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Land Health Evaluation
Smith Wash Lease No. 6221
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1 INTRODUCTION

The purpose of this draft Land Health Evaluation (LHE) report for the Smith Wash allotment is to evaluate whether the Arizona Standards for Rangeland Health (Standards) are being achieved on the allotment. 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 land health evaluation 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. Standards and guidelines are implemented by the BLM 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 land health on the allotment.

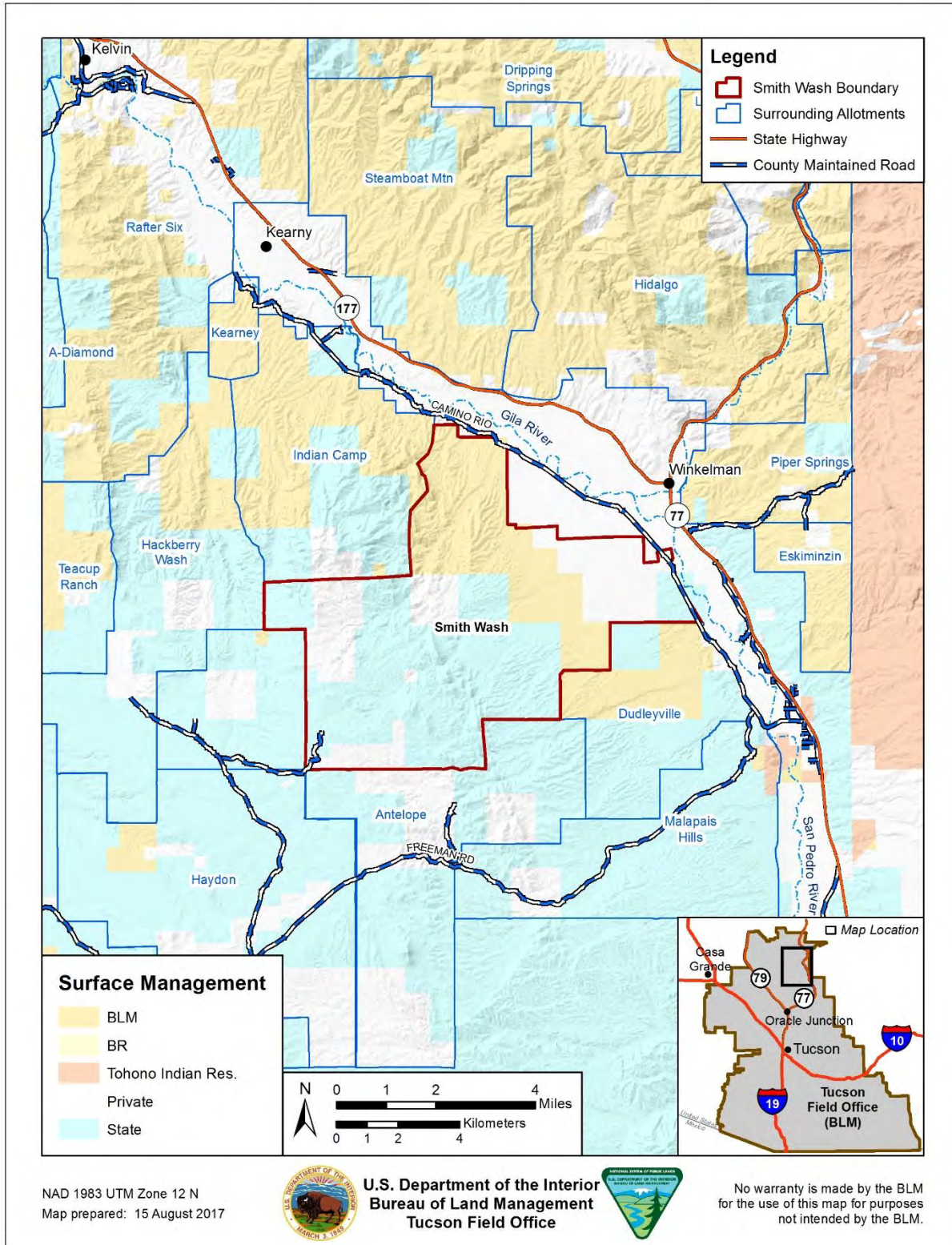
If it is ascertained that Standards are not being achieved, to determine whether livestock grazing is a significant factor causing that non-achievement.

2 ALLOTMENT PROFILE

2.1 Location

The BLM portion of the Smith Wash allotment is located about 2 miles southwest of the town of Winkelman in Pinal County, Arizona. The BLM lands within the allotment comprise approximately 27 percent of the total livestock operation. The Smith Wash allotment borders the Indian Camp allotment to the north, the Dudleyville allotment to the East, the Antelope allotment to the south and the Hayden allotment to the south. Figure 1 below shows the Smith Wash allotment location.

Figure 1. Vicinity Map of the Smith Wash Allotment



2.2 Physical Description

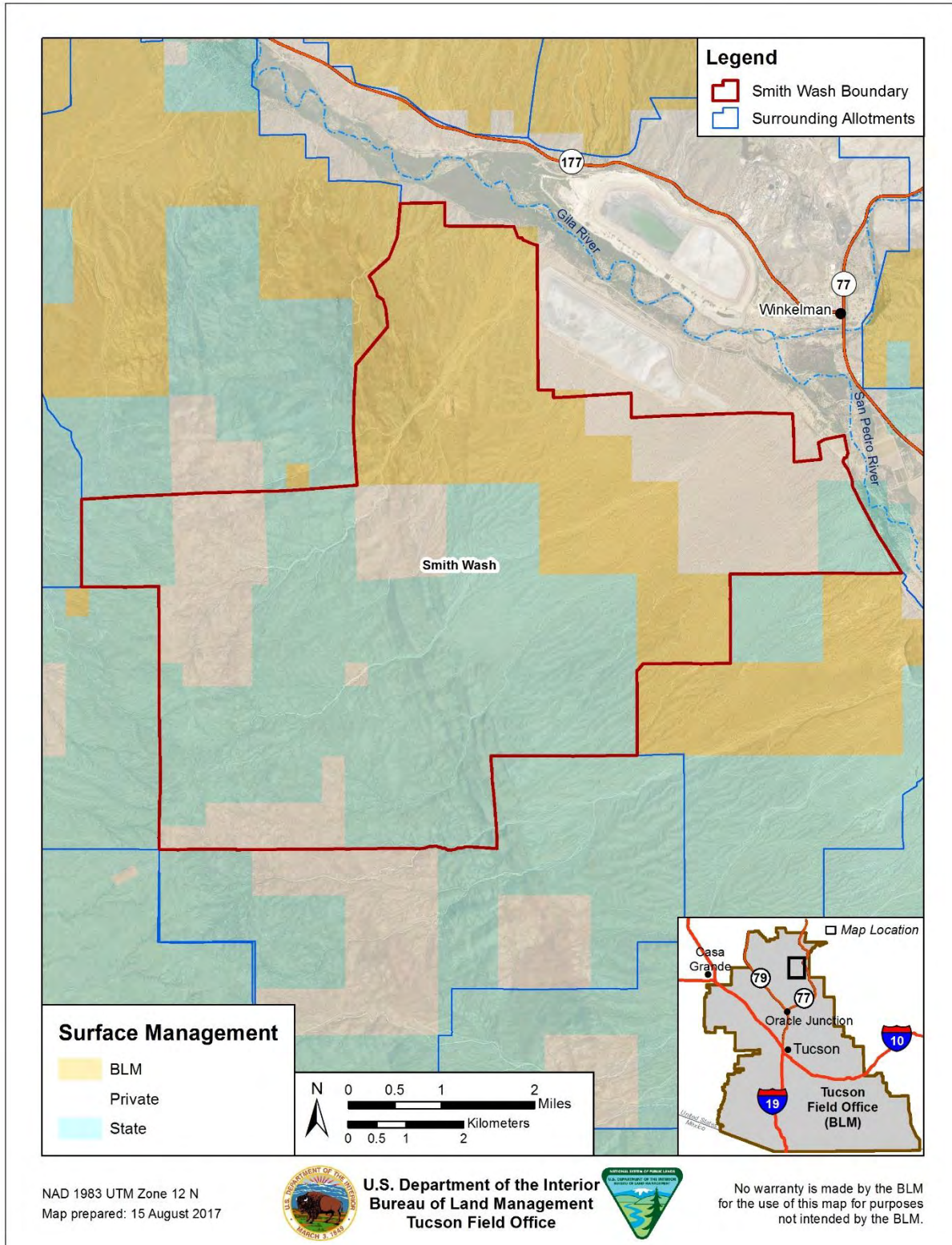
2.2.1 Acreage

The acreage of the Smith Wash allotment is detailed below (Table 1). The BLM lands are all located on the northeastern portion of the allotment. The majority of the allotment is run as a single pasture with no fence lines separating land ownership. Lands within the allotment are predominately State-owned, with lesser amounts of public and private lands. Public lands constitute about 27 percent of the allotment. Spatial distributions of land ownership are displayed in Figure 2.

Table 1. Acreage of Landownership

Land Classification	Smith Wash Allotment
Public Acres	5,292
State Acres	9,431
Private Land Acres	4,613
Total Acres	19,336

Figure 2. Land Ownership of the Smith Wash Allotment



2.2.2 Watershed

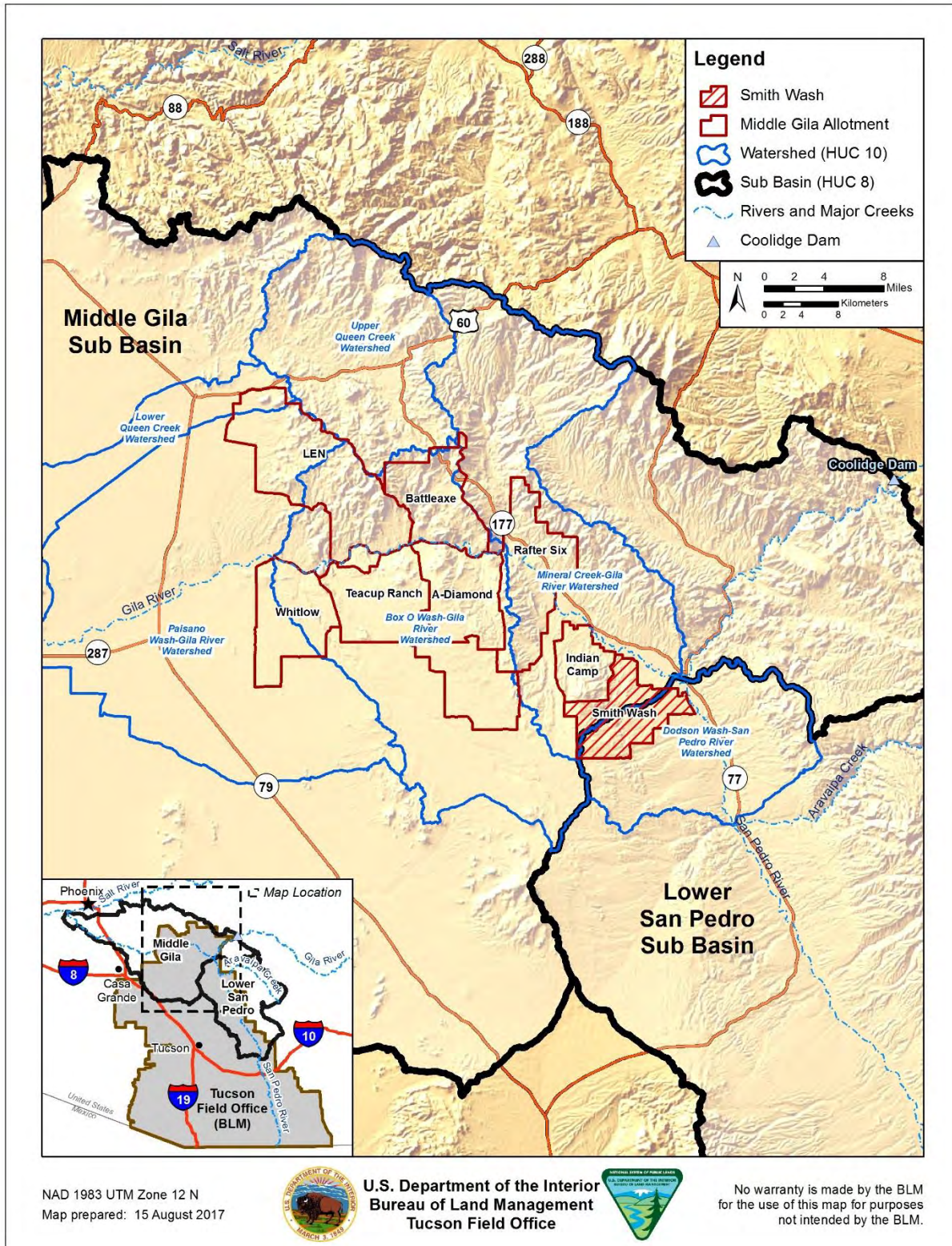
The Smith Wash allotment is located just west of the confluence of the Gila River and the San Pedro River and is thus bisected by two HUC-8 Sub Basins, the Middle Gila and the Lower San Pedro (Figure 3).

