotment exhibits biotic integrity, and it is in a productive and sustainable condition. Currently, soil loss or degradation is not occurring. Perennial, native grasses are very effective at holding soil cover due to their basal area and their fine fibrous root systems. These grasses contribute organic matter directly into the soil and help build stable soil aggregates. In addition the plant and litter cover provide protection against wind erosion, and it increases infiltration and decreases runoff.

Vegetative cover collected at L-2 is adequate to ensure soil stabilization, and appropriate permeability rates within the ecological system. There were no rills/gullies present at the site, pedestals and/or terracettes were slight to non-existent. Wind scouring and litter movement were none to slight. The ground is naturally armored by rock/gravel (Figure 11).

**Figure 11. Photo of L-2 key area in January 2014**





The approximate potential ground cover (surface, basal, and foliar) is described in Table 29 below, which specifically provides a comparison between the desired conditions as described by the ESD (NRCS 2005) and the current conditions of L-2 in January 2014.

**Table 28. A comparison between conditions described in the ESD (R040XA111AZ) and current conditions of key management areas L-2. Soil cover components include plants (including basal cover), biological crusts, litter, surface fragments, rock, and bare**

	<u>Basal Cover</u>				<u>Biological Crust</u>	<u>Litter</u>	<u>Surface Fragments &gt; 1/4" &amp; &lt;= 3"</u>	<u>Surface Fragments &gt; 3"</u>	<u>Bedrock</u>	<u>Bare Ground</u>
	<u>Grass/Grass like</u>	<u>Forb</u>	<u>Shrub/Vine</u>	<u>Tree</u>						
ESD	0-1%	0-1%	1-3%	0-1%	5-25%	5-45%	25-85%	1-15%	0-0%	5-45%
L-2	3%	0%	3%	0%	0%	7%	63%	2%	0%	25%

Table 30 address the kind and amount (by cover) of vegetation at the sites. Litter should be in the range of 5 to 45 percent, with 1 to 15 percent surface fragments. A tolerable range of bare ground would be between 5 and 45 percent. Foliar cover collected at L-2 was 49 percent with 3 percent basal cover of shrubs. Total litter at L-2 was measured at 7 percent, with bare ground measuring 25 percent. Rock and rock fragments covered 65 percent of the soil surface.

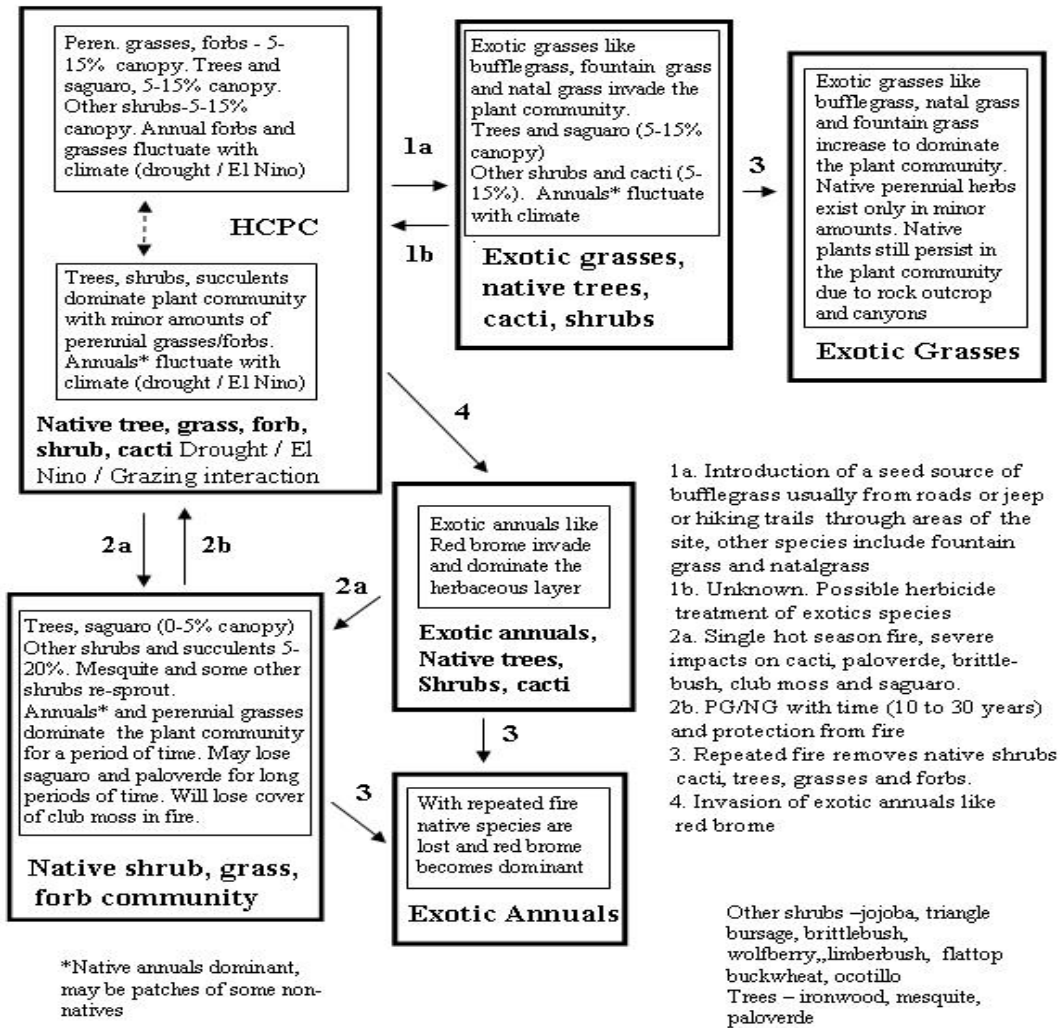
**Table 29. Foliar cover of species recorded in the Line point intercept (LPI) plot for key area L-2 in July of 2017**