The Middle Gila Sub basin encompasses an area of over 2 million acres surrounding the Gila River from below Coolidge Dam to the Salt River confluence, including the confluence with the San Pedro River to the South. Within this sub basin, the Smith Wash allotment is included in the smaller Mineral Creek – Gila River Watershed (HUC-10), which has a drainage area of approximately 165,710 acres.

The Lower San Pedro Sub basin is over 1.2 million acres and includes Aravaipa Creek and the terminus of the San Pedro River. The San Pedro River originates near Cananea, Mexico and travels North a distance of approximately 143 miles before it meets the Gila River. Within the Lower San Pedro Sub basin, the allotment is located in the Dodson wash – San Pedro River watershed (HUC-10), which drains approximately 78,885 acres.

According to the USGS National Elevation Dataset, the Smith Wash allotment ranges in elevation from 1,800 to 4,100 feet, with an average elevation of 3,066 feet. Its slope varies from 0 to 72%, with an average slope of 22%. Additional information about watershed characteristics is located in Section 2.3.1.

Figure 3. Map of watersheds associated with Smith Wash



2.2.3 Soils

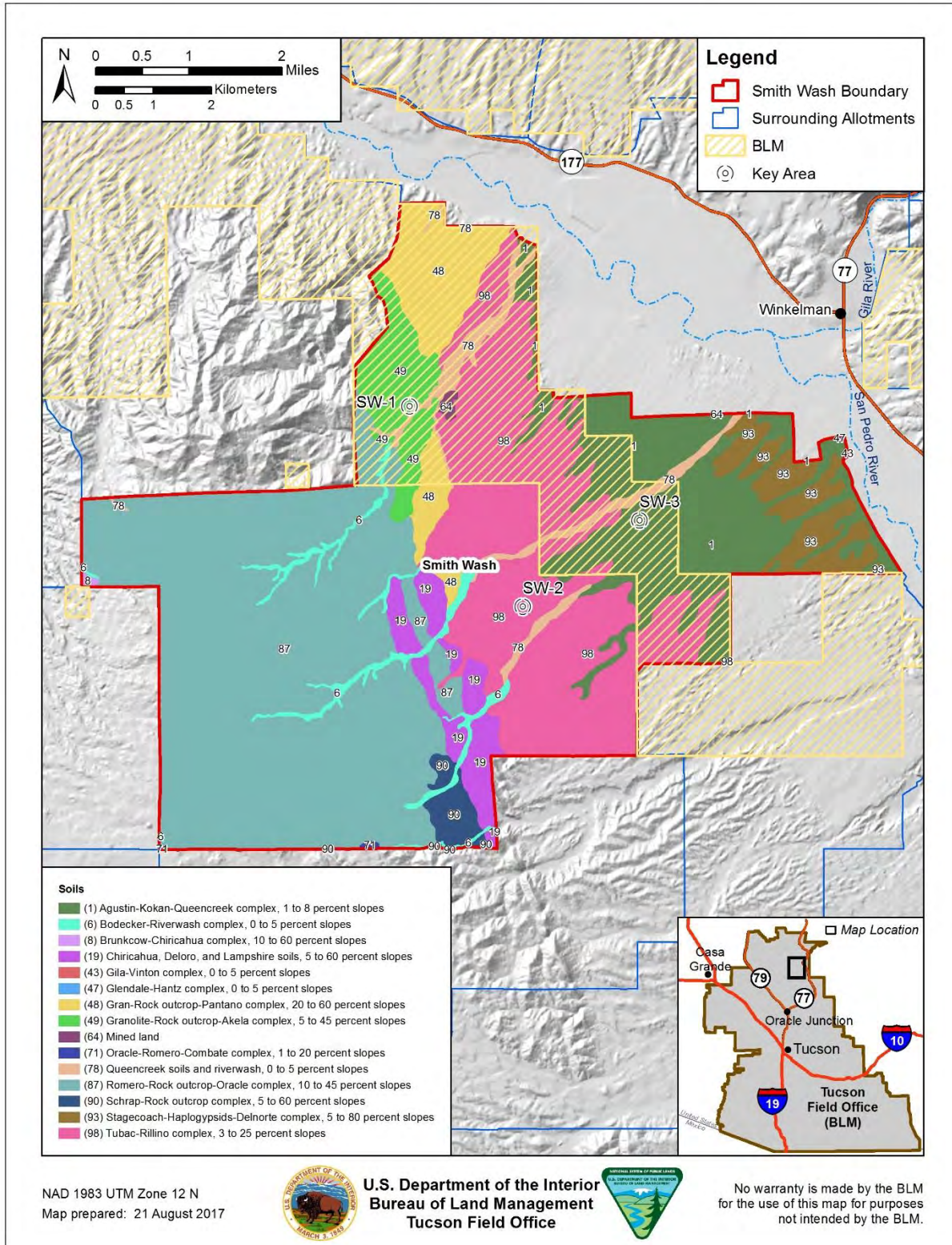
The soil composition on the Smith Wash allotment is varied as presented in Table 2 and Figure 4. The dominant soil orders in this Major Land Resource Area (MLRA) (see section 3.3.1) are Aridisols and Entisols. The soils in the area have a dominantly thermic or hyperthermic soil temperature regime, an aridic soil moisture regime, mixed mineralogy, and are formed in alluvium. They are very shallow to very deep and are well drained to 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. Torrfluvents (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.

The specific soils on the Smith Wash allotment are shown in Table 2 below. The dominant soils are Romero-Rock outcrop-Oracle complex, 10 to 45 percent slopes and Tubac-Rillino complex, 3 to 25 percent slopes. The acreages may not be accurate due to difficulty defining the area of interest in the web soil survey system.

Table 2. Soils on the Smith Wash Allotment

Map Unit Symbol	Map Unit Name	Acres in Allotment	Percent of Allotment Acres
1	Agustin-Kokan-Queen creek complex, 1 to 8 percent slopes	2,904.3	15.6%
6	Bodecker-Riverwash complex, 0 to 5 percent slopes	414.2	2.2%
19	Chiricahua, Deloro, and Lampshire soils, 5 to 60 percent slopes	858.8	4.6%
48	Gran-Rock outcrop-Pantano complex, 20 to 60 percent slopes	943.2	5.1%
49	Granolite-Rock outcrop-Akela complex, 5 to 45 percent slopes	461.4	2.5%
64	Mined land	29.7	0.2%
71	Oracle-Romero-Combate complex, 1 to 20 percent slopes	27.3	0.1%
78	Queen creek soils and riverwash, 0 to 5 percent slopes	515.7	2.8%
87	Romero-Rock outcrop-Oracle complex, 10 to 45 percent slopes	6,123.8	33.0%
90	Schrap-Rock outcrop complex, 5 to 60 percent slopes	331.6	1.8%
93	Stagecoach-Haplogypsids- Delnorte complex, 5 to 80 percent slopes	791.9	4.3%
98	Tubac-Rillino complex, 3 to 25 percent slopes	5,157.5	27.8%
Totals for Allotment		18,559.4	100.0%

Figure 4. Map of Soil Types within the Smith Wash Allotment



2.3 Biological Resources

2.3.1 Major Land Resource Areas

Major Land Resource Areas are geographically associated land resource units, usually encompassing several thousand acres. Natural Resource Conservation Service (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. Major Land Resource Areas are characterized by particular patterns of soils, geology, climate, water resources and land use. The Smith Wash allotment is located in MLRA 40—Sonoran Basin and Range. This area is almost entirely in Arizona, but it includes a very small part of California. It makes up about 31,765 square miles.

Most of this area is in the Sonoran Desert Section of the Basin and Range Province of the Intermontane Plateaus. Many short, fault-block mountain ranges trending southeast to northwest rise abruptly from the smooth or gently sloping desert valley floors. These include the Painted Rock, Gila Bend, Big Horn, Copper, Granite, and Santa Rosa Mountains. Elevation ranges from 980 to 3,600 feet (300 to 1,100 meters) in most of this area. The Gila River then flows west across the southern part of the MLRA to the Colorado River.

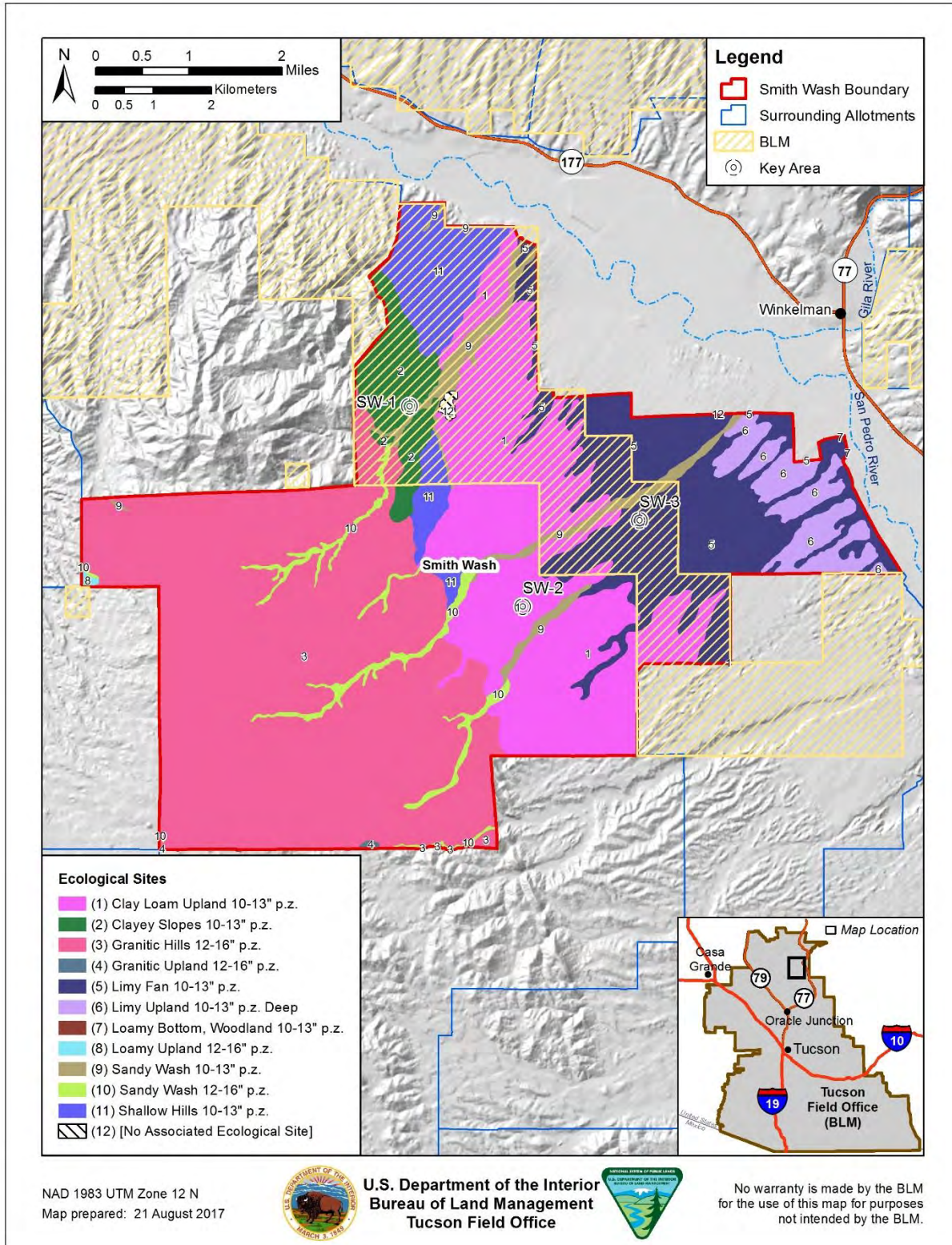
Major Land Resource Areas are broken down further into ecological sites, which are associated units of soil and vegetation with quantifiable characteristics.

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/>.

A total of 10 ecological sites exist within the entire Smith Wash allotment. Two key areas, SW-1 and SW-3, have been established on BLM public lands. Key area SW-1 is within the Schist 10-13" precipitation zone (p.z) ecological site and SW-3 is within the limy fan 10-13" p.z. ecological site, which are the primary ecological sites within the BLM lands in the allotment (Figure 5). Key Areas SW-1 and SW-3 were established by the BLM and University of Arizona Extension, and pace frequency data is collected to track any changes in long-term trend of vegetation and ground cover. SW-1 and SW-3 are also the locations where the U.S. Forest Service TEAMS contractors, documented the 2013 LHE and collected line-point intercept data.

Figure 5. Ecological Sites within Smith Wash Allotment



The ecological site for key area SW-1 is 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 farinosa*), flattop buckwheat (*Eriogonum fasciculatum*) and purple threeawn (*Aristida purpurea*). This site occurs in the upper elevations of the Sonoran Desert in southern Arizona. Slope aspect is site differentiating at elevations near common resource area boundaries. It occurs on steep hill-slopes and ridge-tops. The Historical Climax Plant Community represents the natural potential for plant communities found on relict or relatively undisturbed sites. Other plant communities described here represent plant communities that are known to occur when the site is disturbed by factors such as fire, grazing, or drought. The potential plant community is a diverse mixture of desert shrubs, trees, cacti, and perennial grasses and forbs. The aspect is shrubland. Cool and warm season annual forbs and grasses can be common in their respective seasons with above average rainfall. Perennial forage species can remain green throughout the year with available moisture.