Key area information Range site: R040XA111AZ		Species	Line point intercept cover at L-2	
			Foliar Cover	Basal Cover
<b>L-2 LEN Allotment</b>		creosote bush	10%	0%
		jojoba	11%	0%
		jumping cholla	2%	1%
		triangle-leaf bursage	23%	2%
		white ratany	3%	0%
<b>Cover/Litter/Bare Ground</b>				
Foliar Cover	42.6%			
Basal Cover	4%			
Bare Ground	13.9%			

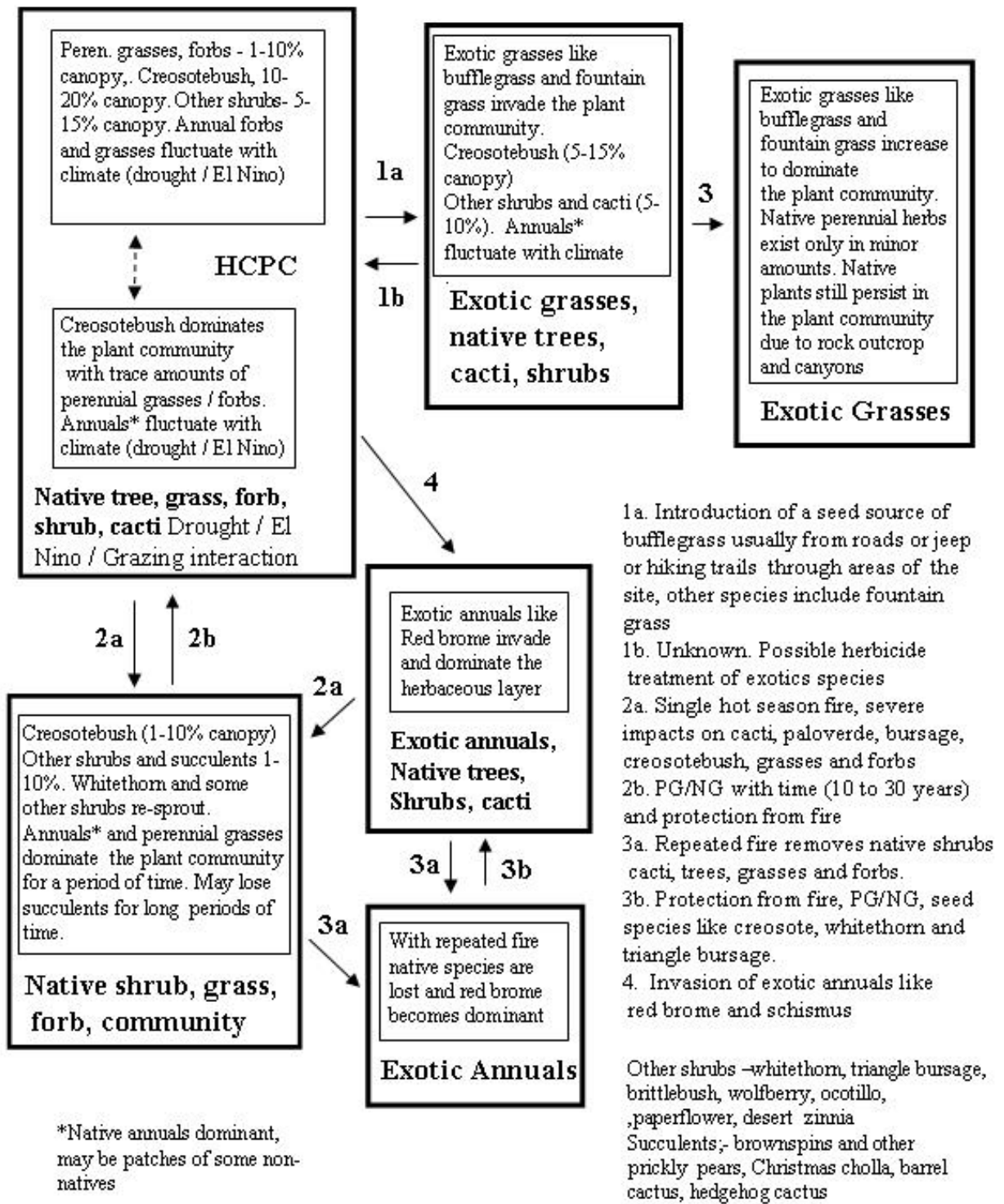
**Conclusion:** The data at the trend plots L-1 and L-2 shows that cover and litter are adequate to ensure soil stabilization and appropriate permeability rates within the ecological sites. The ESDs describe the Ecological Dynamics of the Site on the allotment as plant communities that are “naturally variable” (NRCS 2005). These variations occur due to site aspect, soils, and other natural conditions. The ESD for L-1 describes the Historical Climax Plant Community (HCPC) as “The potential plant community is a diverse mixture of desert shrubs, trees, cacti, and perennial grasses and forbs. The aspect is shrubland.” L-2 reflects these conditions as described within the ESD, which is described as “a diverse community of desert trees, shrubs, cacti, and perennial forbs and grasses”. Overall throughout the allotment the soils are productive, stable and in a sustainable condition. There were no rills/gullies present at any of the ecological sites, pedestals and/or terracettes were slight to non-existent. Wind scouring and litter movement were none to slight. Finally, rocks armor almost the entire allotment. The allotment is within the variability of the state and transition models as delineated in the ecological site descriptions (Figure 12).

**Figure 9 12. Figure 12. State and transition model for Schist Hills and Limy Upland**

**MLRA 40-1 (10-13”), Schist Hills**



### MLRA 40-1 (10-13”), Limy Upland



## **Standard 2: Riparian-Wetland Sites**

### **Criteria for meeting Standard 2:**

Stream channel morphology and functions are appropriate for proper functioning condition for existing climate, landform, and channel reach characteristics. Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high water flows.

Riparian-wetland functioning condition assessments are based on examination of hydrologic, vegetative, soil and erosion-deposition factors. BLM has developed a standard checklist to address these factors and make functional assessments. Riparian-wetland areas are functioning properly as indicated by the results of the application of the appropriate checklist.

As indicated by such factors as:

- Gradient
- Width/depth ratio
- Channel roughness and sinuosity of stream channel
- Bank stabilization
- Reduced erosion
- Captured sediment
- Ground-water recharge
- Dissipation of energy by vegetation

**Evaluation:** A Proper Functioning Condition assessment was conducted on 7-15-2015 along the Gila River at the Cochran Crossing on the south end of the LEN Allotment. The assessment found that the area was in proper function condition with a stable trend. Of the 17 indicators of condition, only two were not properly functioning. Those two were diverse age class distribution of riparian-wetland vegetation and diverse composition of riparian-wetland vegetation. Those two were rated as not functioning because there were few young willows along the banks, and there were only 7 trees/shrub species, three perennial forb/grass/grass like and four annual grasses present.

## **Standard 3 Desired Resource Conditions**

“Productive and diverse upland and riparian-wetland plant communities of native species exist and are maintained.”

### **Criteria for meeting Standard 3:**

Upland and riparian-wetland plant communities meet desired plant community objectives. Plant community objectives are determined with consideration for all multiple uses. Objectives also address native species, and the requirements of the Taylor Grazing Act, Federal Land Policy and Management Act, Endangered Species Act, Clean Water Act, and appropriate laws, regulations, and policies.

Desired plant community objectives will be developed to assure that soil conditions and ecosystem function described in Standards 1 and 2 are met. They 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. Thus, desired plant community objectives will be used as an indicator of ecosystem function and rangeland health.

**As indicated by such factors as:**

- Composition
- Structure
- Distribution

Exceptions and exemptions (where applicable):

Ecological sites or stream reaches on which a change in existing vegetation is physically, biologically, or economically impractical.

**Evaluation:** In general, the composition, structure and distributions of plant communities are present as described within the ESDs throughout a majority of the allotment. The current vegetative composition of both perennial and annual native species within the allotment is appropriate for the range site and is conducive to meet the requirements of the Taylor Grazing Act, Federal Land Policy and Management Act, Endangered Species Act, Clean Water Act, and other applicable laws, regulations, and policies.

Current livestock presence and management dictates habitat condition relative to the stable state vegetative community that has developed on each site because of the long term grazing impacts. Overall, this allotment provides adequate habitat for wildlife species.