The ecological site for key area SW-3 is Limy Fan 10-13" precipitation zone (R040XA108AZ). Key vegetative species for this site include: creosotebush (*Larrea tridentata*) and bush muhly (*Muhlenbergia porteri*). This site occurs in the upper elevations of the Sonoran Desert in southern Arizona. It occurs on alluvial fans, fan terraces and stream terraces. The potential plant community is a shrubland dominated by creosotebush. Annual forbs and grasses are very important in the plant community on this site, but fluctuate from nearly nothing in dry years to several hundred pounds per acre in wet years. Cryptogams (algae, lichens, mosses) are also important in the plant communities on this site. Cool and warm season annual forbs and grasses can be common in their respective seasons with above average rainfall. Perennial forage species can remain green throughout the year with available moisture.

2.3.3 Climate Data for Ecological Site

Climate data comes from the Schist Hills 10-13" precipitation zone (p.z.) Ecological Site Description (ESD). Data is the same for Limy Fan 10-13". Winter-summer rainfall ratios range from 40-60 percent in the southern portions, 50 percent in the central portions and 40-60 percent in the northern part. Summer rains fall July- September, originate in the Gulf of Mexico and are convective, usually brief, intense thunderstorms. Cool season moisture tends to be frontal, originates in the Pacific and Gulf of California. This winter precipitation falls in widespread storms with long duration and low intensity. Snow is rare and seldom lasts more than an hour or two. May and June are the driest months of the year. Humidity is generally very low. Winter temperatures are mild, with very few days recording freezing temperatures in the morning. Summer temperatures are warm to hot, with several days in June and July exceeding 105 °F. Climate stations for the average precipitation and temperature tables below are: 020287, Anvil Ranch, Period of record 1948-2005, 021282 Carefree, Period of Record 1962-2005, 025700 Mormon Flat, Period of Record 1923-2005, 028214 Stewart Mtn., Period of Record 1948-2005, 028815 Tucson, Univ. of Arizona, Period of Record 1894-2005. For more detail on local precipitation data please refer to section 7.2 below.

Table 3. Precipitation and Temperature Averages for Schist Hills and Limy Fan Ecological Site

A. Averaged Temperature and Precipitation (1894-2005)	
Frost-free period (days):	227
Freeze-free period (days):	0
Mean annual precipitation (inches):	13.00

B. Monthly Precipitation (Inches):												
	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
<i>High</i>	1.60	1.34	1.55	0.51	0.21	0.27	2.02	2.16	1.16	1.02	1.04	1.42
<i>Low</i>	0.89	0.85	0.76	0.39	0.18	0.15	1.23	1.65	0.95	0.75	0.77	0.97

C. Monthly Temperature (°F):													
	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>	<u>Dec</u>
<i>High</i>	63.5	66.6	71.6	79.6	90.0	98.3	101.7	99.9	94.7	84.1	71.1	62.8	48.3
<i>Low</i>	37.6	40.1	44.0	49.8	57.5	66.8	73.9	72.4	66.9	54.8	43.8	38.1	47.1

2.3.4 Vegetation Communities

The Schist Hill and Limy Fan ecological sites support desert shrub vegetation. The giant saguaro cactus is a major species. Bursage (*ambrosia dumosa*), desert wolfberry (*lycium macrodon*), ocotillo (*fouquieria splendens*), cholla (*cylindropuntia*), desert saltbush (*atriplex polycarpa*), mesquite (*prosopis*), brittlebush (*encelia*), burroweed (*ambrosia*), pricklypear (*opuntia*), desert broom (*baccharis sarothroides*), and creosotebush (*larrea tridentate*) are the dominant desert shrubs. Bush muhly (*muhlenbergia porteri*), Arizona cottontop (*digitaria californica*), threeawns (*aristida*), and fluffgrass (*tridens*) are the main understory plants. Winter annuals can grow in some areas, depending on the amount of winter precipitation. Joshua-tree (*yucca brevifolia*) and littleleaf palo verde (*parkinsonia microphylla*) mixed with some honey mesquite (*prosopis glandulosa*) are on stony or rocky sites. These sites have an understory of Mormon tea (*ephedra*), pricklypear, cholla, ocotillo, desert saltbush, and grasses, such as tridens, bush muhly, tobosa (*pleuraphis mutica*), Arizona cottontop, and desert needlegrass (*achnatherum speciosum*). At the lower elevations, creosotebush, ironwood (*casuarina*), mesquite, burroweed, and catclaw (*acacia greggii*) are associated with an understory of threeawns and annuals, such as red fescue (*festuca rubra*), bluegrasses (*poa annua*), fiddleneck (*amsinckia*), indianwheat (*plantago*), globemallow (*sphaeralcea*), and filaree (*erodium cicutarium*). Table 4 belows lists the vegetation communities within the Smith Wash allotment. There are three vegetation types that make up almost 90 percent of the total acreage. Those majority communities are;

1. Apacherian-Chihuahuan Mesquite Upland Scrub. "This ecological system occurs as upland shrublands that are concentrated in the extensive grassland-shrubland transition in foothills and piedmont in the Chihuahuan Desert. It extends into the Sky Island region to the west and the Edwards Plateau to the east. Substrates are typically derived from alluvium, often gravelly without a well-developed argillic or calcic soil horizon that would limit infiltration and storage of winter precipitation in deeper soil layers. Prosopis spp. and other deep-rooted shrubs exploit this deep soil moisture that is unavailable to grasses and cacti. Vegetation is typically dominated by Prosopis glandulosa or Prosopis velutina and succulents. Other desert scrub that may codominate or dominate includes Acacia neovernicosa, Acacia constricta, Juniperus monosperma, or Juniperus coahuilensis. Grass cover is typically low. During the last century, the area occupied by this system has increased through conversion of desert grasslands as a result of drought, overgrazing by livestock, and/or decreases in fire frequency. It is similar to Chihuahuan Mixed Desert and Thorn Scrub but is generally found at higher elevations where

Larrea tridentata and other desert scrub are not codominant. It is also similar to Chihuahuan Stabilized Coppice Dune and Sand Flat Scrub but does not occur on eolian-deposited substrates” (<http://swregap.nmsu.edu>)

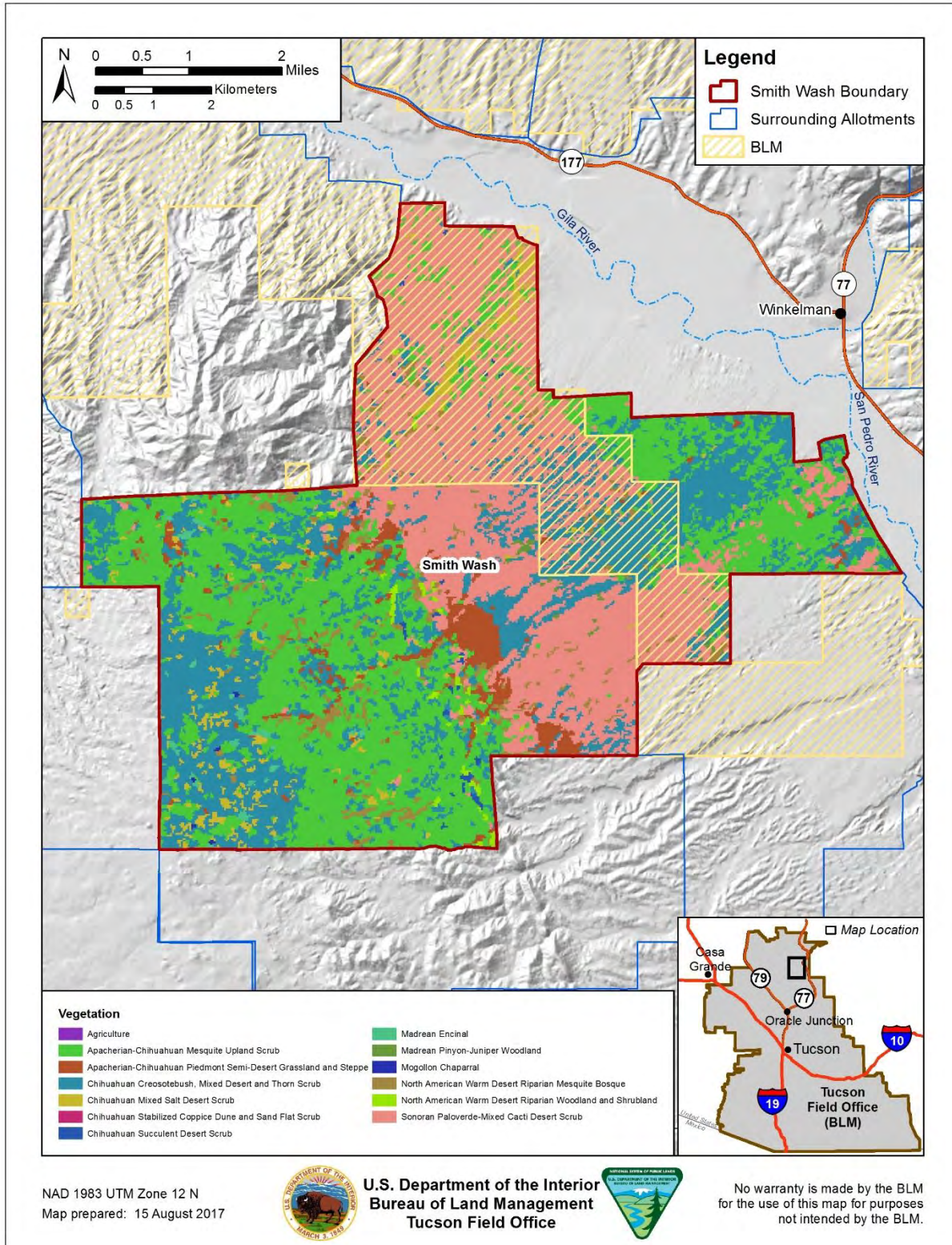
2. Chihuahuan Creosotebush, Mixed Desert and Thorn Scrub. “This widespread Chihuahuan Desert land cover type is composed of two ecological systems the Chihuahuan Creosotebush Xeric Basin Desert Scrub and the Chihuahuan Mixed Desert and Thorn Scrub. This cover type includes xeric creosotebush basins and plains and the mixed desert scrub in the foothill transition zone above, sometimes extending up to the lower montane woodlands. Vegetation is characterized by *Larrea tridentata* alone or mixed with thornscrub and other desert scrub such as *Agave lechuguilla*, *Aloysia wrightii*, *Fouquieria splendens*, *Dasyliirion leiophyllum*, *Flourensia cernua*, *Leucophyllum minus*, *Mimosa aculeaticarpa* var. *biuncifera*, *Mortonia scabrella* (= *Mortonia sempervirens* ssp. *scabrella*), *Opuntia engelmannii*, *Parthenium incanum*, *Prosopis glandulosa*, and *Tiquilia greggii*. Stands of *Acacia constricta* *Acacia neovernicosa* or *Acacia greggii* dominated thornscrub are included in this system, and limestone substrates appear important for at least these species. Grasses such as *Dasyochloa pulchella*, *Bouteloua curtipendula*, *Bouteloua eriopoda*, *Bouteloua ramosa*, *Muhlenbergia porteri* and *Pleuraphis mutica* may be com mon, but generally have lower cover than shrubs.” (<http://swregap.nmsu.edu>)
3. Sonoran Paloverde-Mixed Cacti Desert Scrub . “This ecological system occurs on hillsides, mesas and upper bajadas in southern Arizona and extreme southeastern California. The vegetation is characterized by a diagnostic sparse, emergent tree layer of *Carnegia gigantea* (3-16 m tall) and/or a sparse to moderately dense canopy codominated by xeromorphic deciduous and evergreen tall shrubs *Parkinsonia microphylla* and *Larrea tridentata* with *Prosopis* sp., *Olneya tesota*, and *Fouquieria splendens* less prominent. Other com mon shrubs and dwarf-shrubs include *Acacia greggii*, *A mbrosia deltoidea*, *A mbrosia dumosa* (in drier sites), *Calliandra eriophylla*, *Jatropha cardiophylla*, *Krameria erecta*, *Lycium* spp., *Menodora scabra*, *Sim mondsia chinensis*, and many cacti including *Ferocactus* spp., *Echinocereus* spp., and *Opuntia* spp. (both cholla and prickly pear). The sparse herbaceous layer is composed of perennial grasses and forbs with annuals seasonally present and occasionally abundant. On slopes, plants are often distributed in patches around rock outcrops where suitable habitat is present.” (<http://swregap.nmsu.edu>)

Figure 6 below shows the vegetation community types within the Smith Wash allotment and shows the dominance of those three vegetation communities.