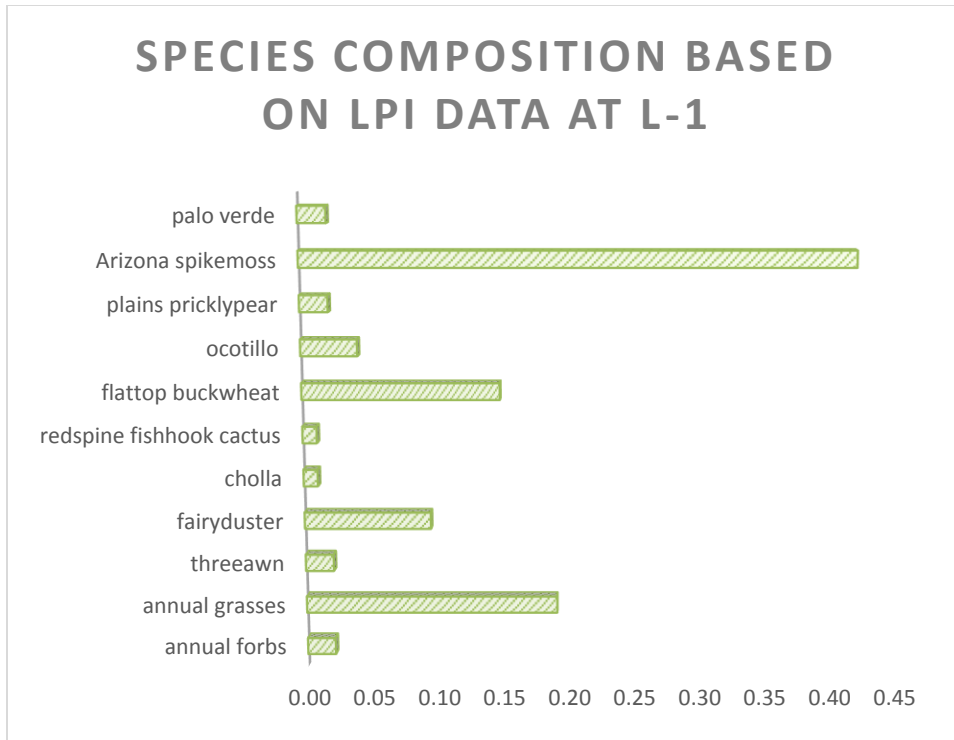
The vegetative community at L-1 and L-2 represents the composition, structure, and distribution of the HCPC state at L-1 “The potential plant community is a diverse mixture of desert shrubs, trees, cacti, and perennial grasses and forbs. The aspect is shrubland.” L-2 reflects the conditions as described within the ESD, which is “a diverse community of desert trees, shrubs, cacti, and perennial forbs and grasses”.

Though sites L-1 and L-2 are lacking some as described within the state and transition model, this is a direct result of “*natural variability of the site*” with respect to soil, aspect and precipitation (Table 18). The functional/structure group was found to have none or only a slight deviation from the reference community as described within the ESD (Table 31). The total vegetative foliar cover for the L-1 site was 75 percent and L-2 was 42%. The site is armored by rock (> 52 percent cover) on the soil surface, which protects plant species from livestock and wildlife use. This helps maintain plant diversity overtime as described in the ESD. Based on observations, the allotment had only a slight deviation from the reference community as described by the ESD for the functional/structural groups. Although slight deviations from the reference community could exist within the allotment, the composition and structure of the vegetation still provides well-distributed habitat for wildlife (general wildlife and sensitive species).

**Table 30. A comparison between the state and transition model in the ESD and the LPI data collected in January 2014 at L-1.**

State in Transition of HCPC Site as described by the ESD for Native grass, forb, half-shrub	LPI Data L-1 Foliar Cover
perennial grasses and forbs 5-15% Canopy Cover	threeawn sp. – 2% Arizona Spike moss – 39%
Trees and Saguaros 5-15% Canopy Cover	Palo verde – 2%
Other Shrubs 5-15% Canopy Cover	Fairy duster 9% flattop buckwheat – 14% succulents – 7%

State in Transition of HCPC Site as described by the ESD for Native grass, forb, half-shrub	LPI Data L-1 Foliar Cover
Annual forbs and grasses fluctuate with climate	Annual forbs – 2% Annual grasses – 18%



**Table 31. Species Functional/Structural Groups at L-1 based on LPI data collected in December 2013.**

Ranking	Species List for Functional/Structural Groups at L-1
D	ERFA2
D	SEAR2
S	AMDE4
S	CAER
S	PAMI5
S	PRVE
S	CAGI10
M	JAGR
M	CYBI
M	SICH
M	Aristida spp.
M	FOSP2
M	Cholla spp.