Table 4. Vegetation Communities Found Within the Smith Wash Allotment

Vegetation Type	Acres on Allotment	Percent of Acres
Apacherian-Chihuahuan Mesquite Upland Scrub	6,368.94	32.91%
Apacherian-Chihuahuan Piedmont Semi-Desert Grassland and Steppe	664.52	3.43%
Chihuahuan Creosotebush, Mixed Desert and Thorn Scrub	4,836.64	25.00%
Chihuahuan Mixed Salt Desert Scrub	513.51	2.65%
Chihuahuan Stabilized Coppice Dune and Sand Flat Scrub	1.33	0.01%
Chihuahuan Succulent Desert Scrub	51.15	0.26%
Madrean Encinal	93.41	0.48%
Madrean Pinyon-Juniper Woodland	55.38	0.29%
Mogollon Chaparral	7.78	0.04%
North American Warm Desert Riparian Mesquite Bosque	607.14	3.14%
North American Warm Desert Riparian Woodland and Shrubland	95.41	0.49%
Sonoran Paloverde-Mixed Cacti Desert Scrub	6,049.58	31.26%
Agriculture	5.12	0.03%
Total	19,349.91	-

Figure 6. Vegetation Communities within Smith Wash Allotment



2.3.5 General Wildlife Resources

Wildlife species composition expected to occur on this allotment are characteristic of the Sonoran Desert Section of the Basin and Range Province of the Intermontane Plateaus in Southeastern Arizona. Species that are expected to occur are: mule deer, mountain lion, coyote, bobcat, raccoon, skunk, white-throated woodrat, white-footed mouse, gopher snake, king snake, western diamondback rattlesnake coachwhip, patch-nosed snake, western whiptail lizard, side-blotched lizard, tree lizard, canyon tree frog, red-tailed hawk, Cooper’s hawk, golden eagle, prairie falcon, raven, turkey vulture, meadowlark, ladder-back woodpecker, ash-throated flycatcher, canyon wren, and rough-winged swallow.

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 condition 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 (T&E) Species

A query conducted on the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC; USDI 2017) website identified threatened, endangered and proposed (TEP) species that may occur within the allotment. Review of habitat requirements for each species was conducted to determine its potential to occur on the allotment. This review included looking at the characteristics of proposed and designated critical habitat for yellow-billed cuckoo and southwestern willow flycatcher. Critical habitat for yellow-billed cuckoo and southwestern willow flycatcher is not present on BLM lands within the Smith allotment (Figure 7). A summary of the potential of occurrence for each species on the Smith Wash allotment is shown in Table 5 below.

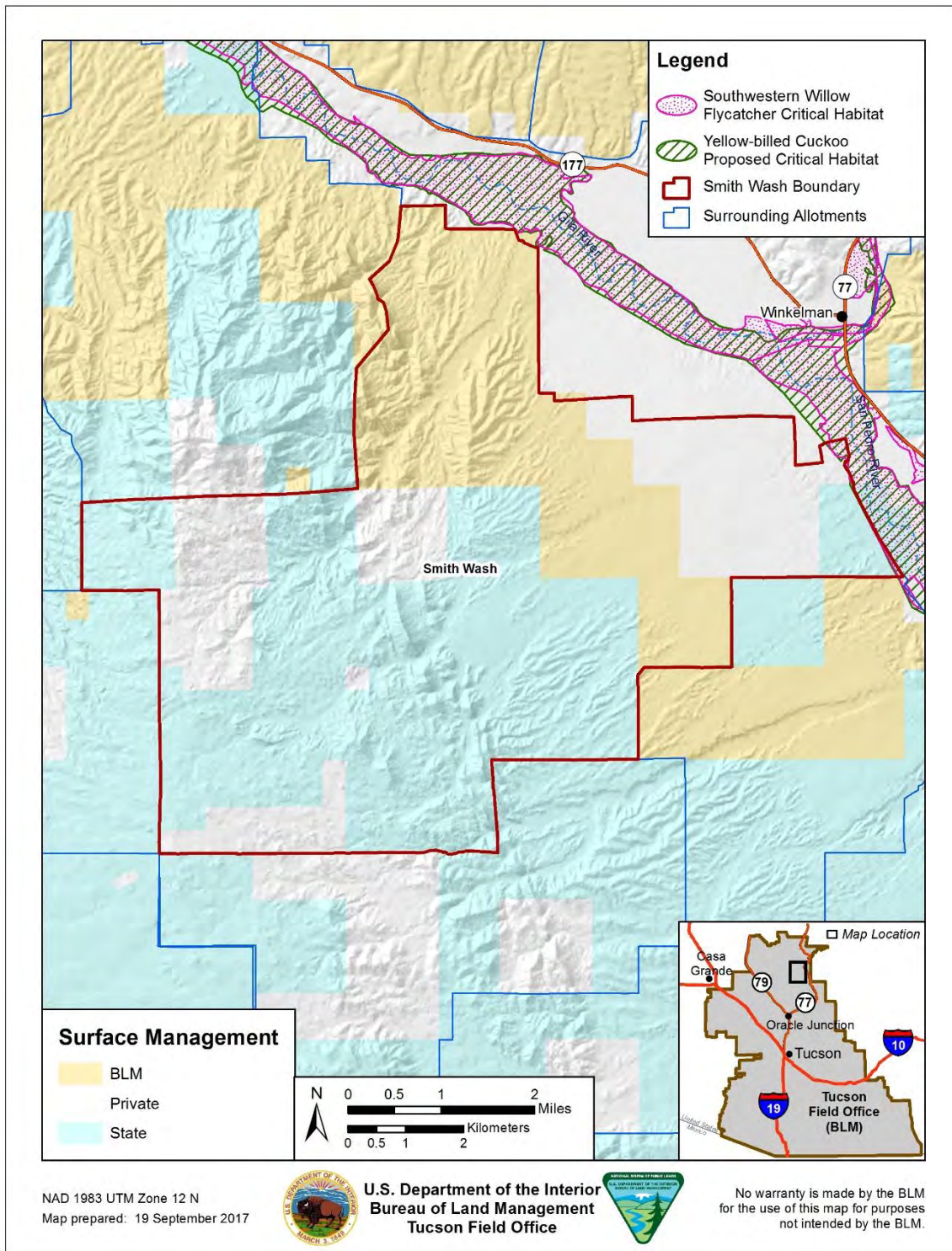
Table 5. T&E Species for the Smith Wash Allotment as Indicated by 2017 USDI iPAC Analysis

Species	Habitat	Potential for Occurrence on Smith Wash allotment
Lesser Long-nosed Bat	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 Smith Wash Allotment; however 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 Smith Wash allotment
Ocelot	Desert scrub communities in Arizona	Several confirmed sightings of ocelots have been made in Arizona in recent years, with confirmed sightings of live ocelots made in 2009 and 2011 in Cochise County. One sighting was known from 30 miles away from the Smith Wash Allotment area.
Southwestern willow flycatcher	Nests in willows along streams and rivers, with nearby cottonwoods serving as foraging sites. Critical habitat designated on Smith Wash allotment.	There is not Southwestern willow flycatcher habitat on the Smith Wash Allotment as riparian areas for migration, feeding, or breeding are not present. Riparian areas are outside the allotment boundary.
Yellow Billed Cuckoo	Nests in willows along streams and rivers, with nearby cottonwoods serving as foraging sites. Critical habitat designated on Smith Wash allotment.	There is not Yellow-billed Cuckoo habitat on Smith Wash Allotment as riparian areas are outside of the allotment boundary.
Northern Mexican Garter Snake	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. The northern Mexican gartersnake 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. ¹⁰	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. In addition, 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.
Gila chub	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. In addition, green sunfish, channels catfish, largemouth bass, and northern crayfish that prey on small fish occupy the aquatic habitat. As a result, this species either is extirpated from the project area or survives at very low population levels.

Species	Habitat	Potential for Occurrence on Smith Wash allotment
Acuña Cactus	This species is found in valleys and 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 365 to 1,150 m (1,198 to 3,773 ft.) in elevation.	Some potential for occurrence on allotment, though surveys have not been conducted. The nearest known population is about 15 miles away.

Figure 7. Critical habitat for Southwestern willow flycatcher and Yellow-billed cuckoo in vicinity of Smith Wash 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*),

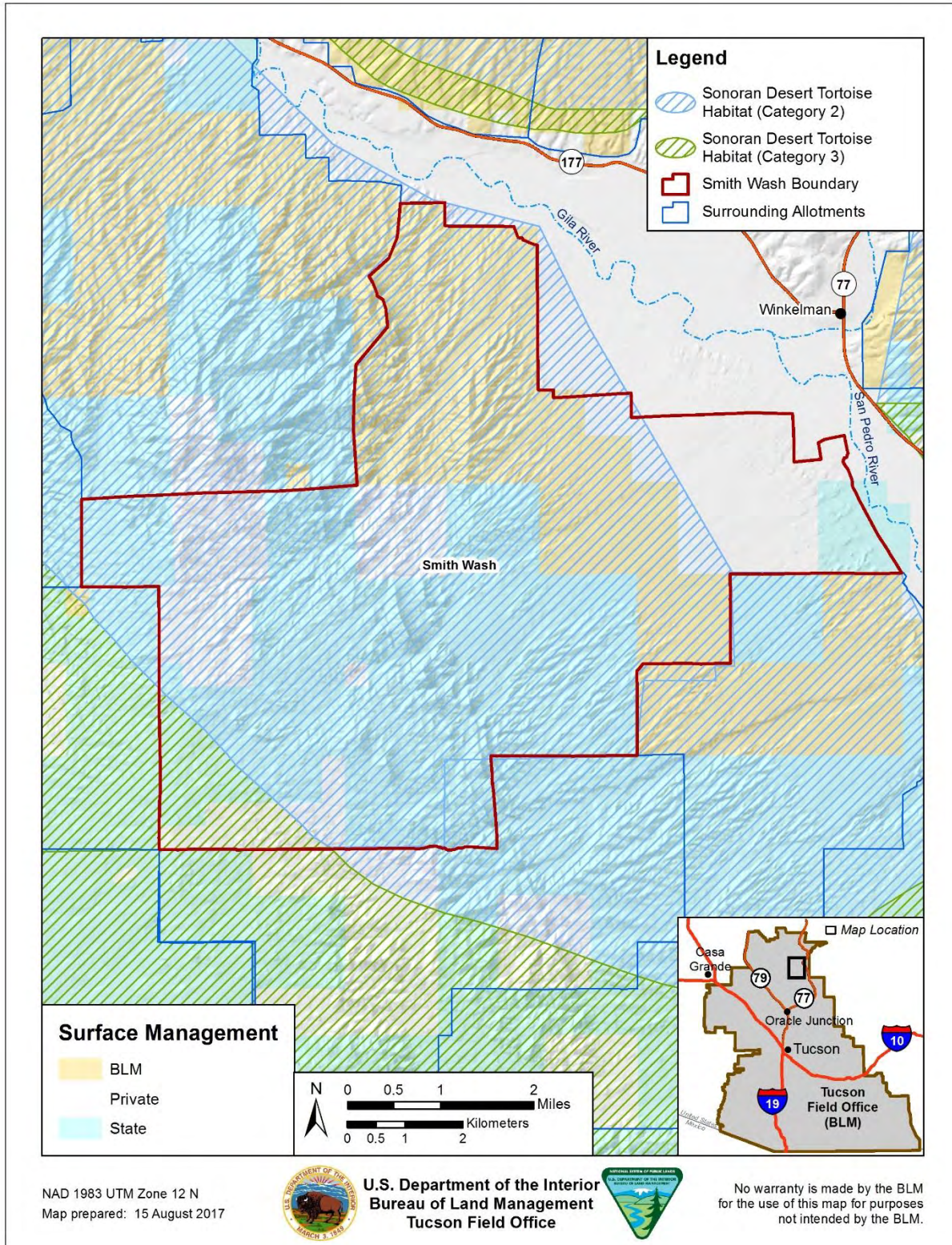
In order to monitor long-term condition and trend of wildlife habitats, particularly for Sonoran desert tortoise, key areas are established within mapped suitable tortoise habitat on the BLM lands. Sonoran desert tortoise occur most commonly on rocky, steep slopes and bajadas (lower mountain slopes) 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. This allotment contains category 2 Sonoran desert tortoise habitat totaling 17,810 acres, of which 5,634 acres overlaps with federal lands and 2,940 total acres of category 3 habitat of which 1,542 acres of category 3 habitat overlaps federal lands as shown in Figure 8 below. The purpose of tortoise habitat categorization is to provide for the protection of tortoise habitat through the management of multiple uses to ensure that adequate forage, cover and space are available to tortoise throughout the year (USDI 1988).

The desert ornate box turtle utilizes low valleys, plains and gentle bajadas of the semi-desert grasslands and Chihuahuan desert scrub communities and is most abundant between 3,000 and 6,500 feet. The box turtle feeds on insects and plant materials.

The bird species utilize the grasslands, upland saguaro-paloverde desert scrub, rocky and wooded hills, and cliff habitat for nesting and foraging. Some bird species utilize man-made water sources such as stock ponds where they occur in or near suitable habitats. No riparian habitat is present on the allotment so riparian obligate bird species are absent.

The bat species that may occur on this allotment roost in cliffs, caves, or mines. Bat species utilize the desert habitats for foraging for nectar, pollen, insects or fruits.

Figure 8. Category 2 and 3 Habitat for the Sonoran Desert Tortoise within the Smith Wash Allotment



2.3.8 Migratory Birds

The Smith Wash allotment, which includes The BLM managed public and other land jurisdictions, offer diverse habitats for migratory birds, providing valuable food, water, and cover. Migratory species that utilize the area (Corman) 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 6).