**Dominant (D) roughly 40-100% composition, Sub-dominant (S) roughly 10-40% composition, Minor Composition (M) roughly 2-5% composition, or Trace (T) roughly <2% composition.**

**Conclusion:** The current vegetative composition of native species within the allotment is appropriate for L-1 and is conducive to meet the requirements of the Taylor Grazing Act, Federal Land Policy and



Management Act, Endangered Species Act, Clean Water Act, and other applicable laws, regulations, and policies that support a productive and a diverse native biotic community. L-2 key area is sufficiently vegetated by shrubs that supports soil productivity and protection and provides forage and habitat for both wildlife and livestock. The presence of perennial species as described within the ESD within the allotment is an indicator that the overall ecological condition within the community is functioning within the parameters of the ESD. Generally the composition, structure, and distribution of habitat for the threatened, endangered, and sensitive species is intact and is suitable for use if the species is present.

Specifically, for Sonoran desert tortoise, approximately 3 percent of foliar cover measured on the key area L-2 transects is comprised of grasses/grass like plants known to be utilized as forage by Sonoran desert tortoise (Van Devender 2002). Given the level of grass cover on site L-2, particularly viewed in light of the low level of utilization observed (0 percent), forage exists and will continue to exist on the allotment in adequate abundance to support Sonoran desert tortoise. The allotment will continue to support tortoise if all other habitat factors for the species (e.g. availability of denning opportunities) also exist.

**Standard 3: Desired Plant Community Objectives**

As part of the land health evaluation process, Desired Plant Community (DPC) objectives were established for important biological resources. DPC objectives address the desired resource conditions based on vegetation attributes, such as composition, structure, and cover that are desired within the allotment. These include establishing vegetative characteristics necessary for soil protection, providing forage and habitat for both livestock and wildlife.

Grasses/grass like components of the DPCs provide important forage resources for Sonoran desert tortoise by providing protein for nutrition and to help tortoises excrete excess potassium. Shrub components provide forage for grazing wildlife such as mule deer, as well as foliar cover for smaller animals such as rabbits, quail and tortoise.

**R040XA119AZ Schist Hills 10-13" precipitation zone:**

Maintain plant species diversity such that warm season perennial grasses dominate the potential plant community on this site. Many species of shrubs and succulents are well represented on the site. Larger shrubs are concentrated at the edges of rock outcrops and in canyon bottoms. All the major grass species are well dispersed throughout the plant community. The aspect is shrub dotted grassland.

**Conclusions:**

**Key Area L-1**

- |  |                      |
|--|----------------------|
| • Maintain Grasses/Grass like plants composition of $\geq 5\%$ | NOT ACHIEVED         |
| • Maintain annual grass and forb composition of $\geq 5\%$     | ACHIEVED             |
| • Maintain a palatable shrub composition of $\geq 30\%$        | ACHIEVED             |
| • Maintain vegetative foliar cover at $\geq 10\%$              | ACHIEVED             |
| • Maintain current vegetative diversity in the key area        | BASELINE-ESTABLISHED |

Maintaining a perennial grass composition of 5% on this site complies with Sonoran desert tortoise habitat requirements and is appropriate for the site based on its aspect and elevation. Palatable shrub composition of 30% or greater is appropriate for the site based on its aspect and elevation and complies with the expected ranges of shrub production in the Ecological Site Guide. Foliar cover is expected to be between 10% and 15% as per the reference sheet. A vegetative foliar cover of 10% or greater should

serve to prevent accelerated erosion beyond what is expected in the reference state. The range of bare ground cover class on the site ranges from 1-2% (Low values due to high rock and gravel cover) based on the reference sheet. Maintaining a bare ground cover class of 10% or less will ensure that soil erosion on the site is consistent with the expected erosion rate of the reference state. Therefore; the data collected in 2014 establishes the baseline for monitoring trend in vegetative diversity.

**Key Area L-2**

- |  |                          |
|--|--------------------------|
| • Maintain Grasses/Grass like plants composition of $\geq 2\%$ | NOT ACHIEVED             |
| • Maintain annual grass and forb composition of $\geq 5\%$     | ACHIEVED                 |
| • Maintain a palatable shrub composition of $\geq 40\%$        | ACHIEVED                 |
| • Maintain vegetative foliar cover at $\geq 5\%$               | ACHIEVED                 |
| • Maintain current vegetative diversity in the key area        | BASELINE-<br>ESTABLISHED |

The grass composition objective is not being met at the L-2 key area. The most current long-term monitoring data shows a perennial grass composition of 0 percent (Table 12) which is within the range of the Historic Climax Plant Community under drought stress. The site was chosen to be a likely location for SDT. This included natural landscape features that could be used for shelter. We now have a baseline for future monitoring to be based on this established baseline.

Rationale for the DPCs listed above is taken from the NRCS Ecological Site Guide. The reference sheet used for this L-2 is the Limy Upland 10-13" pz ecological site.

Maintaining a perennial grass and forb composition of 5 percent on this site complies with Sonoran desert tortoise habitat requirements and is appropriate for the site based on its aspect and elevation.

## 8. DETERMINATION OF LAND HEALTH STANDARDS

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

With the commitment of BLM to ecosystem and interdisciplinary resource management, the standards for rangeland health as developed in this current process will be incorporated into management goals and objectives. The standards and guidelines for rangeland health for grazing administration, however, are not the only considerations in resolving resource issues.

### Standard 1: Upland Sites

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

Determination:

- Meeting the Standard
- Not Meeting the Standard; Making Significant Progress Toward Standard
- Not Meeting the Standard; Not Making Significant Progress Toward Standard
- Standard Does Not Apply

**Conclusion:** Standard Achieved.

**Rationale:** The data at the trend plot shows that cover and litter are adequate to ensure soil stabilization and appropriate permeability rates within the ecological site. The ESDs describe the ecological dynamics of the site on the allotment as plant communities that are “naturally variable” (NRCS 2005). These variations occur due to site aspect, soils, and other natural conditions. The ESDs for L-1 and L-2 describes the Historical Climax Plant Community (HCPC) as “The potential plant community on this site is dominated by warm season perennial grasses. Many species of shrubs and succulents are well represented on the site. Larger shrubs are concentrated at the edges of rock outcrops and in canyon bottoms. All the major grass species are well dispersed throughout the plant community. The aspect is shrub dotted grassland. With continuous, heavy grazing, herbaceous forage species and palatable half shrubs are removed from the plant community and replaced by increases in shrubby species like little leaf paloverde, white brittlebush, ocotillo, triangle bursage, and cholla.” The key area reflects these conditions as described within the ESD. Overall throughout the allotment the soils are productive, stable and in a sustainable condition. There were no rills/gullies present at any of the ecological sites, pedestals and/or terracettes were slight to non-existent. Wind scouring and litter movement were none to slight. Finally, rocks armor almost the entire allotment. The allotment is within the variability of the state and transition models as delineated in the ecological site descriptions.

### Standard 2: Riparian-Wetland Sites

Objective: Riparian-wetland areas are in proper functioning condition.

Determination:

- Meeting the Standard
- Not Meeting the Standard; Making Significant Progress Toward Standard
- Not Meeting the Standard; Not Making Significant Progress Toward Standard
- Standard Does Not Apply

**Conclusion:** Standard Achieved.

**Rationale:** A Proper Functioning Condition assessment was conducted on 7-15-2015 along the Gila River at the Cochran Crossing on the south end of the LEN Allotment. The assessment found that the area was in proper function condition with a stable trend. Of the 17 indicators of condition, only two were not properly functioning. Those two were diverse age class distribution of riparian-wetland vegetation and diverse composition of riparian-wetland vegetation. Those two were rated as not functioning because there were few young willows along the banks, and there were only 7 trees/shrub species, three perennial forb/grass/grass like and four annual grasses present. It was noted that the water flow is regulated from the San Carlos reservoir upstream for irrigation purposes and the timing of the releases do not support the recruitment of cottonwood and willow trees.

### **Standard 3: Desired Resource Conditions**

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

- Maintain Grasses/Grass like plants composition of  $\geq 5\%$
- Maintain a palatable shrub composition of  $\geq 40\%$
- Maintain vegetative foliar cover at  $\geq 10\%$
- Maintain current vegetative diversity in the key areas.

Determination:

- Meeting the Standard
- Not Meeting the Standard; Making Significant Progress Toward Standard
- Not Meeting the Standard; Not Making Significant Progress Toward Standard
- Standard Does Not Apply

**Conclusion:** (Standard Achieved).

**Rationale:** In general, the composition, structure and distribution are present as described within the ESDs throughout a majority of the allotment. However, line point intercept (LPI) cover data collected at both of the key areas indicates that primary plant species, such as tanglehead (*Heteropogon contortus*), sideoats grama (*Bouteloua curtipendula*), bush muhly (*Muhlenbergia porteri*), and native *Aristida* grasses

are significantly reduced. These warm season grammanoid species are desirable/preferred species by livestock and wildlife and are decreaseers within a range site as a result of herbivory. These species were observed within the allotment though at significantly reduced frequencies. Only one of these species occurred within the established monitoring site. Historical livestock grazing combined with drought has caused a significant decrease of primary species within these ecological sites resulting in the annual native and non-native species to become dominate in many cases. The current vegetative composition of both perennial and annual native species within the allotment, even though shifted from a Climax Community is appropriate for the range site and is conducive to meet the requirements of the Taylor Grazing Act, Federal Land Policy and Management Act, Endangered Species Act, Clean Water Act, and other applicable laws, regulations, and policies. Designated critical habitat for Southwestern willow flycatcher and yellow-billed cuckoo proposed critical habitat overlap BLM-administered lands on the southern border of the allotment. Fences, other control devices, and topography are functioning to exclude cattle from the Gila River on BLM lands (USDI FWS 2012).