2.4 Special Management Areas

There are no Special Management Areas within the Smith Wash allotment boundary. Public lands in the allotment are within the White Canyon Resource Conservation Area, designated in the Phoenix Resource Management Plan to retain lands for long term management.

2.5 Recreation Resources

2.5.1 Recreation Resources

The Smith Wash allotment includes approximately 14,724 acres of land available for public recreational use, comprising approximately 76% of the allotment as shown on Table 6 below, and on the map in Figure 9. BLM land is available for public use subject to BLM recreation and OHV regulations, and State Trust land is available for public use subject to a hunting license or recreational permit from the Arizona State Land Department. 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.

Approximately 24% of the allotment is private land not open to public use without the land owner's permission.

Table 6. Land base in the Smith Wash Allotment available for public recreational use

Category	Acres	Description
Bureau of Land Mgmt.	5,292	Available for public use
State Trust Land	9,432	Available for recreation with a permit
Private Land	4,613	Not available for public use
Total	19,337	

The land base in the allotment provides recreational opportunities primarily related to hunting (deer, javelina, upland birds and small game, and predators), sightseeing, driving for pleasure and primitive camping. The area appears to receive primarily day use, and very few recreation activity areas have been identified in the allotment, as shown on the map in Figure 8. Recreational off highway vehicle (OHV) driving occurs on the network of existing county maintained and primitive routes (4WD, ATV riding), and in 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. The Arizona National Scenic Trail is within a mile west of the allotment, and a trailhead is found along Freeman Rd. Overall recreational use in the allotment is low, estimated at less than 1,500 visits annually. Recreational use is primarily local, and may occur throughout the year, but peaks during the fall through spring and during hunting seasons. Recreational use at activity areas (i.e. 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, because of infrequent occurrence, the localized and small scale nature of the recreation impacts, the effects on overall rangeland health in the allotment are considered insignificant.

2.5.2 Access/Transportation:

The Smith Wash grazing allotment includes approximately 71.5 miles of primitive access routes identified in a route inventory completed for the area in 2003 and shown on the map in Table 7 and on Table 6 below. The existing routes provide access for the use, maintenance and operation of the grazing allotment and range improvements, private land inholding access, and public recreational use. The primitive routes are accessed from Camino Rio (Pinal County maintained), which is accessed from SR177 across the San Pedro River via the 'Dudleyville Crossing' (on the Schwennesen easement # AZA-029854), and the Asarco Crossing near the town of Winkelman. One of the existing routes across the allotment is the historic Winkelman to Florence Road. Some of the existing access routes from Camino Rio cross private property but lack legal public access. Most of the routes are single lane, natural soil surfaced, with material ranging from fine grained soil to gravel and unmaintained. The routes vary in width from 10 feet to 20 feet, though some may be wider. For analysis purposes, an average width of 12 feet was used. Approximately 38 miles of the routes are in the channel of natural drainages.

The current Off Highway Vehicle designation established in the current Resource Management Plan limits use of motor vehicles to 'Existing Roads and Trails'. A route evaluation was completed in this area in 2006 to consider possible route designations, but no comprehensive travel management plan has been completed for the allotment.

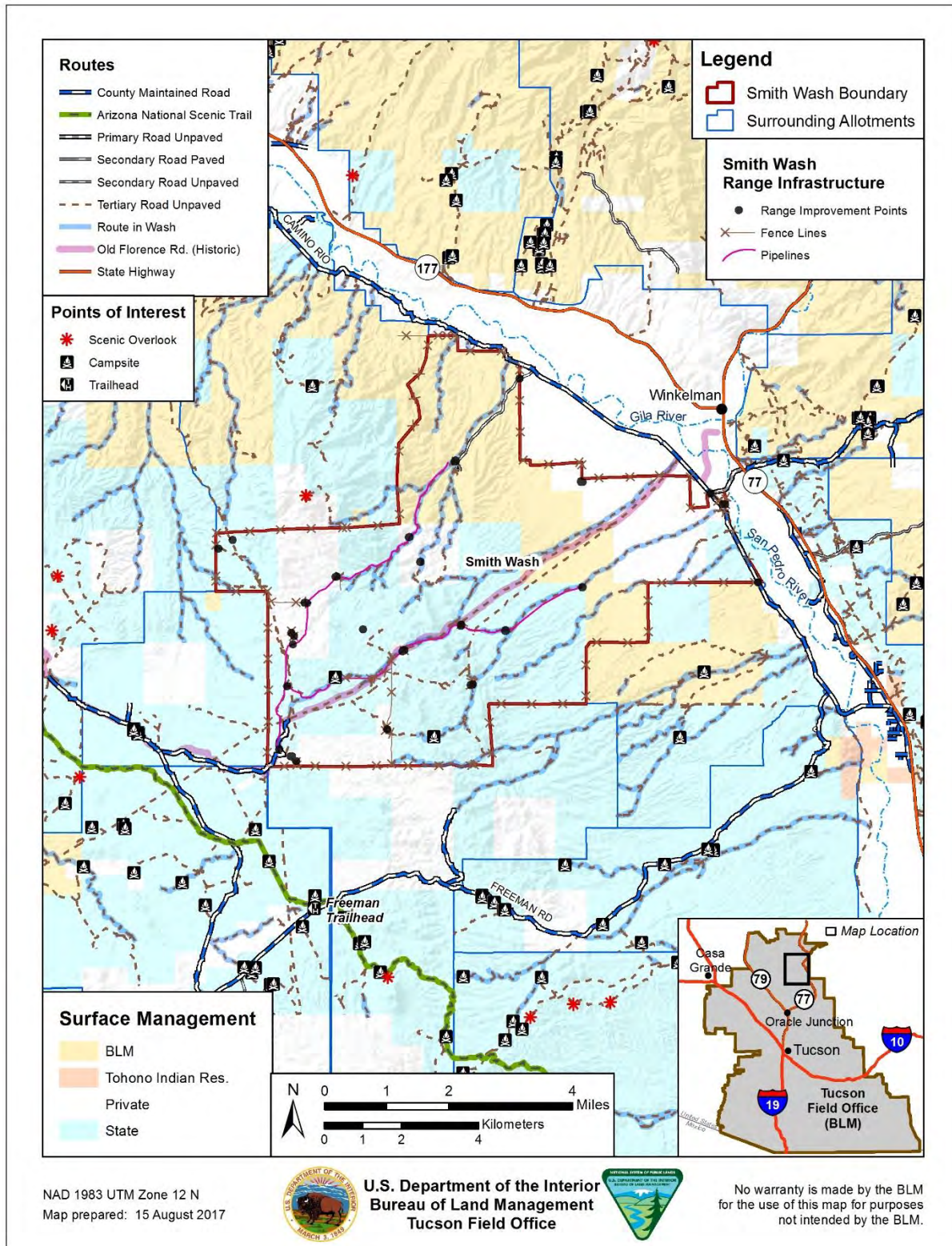
The existing primitive roads in the uplands typically alter natural drainage patterns by intercepting surface runoff in the roadway and ditches, and sometimes intercepting small side drainages and diverting runoff along the road. The intercepted runoff may prevent some moisture from reaching soils and 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 minor soil and roadbed erosion. 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 roadway. The routes in the wash bottoms may prevent vegetative growth in the stream bed, and cause channelization in the vehicle tracks and 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 7. Existing route inventory in the Smith Wash Allotment

Route Type on Smith Wash Allotment	Miles
Primary_Road_Unpaved	1.6
Secondary_Road_Unpaved	2.0
Tertiary_Road_Unpaved	67.9
Total	71.5

Figure 9. Smith Wash Access Route Inventory and recreation activity areas



2.6 Heritage Resources & the Human Environment

The BLM's evaluation of rangeland health standards includes considerations for the protection of cultural resources—such as prehistoric and historic-age sites, buildings, and structures—and plants that may be of traditional cultural significance to Native Americans. Should the BLM identify impacts to sites or traditional-use plants, revised lease terms and conditions may be warranted and/or rangeland management directives could be modified to achieve desired resource conditions. The following sections describe BLM TFO's assessment efforts regarding applicable heritage resources management and compliance criteria.

2.6.1 Cultural Resources

The BLM's authorization of grazing leases is considered an undertaking subject to compliance with Section 106 of the National Historic Preservation Act (NHPA; 54 U.S.C. 306108 et seq.) and its implementing regulations found at 36 C.F.R. 800, wherein the BLM has the legal responsibility to consider the effects of its actions on *historic properties*. BLM Manual 8100 Series and the Arizona BLM Protocol (the Statewide Protocol) provide applicable Section 106 compliance procedures to meet appropriate cultural resources management standards. Additionally, cultural resources evaluations for proposed grazing permits and leases generally follow the procedures and guidance provided in BLM Instructional Memoranda.

Section 106 of the NHPA requires federal agencies to 1) identify historic properties within Areas of Potential Effects (APEs) for a federal undertaking; 2) evaluate the significance of cultural resources by determining National Register of Historic Places (NRHP) eligibility; and 3) consult with applicable federal, state, and tribal entities regarding assessment results, NRHP eligibility determinations, and proposed methods to avoid or mitigate potential impacts to historic properties. In Arizona, the BLM's NHPA responsibilities are carried out in accordance with the Statewide Protocol—a Programmatic Agreement among the BLM and the Arizona State Historic Preservation Officer (SHPO; agreement executed December 14, 2014). Should the BLM determine that a routine undertaking would result in *no historic properties affected* or *no adverse effect*, as advised by a qualified cultural resources specialist, the undertaking may proceed under the terms and conditions of the Statewide Protocol. If the undertaking is determined to have an *adverse effect*, or otherwise meets stipulated consultation thresholds, project-specific consultation is then initiated with the SHPO.

A small number of controlled studies that examine potential grazing impacts on historic properties have been performed (e.g., Osborn and Hartley 1991, Osborn et al. 1987, Roney 1977, and Van Vuren 1982). For example, Alan Osborn and his colleagues (c.f., Osborn et al. 1987; Osborn and Hartley 1991) examined the effects of domestic livestock grazing on the archaeological resources of Capitol Reef National Park in southern Utah. The study included reconnaissance and observations at recorded sites, and the creation of experimental and control plots containing several types of newly manufactured lithic and ceramic artifacts that were measured, weighed, placed, and mapped. Several study plots were located close to water sources. The study plots and artifacts were reexamined after 6 months of grazing use. Osborn found that 93 percent of the artifacts remained intact, and 84 percent remained visible. Pottery fragments were more prone to breakage. Mapping revealed that 23 percent of artifacts were displaced, but that 75 percent of the displaced artifacts had moved fewer than 15 centimeters. (Osborn et al. 1987)

The results varied by study plot location with the greatest impacts recorded near water sources, where higher concentrations of livestock use occurred. Osborn and Hartley (1991) concluded that “the degree of effect is a direct reflection of grazing intensity and dependence on limited water sources in this cold

desert environment.” This conclusion is also reflected in a study that examined lithic artifact breakage in areas of variable livestock use along the Central Arizona Project aqueduct in the western Arizona desert (Brown and Stone 1982) where collections of lithic artifacts from six archaeological sites were found to exhibit breakage rates between 13 and 17 percent. In comparison, 52 percent of the artifacts from a seventh site located near a cattle-accessed reservoir were found broken. In sum, these studies have demonstrated that grazing impacts to cultural resources are primarily of concern in areas of concentrated livestock use such as around water sources and corrals.

Direct impacts to historic properties where livestock concentrate may include trampling, chiseling, and churning of site soils, cultural features and artifacts, artifact breakage, and impacts from standing, leaning, or rubbing against historic structures and other above-ground cultural features such as rock art (Broadhead 2001; Osborn et al. 1987). Indirect impacts from livestock concentrations may include accelerated soil erosion and gulying, in addition to increased potential for unlawful artifact collection and/or vandalism of cultural resources. Other indirect impacts may include degradation of the historic setting, thereby detracting from the view-shed and historic feeling of nearby cultural resource sites. However, cultural resources are constantly subject to site formation processes or events after creation (Binford 1981; Schiffer 1987). These processes can be both cultural and natural, and may occur instantly or over thousands of years. Cultural formation processes include activities directly or indirectly caused by humans. Natural processes include chemical, physical, and biological processes of the natural environment that impinge upon and/or modify cultural materials. Determining the cause of impacts to historic properties may be difficult, in some cases, because activities such as camping and off-highway vehicle use may also result in the same kinds of effects as described above.

A BLM cultural resources specialist completed a comprehensive Class 1 (existing information) assessment of the Smith Wash grazing allotment on June 20 and June 21, 2017. Data reviewed were obtained from BLM TFO cultural program project files, site reports, and atlases, in addition to BLM-maintained General Land Office (GLO) plats and patent records. Electronic files also were reviewed using online cultural resource databases including *AZSite* (2017), Arizona’s statewide cultural resource inventory system, and the *National Register of Historic Places Digital Asset Management System & NP Gallery* (2017). Archival information was compared with livestock grazing and range improvement data to determine the potential for resource conflicts, particularly in livestock concentration areas such as around water sources, at chutes/corrals, and near supplemental feeding locations (figure 9). The results of archival research are summarized as follows; data provided are applicable to BLM-administered lands within the subject allotment (i.e., the jurisdictional APE) and based on currently available information from the aforementioned sources.