The BLM sensitive species that have suitable habitat present and are known or have the potential to exist within this allotment are Sonoran desert tortoise, lowland leopard frog, bald eagle (winter), American peregrine falcon, Townsend's big-eared bat, Arizona Myotis, greater western mastiff bat, Mexican long-tongued bat, golden eagle, Sonora mud turtle, and Pima Indian mallow. The Sonoran desert tortoise has Category 2 habitat identified within the allotment. The tortoise occur most commonly on rocky, steep slopes and bajadas (lower mountain slopes) often formed by the coalescing of several alluvial fans and in paloverde-mixed cacti associations.

The bird species utilize the grassland, open shrub, and cliff habitat for rooting and hunting prey. The aquatic species including the frog, turtles, and possibly spring snails are associated with the riparian habitat available at any spring sources and near the Gila River. The bat species may occur on the allotment if roosting habitat is available in cliffs, caves, or mines. The bat species utilize the desert habitats for foraging for nectar, pollen, insects or fruits. The Pima Indian mallow grows in full sun within higher elevation Sonoran Desert Shrub on rocky hillsides, cliff bases, canyon bottoms, lower side slopes and ledges of canyons among rocks and boulders.

The vegetative community at L-1 represents the composition, structure, and distribution of an HCPC community that has been affected by drought and historical heavy grazing. The ESD describes this state as "*a diverse mixture of desert shrubs, cacti, trees and perennial grasses and forbs. Continuous, heavy grazing, removes herbaceous forage species and palatable half shrubs from the plant community and they are replaced by increases in shrubby species like littleleaf paloverde, white brittlebush, ocotillo, triangle bursage, and cholla. Cover of club moss (SEAR2) ranges from 10 to 50%. Grass (perennial) canopy cover ranges from 0-5%. The percent of annual forbs and grasses in the plant community can range from 5% in dry years to nearly 70% in very wet winters or summers. Severe drought can reduce the cover of perennial grasses and suffrutescent forbs to less than 1%.*" The functional/structure group was found to have none or only a slight deviation from the reference community as described within the ESD. This slight departure is due to the diminished quantity of perennial grasses that would be found in an HCPC community.

## 9. RECOMMENDED MANAGEMENT ACTIONS

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Based on existing information there are resource concerns related to current livestock use that should be considered before lease issuance. The first concern is the reconstruction of livestock waters that have reached the end of their useful life and need to be reconstructed with more modern construction materials and techniques such as solar powered electric pumps on windmills and water storage tank instead of just water troughs. There is also a concern about maintenance of roads to allow access to the improvements that need to be rebuilt by modern equipment such as rotary well drilling trucks. A third concern is the need for additional water sources away from the Gila River to provide water to livestock during the breeding season for southwestern willow flycatchers and yellow-billed cuckoos. These concerns will be addressed as part of the Proposed Action for the Environmental assessment for the LEN grazing lease renewal. Therefore, the 10-year grazing lease may be renewed with the following terms and conditions:

### 9.1 Proposed Terms and Conditions

**Terms:**

**Table 32 Proposed Terms of new grazing lease.**

Allotment	Livestock # and Kind	Grazing Period of Use	Percent Public Land	AUMs	Type Use
LEN	357 Cattle	3/1 to 2/28	69	2956	Active

**Conditions:**

1. Grazing permit or lease terms and conditions and the fees charged for grazing use are established in accordance with the provisions of the grazing regulations now or hereafter approved by the Secretary of the Interior.
2. They are subject to cancellation, in whole or in part, at any time because of:
  - a. Noncompliance by the permittee/lessee with rules and regulations.
  - b. Loss of control by the permittee/lessee of all or a part of the property upon which it is based.
  - c. A transfer of grazing preference by the permittee/lessee to another party.
  - d. A decrease in the lands administered by the Bureau of Land Management within the allotment(s) described.
  - e. Repeated willful unauthorized grazing use.
  - f. Loss of qualifications to hold a permit or lease.
3. They are subject to the terms and conditions of allotment management plans if such plans have been prepared. Allotment management plans MUST be incorporated in permits or leases when completed.
4. Those holding permits or leases MUST own or control and be responsible for the management of livestock authorized to graze.
5. The authorized officer may require counting and/or additional or special marking or tagging of the livestock authorized to graze.

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6. The permittee's/lessees grazing case file is available for public inspection as required by the Freedom of Information Act.
7. Grazing permits or leases are subject to the nondiscrimination clauses set forth in Executive Order 11246 of September 24, 1964, as amended. A copy of this order may be obtained from the authorized officer.
8. Livestock grazing use that is different from that authorized by a permit or lease **MUST** be applied for prior to the grazing period and **MUST** be filed with and approved by the authorized officer before grazing use can be made.
9. Billing notices are issued which specify fees due. Billing notices, when paid, become a part of the grazing permit or lease. Grazing use cannot be authorized during any period of delinquency in the payment of amounts due, including settlement for unauthorized use.
10. Grazing fee payments are due on the date specified on the billing notice and **MUST** be paid in full within 15 days of the due date, except as otherwise provided in the grazing permit or lease. If payment is not made within that time frame, a late fee (the greater of \$25 or 10 percent of the amount owed but not more than \$250) will be assessed.
11. No Member of, or Delegate to, Congress or Resident Commissioner, after his/her election of appointment, or either before or after he/she has qualified, and during his/her continuance in office, and no officer, agent, or employee of the Department of the Interior, other than members of Advisory committees appointed in accordance with the Federal Advisory Committee Act (5 U.S.C. App.1) and Sections 309 of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 et seq.) shall be admitted to any share or part in a permit or lease, or derive any benefit to arise there from; and the provision of Section 3741 Revised Statute (41 U.S.C. 22), 18 U.S.C. Sections 431-433, and 43 CFR Part 7, enter into and form a part of a grazing permit or lease, so far as the same may be applicable.
12. The operator is responsible for informing all persons who are associated with the allotment operations that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts. Any cultural (historic/prehistoric site or object) or paleontological resource (fossil remains of plants or animals) discovered during operations shall be immediately reported to the Authorized Officer (AO) or his/her designee. All operations in the immediate area of the discovery shall be suspended until written authorization to proceed is issued. An evaluation of the discovery shall be made by a qualified archaeologist or paleontologist to determine appropriate actions to prevent the loss of significant cultural or scientifically important values.
13. If in connection with this work any human remains, funerary objects, sacred objects or objects of cultural patrimony as defined in the Native American Graves Protection and Repatriation Act (P.L. 101-601; 104 Stat. 3048; 25 U.S.C. 3001) are discovered, operations in the immediate area of the discovery shall cease, the remains and objects shall be protected, and the operator shall immediately notify the BLM TFO. The immediate area of the discovery shall be protected until notified by the BLM TFO Manager that operations may resume.
14. Livestock will not be grazed on public lands within the Gila River during the period from April 1 to October 1 annually. If livestock are found in the river inside the exclusion fencing, they will be promptly removed within 14 days and the fence repaired by the lessee to prevent further unauthorized grazing. The BLM will be notified within 5 business days of all instances of livestock grazing within the riparian area during the time of exclusion.

15. The grazing lessee is responsible for the maintenance and upkeep of the riparian exclusion fences along the Gila River.



## 10. LIST OF PREPAREERS AND REVIEWERS

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**Table 33 Field Data Collected and Prepared By**

<b>Name</b>	<b>Organization</b>	<b>Title</b>
Troy Grooms	Forest Service TEAMS USDA Forest Service	Rangeland Management Specialist
Rick Baxter	Forest Service TEAMS USDA Forest Service	Wildlife Biologist
Doug Middlebrook	Forest Service TEAMS USDA Forest Service	Wildlife Biologist
Evan Darrah	Safford Field Office USDI Bureau of Land Management	Geographic Information Specialist

**Table 34 List of Preparers**

<b>Name</b>	<b>Organization</b>	<b>Title</b>
Eric Baker	Tucson Field Office USDI Bureau of Land Management	Rangeland Management Specialist
Keith Hughes	Tucson Field Office USDI Bureau of Land Management	Natural Resource Specialist
Ben Lomeli	Tucson Field Office USDI Bureau of Land Management	Hydrologist
Amy Markstein	Gila District Office USDI Bureau of Land Management	Planning & Environmental Specialist
Amy Sobiech	Tucson Field Office USDI Bureau of Land Management	Cultural Resources Specialist
Darrell Tersey	Tucson Field Office USDI Bureau of Land Management	Natural Resource Specialist

## 11. AUTHORIZED OFFICER CONCURRENCE

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I have reviewed the determinations presented in Section 8 Determinations of Land Health Standards and the grazing and other management actions identified in Section 9 Recommended Management Actions.

I concur with the determinations and recommendations as written.

I do not concur.

I concur, but with the following modifications:

/S/ Karen McKinley \_\_\_\_\_

9-22-2017 \_\_\_\_\_

Karen McKinley

Date

Field Office Manager

BLM Tucson Field Office

## 12. REFERENCES

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