Background data identified four prior surveys and four documented sites on the BLM-administered portion of the allotment. Prior surveys were all performed in support of mineral/mining-related activities and/or proposed land exchanges that, collectively, have covered approximately 512 acres of BLM-managed surface (see Slawson 1993, Doak 2009, and Bartholomew and Tremblay 2013). Additionally, a historic-age GLO plat map was reviewed (dated 1877; plat no. 1649) that shows no cultural features on the BLM-administered lands. Because the documented sites, designated as AZ BB:1:92 to 95 (ASM), lack formal NRHP evaluations, these sites are considered historic properties for the purpose of this analysis; however, none of the identified sites coincide with existing range improvements or potential livestock concentration areas. Only one livestock concentration area was identified on the BLM-administered portion of the allotment, and that location was recently surveyed (Doak 2009) with no cultural resources encountered.

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 Smith Wash allotment*. A light-to-moderate level of dispersed livestock use is proposed under the proposed lease terms, with no identified concentrated use-areas on the BLM-administered portion of the allotment. Additionally, no new range improvement projects are currently proposed as a component of land-health evaluation or lease issuance.

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 Smith Wash allotment under 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 Section 106 compliance in accordance with 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 11 Native American tribes who claim cultural affiliation to and/or traditional use of the area—as determined through the online *Arizona Government-to-Government Consultation Toolkit* (last updated June 19, 2017)—by sending letters summarizing the results of the Class 1 cultural resources assessment and rangeland monitoring data for the Smith Wash allotment. Tribes consulted include the Fort McDowell Yavapai Nation, Gila River Indian Community, Hopi Tribe, Navajo Nation, Pascua Yaqui Tribe, the Pueblo of Zuni, San Carlos Apache Tribe, Tonto Apache Tribe, White Mountain Apache Tribe, Yavapai Apache Nation, and the Yavapai-Prescott Indian Tribe. Identified plant species with potential cultural significance include buckhorn cholla (*Cylindropuntia acanthocarpa*), saguaro (*Carnegiea gigantea*), and mesquite (*Prosopis velutina*; USDA-NRCS 2017), is noted to occur within the Smith Wash allotment. Section 5 below lists plant species expected for the ecological site as well as recorded species at key areas.

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

3.1 Grazing History

Historic and recent grazing use has been by cattle on the Smith Wash allotment. The BLM lands within the allotment comprise approximately 27 percent of the total livestock operation. There are 46 head of cattle run on the BLM lease. Between it and the other leased and private lands, there is a yearlong grazing system. The 552 Animal Unit Months (AUMs) under the BLM grazing lease are included in the total head of cattle on the private land and State lease, and are managed together on the entire allotment.

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.

The management category given to the Smith Wash 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.

3.2 Grazing System

The allotment is 19,336 total acres, of which 5,292 acres is administered by the BLM. There is currently one lease issued for 552 Animal Unit Months (AUMs) on the BLM public lands for the Smith Wash 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. The BLM land, however, is not fenced off completely. 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. AUMs totals for the Smith Wash allotment lease is in Table 8.

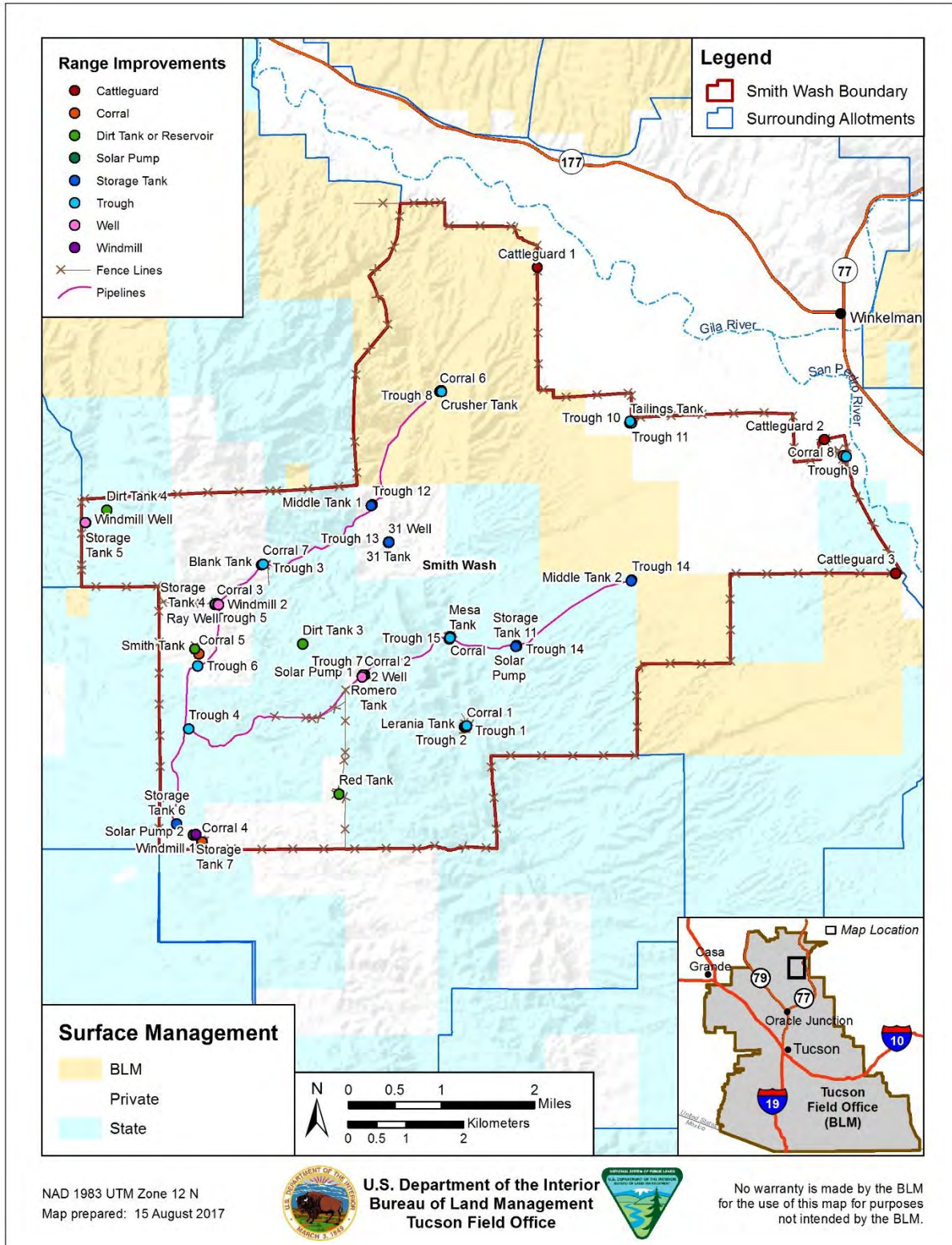
Table 8. Smith Wash Lease and AUMs

Smith Wash Animal Unit Months (AUMs) Summary		
Ownership	Animal Unit Months (AUMs)	Animal Units (AU)
BLM – Smith Wash #6221	552 AUMs	46 AU Yearlong

3.2.1 Existing Range Improvements

After a review of the range improvement record for this allotment there is one corral on the BLM lands. In addition, there is one water source located on the BLM land where livestock might congregate. Figure 10 is a map of the existing range improvements throughout the entire allotment. This mapping exercise was completed using areal imagery as well as verification from the lease holder.

Figure 10. Existing Range Improvements on the Smith Wash Allotment



3.3 Mandatory Terms and Conditions for Permitted Use

There is currently one lease issued for 552 AUMs on public lands. The Mandatory Terms and Conditions of the lease are listed below:

Table 9. Mandatory Terms and Conditions of the Lease

Total Livestock on the BLM acres of the Allotment	Livestock Kind	Grazing Period of Use	Percent Public Land*	Type Use	AUMs on Public Land
46	Cattle	3/1 to 2/28	100	Active	552

* 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

4.1 Relevant Planning and Environmental Documents

Eastern Arizona Grazing Environmental Impact Statement (1987)

Phoenix 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.”

Standard 2 is **not applicable** because no riparian-wetland sites exist within the Smith Wash allotment.

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 were 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 are used as an indicator of ecosystem function and rangeland health.

As indicated by such factors as:

- Composition
- Structure
- Distribution

Desired Plant Community Objective

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.

Perennial grass 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.

Key Areas SW-1 and SW-3 Desired Plant Community Objectives for Schist Hills 10-13” and Limy Fan 10-13” precipitation zone ecological sites

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/Grasslike plants composition of ≥5%
- Maintain annual grass and forb composition of ≥5%
- Maintain a palatable shrub composition of ≥30%
- Maintain vegetative foliar cover at ≥10%

Rationale: The rationale for the DPCs listed above is taken from the NRCS Reference Sheet. The reference sheet used for these key areas is the Schist Hills 10-13” p.z and Limy Fan 10-13” p.z.

Maintaining a perennial grass 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. Palatable shrub composition of 30 percent 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 percent and 15 percent as per the reference sheet. A vegetative foliar cover of 10 percent or greater should serve to prevent accelerated erosion beyond what is expected in the reference state.

5 PLANT LIST

This section includes the list of plant species present or potentially present within the Schist Hills 10-13” precipitation zone (p.z.) ecological site located on the public lands within the Smith Wash allotment. These plant species provide key forage and cover for wildlife species and livestock.

Table 10 presents a list of plant species from the Schist Hills 10-13” p.z. ecological site description located on the Smith Wash allotment.

Table 10. Key Plant Species from the Schist Hills 10-13” p.z. ecological site description

Common name	Scientific name
Purple threeawn	<i>Aristida purpurea</i>
Slender janusia	<i>Janusia gracilis</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>
Slim tridens	<i>Tridens muticus</i>
Narrowleaf silverbush	<i>Argythamnia lanceolata</i>
Desert Mormon-tea	<i>Ephedra fasciculata</i>
Fishhook barrel cactus	<i>Ferocactus wislizeni</i>
False Mesquite	<i>Calliandra eriophylla</i>
Jumping cholla	<i>Cylindropuntia fulgida</i>
Flatop buckwheat	<i>Eriogonum fasciculatum</i>
Fluffgrass	<i>Dasyochloa pulchella</i>
Engelmann pricklypear	<i>Opuntia engelmannii</i>

Common name	Scientific name
Desert agave	Agave deserti
Saguaro	Carnegiea gigantea
Buck-horn cholla	Cylindropuntia acanthocarpa
Teddybear cholla	Cylindropuntia bigelovii
Dollarjoint pricklypear	Opuntia chlorotica
Foothill palo verde	Parkinsonia microphylla

During the December 2013 data collection these species in table 11 were found on key areas SW-1 and SW-3.

Table 11. Species List from Smith Wash SW-1 and SW-3 Key Areas in December 2013.

Common Name	Scientific Name
Trees and Shrubs	
Burroweed	<i>Isocoma tenuisecta</i>
Yellow paloverde	<i>Parkinsonia microphylla</i>
Creosote bush	<i>Larrea tridentata</i>
Jojoba	<i>Simmondsia chinensis</i>
Succulents	
Buckhorn cholla	<i>Cylindropuntia acanthocarpa</i>
Teddy bear cholla	<i>Cylindropuntia bigelovii</i>
Ocotillo	<i>Fouquieria splendens</i>
Annuals	
Annual forbs	
Annual grasses	

6 INVENTORY AND MONITORING DATA

The following sections describe the inventory and monitoring protocols that were used on the Smith Wash allotment in 2013.

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

6.2 Monitoring Protocols

The standards were assessed for the Smith Wash 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). TEAMs (Talent, Expertise, Agility, Mobility and Simplicity) Enterprise mission is to provide convenient and cost effective environmental planning, field services, and policy development through an exemplary workforce of dedicated, creative, and experienced natural resource specialists. Additional information is on their website: <https://www.fs.fed.us/teams/>.

The interdisciplinary team used rangeland monitoring data, professional observations, and photographs to assess achievement of the Standards and conformance with the Guidelines. 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 [LPI]) 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 the key area within the Smith Wash 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 key areas SW-1 and SW-3 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 LPI. This method consists of a horizontal, linear measurement of plant intercepts along the course of a line (tape) 100 foot in Smith Wash. 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.

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 m²) 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 quadrat's 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 40cm x 40cm 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 (1st, 2nd, and 3rd most biomass). Multiple ranks are given when less than 3 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 12. 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 seedstalks 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 seedstalks 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 seedstalks 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 seedstalks 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 seedstalks.
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 13. 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 so as to appear artificially clipped or consistent browsing of terminal buds of browse species that results 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

7.1 Actual Use

Actual use information is submitted within 15 days of the end of each grazing year in accordance with 43 CFR 4130.3-2(d). Actual use reports identify the amount of livestock use and period of use for each water source/pasture. According to billed use the leasee has paid for the full 552 AUMs on the lease from 2008-2017.

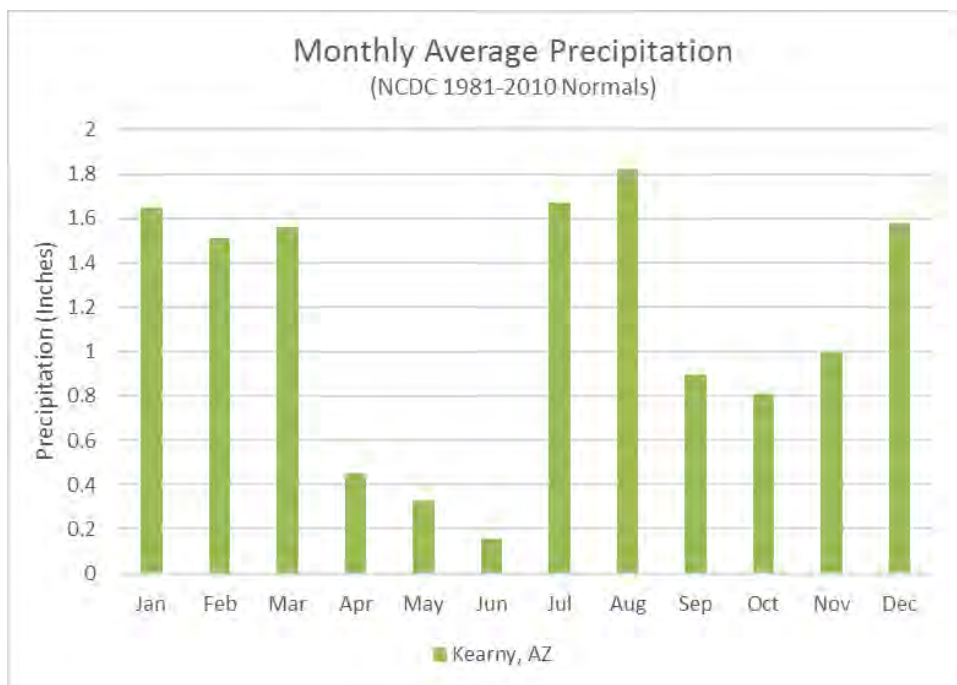
7.2 Precipitation

The closest long term climate monitoring station to the Smith Wash allotment is located in Kearny, AZ and is approximately 7.5 miles from the center of the allotment. Table 14 and Figure 10 below displays the most recent National Climatic Data Center (NCDC) 30-year Normals (1981-2010) from the Western Regional Climate Center.

Table 14. Precipitation Data (Inches) from Kearny, AZ COOP site – NCDC 30 Year Normals

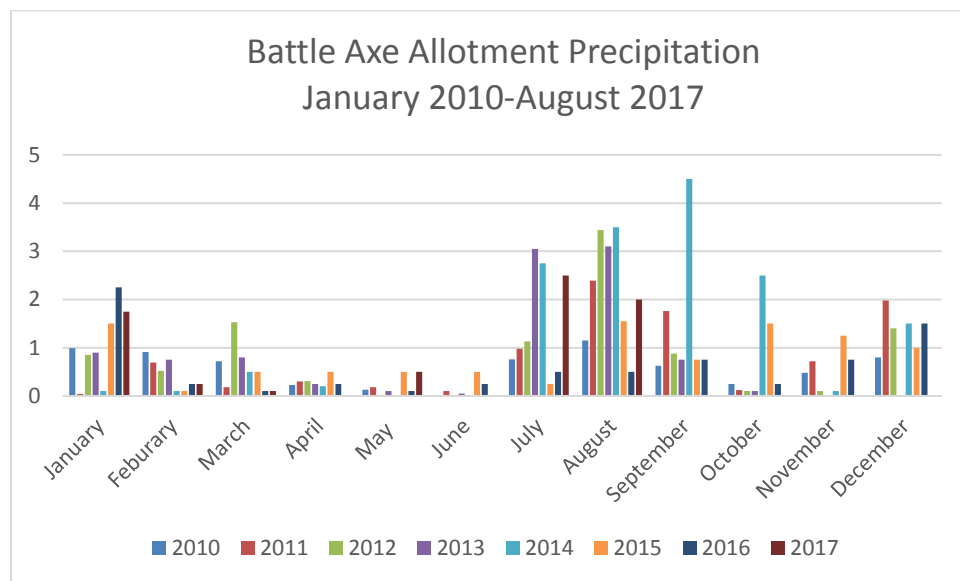
	Elev. (ft)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Kearny, AZ	1,840	1.65	1.51	1.56	0.45	0.33	0.16	1.67	1.82	0.9	0.81	1.00	1.58	13.44

Figure 10. Precipitation Data (Inches) from Kearny, AZ COOP site – NCDC 30 Year Normals



More recent precipitation data, shown in Figure 11 below, is from the Battle Axe allotment which is about 15 miles northwest of the Smith Wash allotment. This information illustrates more recent drought conditions. Total precipitation for each year is as follows: 2010- 7.07”, 2011- 9.44”, 2012- 10.28”, 2013- 9.85”, 2014- 15.75”, 2015- 9.9”, 2016- 7.45” and to date from 2017- 7.1”. The summary of this precipitation data, based on averages from the Kearny site, shows April, May, and June as low rainfall months. The summary shows that with the exception of 2012 (10.3”) and 2014 (>15”), the majority of years have had low rainfall (<10”) that is indicative of drought conditions. The state and transition models shown in Figures 20 and 21 show that the Drought/El Nino climate conditions exert major influence on the expression of annual vegetation. In drought years, annual vegetation may be much reduced and in extended drought perennial vegetation which also be reduced.

Figure 11. Precipitation Data (Inches) from Battle Axe Allotment



7.3 Key Area Data

Upland range health was evaluated at two key areas (SW-1 and SW-3) which were established in 2010. The key areas were selected for their consistency with average livestock use within the allotment.

Key area SW-1 is located in the Schist Hills 10-13" p.z. These are very shallow to very deep soils and are well drained and somewhat excessively drained. These are shallow soils formed on schist and related metamorphic rock. Bedrock is cracked and weathered offering good opportunity for root growth. Soils can be slightly calcareous and have lime accumulations in the fractures of the bedrock material. Soil surfaces have very well developed covers of gravels and channel, but lack cobble cover. Areas of rock outcrop range from 1 to 10 percent. Talus areas or rock slides can make up 5 to 10% of the area. Plant-soil moisture relationships are fair. The potential plant community is a diverse mixture of desert shrubs, trees, cacti, and perennial grasses and forbs. The aspect is shrubland.

Key area SW-3 is located in the Limy Fan 10-13" p.z. Key vegetative species for this site include: creosotebush (*Larrea tridentate*) and bush muhly (*Muhlenbergia porter*). This site occurs in the upper elevations of the Sonoran Desert in southern Arizona. It occurs on alluvial fans, fan terraces and stream terraces. The potential plant community is a shrubland dominated by creosotebush. Annual forbs and grasses are very important in the plant community on this site, but fluctuate from nearly nothing in dry years to several hundred pounds per acre in wet years. Cryptogams (algae, lichens, mosses) are also important in the plant communities on this site.

Vegetation monitoring was conducted by the University of Arizona Extension and the BLM range specialists at the SW-1 and SW-3 key areas in 2010, 2013 and again in 2017. Upland range health was evaluated on SW-1 and SW-3 in 2013 by TEAMs.

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 applicable resource standards were being met within the allotment and whether adequate perennial grass resources were available relative to Sonoran desert tortoise forage needs.

7.3.1 Utilization

Utilization measured at SW-1 and SW-3 was 0 percent in 2013.

7.3.2 Rangeland Health Evaluations and Frequency/Cover, Composition, and Structure Data

Tables 15 and 16 below show the results from the land health evaluation completed in December 2013 on the Smith Wash allotment. Summary results are shown from the Rangeland Health Evaluation at key area SW-1. All but one attribute ranked none to slight from departure of the Schist Hills 10-13” p.z. reference sheet.

Table 15. December 12, 2013 Summary Results from Rangeland Health Evaluation at Key Area SW-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	1	8

Table 16. Summary of 17 Indicators for Schist Hills 10-13” p.z. Ecological Site on Key Area SW-1.

17 Indicators Reference Sheet	Rational from December 2013
1. Number and extent of rills: Current or past formation of rills as expected for the site.	None to slight. None observed.
2. Presence of water flow patterns: Matches what is expected for the site; minimal evidence of past or current soil deposition or erosion.	None to slight. None observed.
3. Number and height of erosional pedestals or terracettes: Current or past evidence of pedestaled plants or rocks as expected for this site. Terracettes absent or uncommon.	None to slight. None observed.
4. Bare ground from Ecological Site Description or other studies (rock, litter, standing dead, lichen, moss, plant canopy are not bare ground): Amount and size of bare areas match that expected for the site.	None to slight. 24% bare ground was recorded. Within ESD parameters.
5. Number of gullies and erosion associated with gullies: Match what is expected for the site; drainages are represented as natural stable channels; vegetation common and no signs of erosion.	None to slight. None observed.

17 Indicators Reference Sheet	Rational from December 2013
<p>6. Extent of wind scoured, blowouts and/or depositional areas: Match what is expected for the site.</p>	<p>None to slight. None observed.</p>
<p>7. Amount of litter movement (describe size and distance expected to travel): Matches that expected for the site with a fairly uniform distribution of litter.</p>	<p>None to slight. Both fine and course litter observed at plant bases.</p>
<p>8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values): Matches that expected for the site. Surface soil is stabilizes by organic matter decomposition products and/or a biological crust.</p>	<p>None to slight. Soils have a natural rock component.</p>
<p>9. Soil surface structure and SOM content (include type and strength of structure, and A-horizon color and thickness): Soil surface horizon intact. Soil structure and organic matter content match that expected for the site.</p>	<p>None to slight. None observed.</p>
<p>10. Effect on plant community composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: Infiltration and runoff are not affected by any changes in plant community composition and distribution. Any changes in infiltration and runoff can be attributed to other factors (e.g. compaction).</p>	<p>None to slight. Dominated by shrubs and cacti with few to any forbs/ grasses. Maybe due to drought conditions.</p>
<p>11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): Matches that expected for the site; none to minimal, not restrictive to water movement and root penetration.</p>	<p>None to slight. None observed</p>
<p>12. Functional/Structural Groups (list in order of descending dominance by above-ground weight using symbols: >>, >, = to indicate much greater than, greater than, and equal to) with dominants and sub-dominants and "others" on separate lines: Functional/Structural groups slightly reduced and/or relative dominance of functional/structural groups has been</p>	<p>Slight to moderate. Due to lack of perennial grasses.</p>

17 Indicators Reference Sheet	Rational from December 2013
<p>modified from that expected for the site and/or number of species within functional/structural slightly reduced.</p>	
<p>13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): Plant mortality and decadence match that expected for the site.</p>	<p>None to slight. Even age class distribution.</p>
<p>14. Litter amount: Amount is what is expected for the site potential and weather.</p>	<p>None to slight. Litter amount was within the parameters of the site.</p>
<p>15. Expected annual production (this is TOTAL above-ground production, not just forage production): Exceeds 80% of the potential production for the site based on recent weather.</p>	<p>None to slight. Within site parameters.</p>
<p>16. Invasive Plants: If present, composition of invasive species, matches that expected for the site.</p>	<p>None to slight. None observed.</p>
<p>17. Perennial plant reproductive capability: Capability to produce seed or vegetative tillers is not reduced relative to recent climatic conditions.</p>	<p>None to slight. Within ESD parameters.</p>

Tables 17 and 18 below show the results from the land health evaluation completed in December 2013 on the Smith Wash allotment at key area SW-3. Summary results are from Land Health Evaluation at SW-3. All but one attribute ranked none to slight from the departure of the Limy Fan 10-13" p.z. reference sheet.

Table 17. December 12, 2013 summary results from Rangeland Health Evaluation.

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	1	8

Table 18. Summary of 17 Indicators for Limy Fan 10-13" p.z. Ecological Site on Key Area SW-3.

17 Indicators Reference Sheet	Rational from December 2013
1. Number and extent of rills: None.	None to slight. None observed.
2. Presence of water flow patterns: Water flow patterns are common on this site covering 10-15% of the area.	None to slight. None observed.
3. Number and height of erosional pedestals or terracettes: Pedestals are uncommon on grasses and gravels. Terracettes are uncommon. Mounds are common on shrubs like creosote bush.	None to slight. None observed.
4. Bare ground from Ecological Site Description or other studies (rock, litter, standing dead, lichen, moss, plant canopy are not bare ground): Bare ground on this site is 25-40%.	None to slight. 0% bare ground. Within ecological site description parameters.
5. Number of gullies and erosion associated with gullies: None.	None to slight. None observed.
6. Extent of wind scoured, blowouts and/or depositional areas: None	None to slight. None observed.
7. Amount of litter movement (describe size and distance expected to travel): Herbaceous litter moves only in water flow paths 10-15 feet and is deposited in terracettes at curves in flow paths. Woody litter remains in place under shrub canopies.	None to slight. Litter in place at plant bases.
8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values): Expect ratings of 4-6 under shrub and grass canopies, and 1-3 in openings. High gravel/cobble cover provides good resistance to erosion.	None to slight. Soils are naturally armored by gravel.

17 Indicators Reference Sheet	Rational from December 2013
<p>9. Soil surface structure and SOM content (include type and strength of structure, and A-horizon color and thickness): Thin platy structure from rain drop impact to weak granular; 7.5-10YR5-6/5-6 dry; 7.5-10YR4/4-6 moist; thickness to 4 inches.</p>	<p>None to slight. None observed.</p>
<p>10. Effect on plant community composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: large shrubs (creosote #1, whitethorn #2, mesquite #3) 15-20% canopy cover; shrublike grasses (bush muhly) have a 2-5% canopy cover, sub-shrubs including desert zinnia, burroweed, and paper flower have a 2-5% canopy cover and succulents like prickly pear, agave, and barrel cactus have a 1-2% canopy cover.</p>	<p>None to slight. Within ecological site description parameters.</p>
<p>11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): Soil surface (0.25-0.5 inch) has a platy structure due to overland water flow and some raindrop impact. There is no subsurface soil compaction.</p>	<p>None to slight. None observed</p>
<p>12. Functional/Structural Groups (list in order of descending dominance by above-ground weight using symbols: >>, >, = to indicate much greater than, greater than, and equal to) with dominants and sub-dominants and "others" on separate lines: Dominant: large shrubs > shrub-like grasses > sub-shrubs > annual forbs and grasses > other perennial grasses > succulents > perennial forbs > cryptogams. (In El Nino years, the production of annual forbs can exceed all other plant species.)</p>	<p>Slight to moderate. Primary perennial grasses completely absent from site, though drought conditions could have caused this.</p>
<p>13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): Severe drought last several years resulting in 90-100%</p>	<p>None to slight. Large amount, but reference sheet describes 20-30% decadence in tree/shrub and 90-100% in grasses.</p>

17 Indicators Reference Sheet	Rational from December 2013
mortality on short perennial grasses (threeawns), 50% mortality on bush muhly, 75% mortality on sub-shrubs and 10-15% mortality on large shrubs.	
14. Litter amount: litter cover (5-10%) and depth (0.25inches).	None to slight. Litter within ecological site description parameters.
15. Expected annual production (this is TOTAL above-ground production, not just forage production): 110 lbs/ac unfavorable precipitation; 505 lbs/ac normal precipitation; 1305 lbs/ac favorable precipitation.	None to slight. Within ecological site description parameters.
16. Potential invasive (including noxious) species (native and non-native). List Species which 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: schismus, filaree, malta starthistle	None to slight. None observed.
17. Perennial plant reproductive capability: not impaired for shrubs, drought impaired for perennial grasses and forbs.	None to slight. Within ecological site description parameters.

Key Area SW-1 on Schist Hills 10-13” precipitation zone and SW-3 on Limy Fan 10-13”

7.3.2.1 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

The ecological site for key area SW-1 is Schist Hills 10-13" precipitation zone ecological site. Vegetative cover collected at SW-1 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 (Figure 13).

Figure 13. Key Area SW-1 looking West in December 2013



The approximate potential ground cover (surface, basal, and foliar) is described in Tables 19 and 20 below. Table 19 specifically provides a comparison between the desired conditions as described by the ESD reference sheet for Schist Hills 10-13" and Limy Fan 10-13", and the current conditions of SW-1 and SW-3 in December 2013. Table 20 address the kind and amount (by cover) of vegetation at the sites.

The ecological site for SW-1 is Schist Hills 10-13". Litter should be in the range of 5 to 45 percent, with 5 to 60 percent surface fragments. A tolerable range of bare ground would be between 5 and 20 percent. Foliar cover collected at SW-1 was 42 percent with 6 percent basal cover of perennial grasses and shrubs. Total litter at SW-1 was measured at 59 percent, with bare ground measuring 25 percent. Rock and rock fragments covered 6 percent of the soil surface. Total litter at SW-1 was measured at 34 percent, with bare ground measuring 0 percent. Rock and rock fragments covered 96 percent of the soil surface. Utilization, measured at the key area in 2013, was 0 percent, and no livestock sign was observed.

The ecological site for key area SW-3 is Limy Fan 10-13". Foliar cover collected at key area SW-3 was 32 percent with 5 percent basal cover of perennial grasses and shrubs. Foliar cover collected at SW-3 was 32 percent with 5 percent basal cover of native shrubs. Total litter cover was 34 percent with bare ground measuring 0 percent. A total of 96 percent of the soil surface was covered by rock/rock fragments. Utilization, measured at the key area in 2013, was 0 percent, and no livestock sign was observed.

Table 19. A comparison between conditions described in the ESD (R040XA119AZ – NRCS 2008) and current conditions of key areas SW-1 and SW-3. Soil cover components include: plants (including basal cover), biological crusts, litter, and surface fragment.

	Basal Cover				Biological Crust	Litter	Surface Fragments > 1/4" & <= 3"	Surface Fragments > 3"	Bedrock	Bare Ground
	Grass/ Grass like	Forb	Shrub / Vine	Tree						
SW-1 ESD R040XA119AZ	0-1%	0-1%	1-4%	0-1%	0-5%	5-45%	40-60%	5-20%	1-10%	5-20%
SW-1	0%	0%	6%	0%	0%	59%	3%	3%	0%	24%
SW-3 ESD R040XA108AZ	0-1%	0-1%	1-3%	0%	15-30%	10-80%	0-50%	0-5%	0%	5-70%
SW-3	0%	0%	5%	0%	0%	34%	90%	6%	0%	0%

Table 20. Foliar cover of species recorded in the LPI plot for key areas SW-1 and SW-3.

Key area information		Species	Line point intercept canopy cover at SW-1
SW-1 Smith Wash Allotment		Annual forbs	5%
Range site: R040XA119AZ		Yellow paloverde (<i>Parkinsonia microphylla</i>)	9%
		<i>Teddybear cholla (Cylindropuntia bigelovii)</i>	3%
		<i>Ocotillo (Fouquieria splendens)</i>	3%
		<i>Creosote bush (Larrea tridentate)</i>	10%
		<i>Jojoba (Simmondsia chinensis)</i>	14%
Cover/Litter/Bare Ground			
Foliar Cover	42%		
Basal Cover	6%		
Bare Ground	24%		
Key area information		Species	Line point intercept canopy cover at SW-3
SW-3 Smith Wash Allotment		Annual forbs	5%
Range site: R040XA108AZ		Annual grasses	8%
		Buckhorn cholla (<i>Cylindropuntia acanthocarpa</i>)	2%
		<i>Burroweed (Isocoma tenuisecta)</i>	2%

Key area information		Species	Line point intercept canopy cover at SW-1
		<i>Yellow paloverde (Parkinsonia microphylla)</i>	3%
		<i>Jojoba (Simmondsia chinensis)</i>	14%
Cover/Litter/Bare Ground			
Foliar Cover	32%		
Basal Cover	5%		
Bare Ground	0%		

Figure 14 is the percent frequency data collected by U of A, using pace frequency, on the Smith Wash allotment from 5-17-17 on key area SW-1. Paloverde, jojoba, wolfberry and brittlebush make up the largest percent composition on the site. Litter is within range as expected for the site (5-45 percent) at 28 percent and bare ground is within range expected for the site (5-20 percent) at 11 percent. Figure 15 is the most recent photo of transect SW-1 from 5-11-16. Production data, figure 16, was also collected to determine how many pounds per acre the site produced for a total of 372 lbs/acre. Annual total production for Schist Hills ranges from 205 lbs/acre to 1424 lbs/acre with a representative value of 575 lbs/acre.

Figure 14. Data Summary from University of Arizona Extension on Key Area SW-1

Data Summary

Site Class: BLM || Tucson || Smith Wash

Date: 5/11/2017

Site ID: SW-1

Examiner(s): Mike McIntire, Peggy Monkemeier

% Ground Cover						
Species	Transect (#Hits)					% Cover*
	1	2	3	4	Total	
Bare Ground	9	6	7	11	33	11.00
Gravel (1/4" - 3")	31	34	21	23	109	36.33
Litter	18	21	21	24	84	28.00
Rock > 3"	16	14	26	16	72	24.00
Live Basal Veg.	1			1	2	0.67

% Frequency							40x40 cm					DWR WL Composition			Sample Size = 62
Species		Transect (#Hits)					% Freq*	Rank (#Hits)			Wtd. Sum	% Comp.*			
		1	2	3	4	Total		1	2	3					
Woody Species															
spicebush	ALWR		1			1	1.00	2	2	3	21	3.39			
spicebush-canopy	ALWR				2	2	2.00								
saguaro-canopy	CAG10			1		1	1.00								
saguaro	CAG10							1	1	1	10	1.61			
blue paloverde-canopy	CEFLB	3				3	3.00								
blue paloverde	CEFLB							3	2	1	26	4.19			
littleleaf paloverde-canopy	CEM16	3	2	12	10	27	27.00								
littleleaf paloverde	CEM16							25	25	20	245	39.52			
brittlebush	ENFA				1	1	1.00	6	5	7	59	9.52			
brittlebush-canopy	ENFA	3		2	1	6	6.00								
creosote bush	LATR2	1				1	1.00	3	2	4	29	4.68			
creosote bush-canopy	LATR2	1	2			3	3.00								
wolfberry	LYPA	1				1	1.00	6	6	6	60	9.68			
wolfberry-canopy	LYPA	4	1		1	6	6.00								
jojoba	SICH		1	3	1	5	5.00	15	17	18	157	25.32			
jojoba-canopy	SICH	5	4	3	6	18	18.00								
Forbs - Perennial/Biennial															
globemallow	SPHAE	1	1			2	2.00	1	2	2	13	2.10			
Annuals															
Annual forb(s)	AAPF	16	20	17	18	71	71.00								
Annual grass(es)	AAGG	9	7	1	3	20	20.00								

* Number of decimal places does not imply level of precision

Figure 15. SW-1 Key Area on 5/11/2017



Figure 16. SW-1 Key Area Production by Species on 5/11/2017

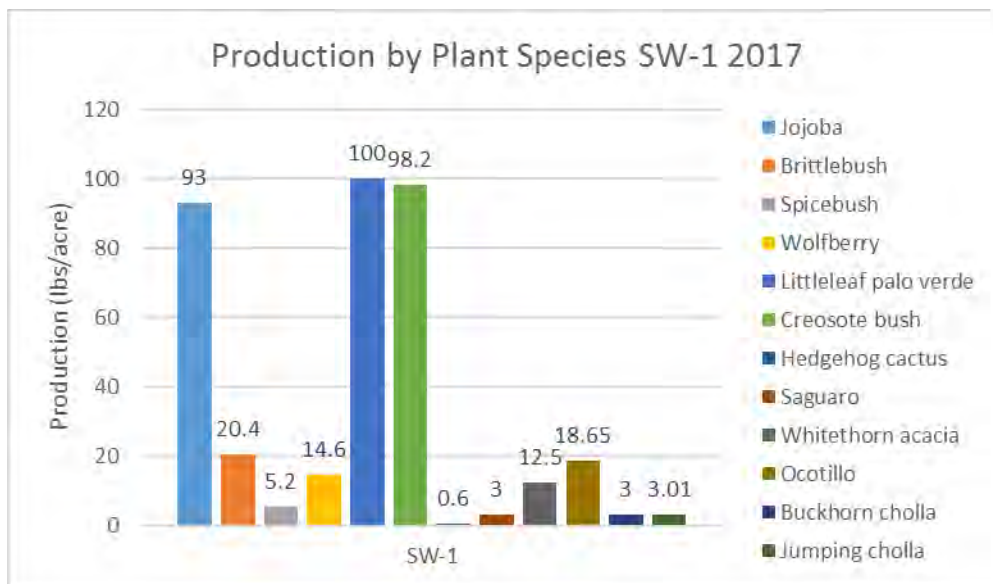


Figure 17 is the percent cover and composition data collected by U of A, using line intercept, on the Smith Wash allotment from 5-10-17 on key area SW-3. Paloverde, jojoba, whitethorn acacia and jumping cholla make up the largest percent composition on the site. Figure 18 shows percent ground cover for SW-3. Litter is within range as expected for the site (10-80 percent) at 40 percent and bare ground is within

range expected for the site (5-70 percent) at 31 percent. Figure 19 is the most recent photo of transect SW-1 from 5-10-16. Production data, figure 20, was also collected to determine how many pounds per acre the site produced for a total of 254 lbs/acre. Annual total production for Limy Fan ranges from 110 lbs/acre to 1305 lbs/acre with a representative value of 505 lbs/acre.

Figure 17. Data Summary from University of Arizona Extension on Key Area SW-3

Cover by Transect (Line-Intercept)

Site Class: BLM > Tucson > Smith Wash
 Site ID: SW-3
 Examiner(s): Mike McIntire, Peggy Monkemeler
 Date: 5/10/2017

% Canopy Cover								
Species	Transect (% Cover*)					% Cover*	% Comp.*	
	1	2	3	4	5			
Woody Species								
whitethorn acacia				3.90	24.60	5.70	18.50	
littleleaf paloverde	6.35	0.80	18.35			5.10	16.55	
desert hackberry			4.30			0.86	2.79	
buckhorn cholla				2.70		0.54	1.75	
Arizona pencil cholla				4.40	5.50	1.98	6.43	
jumping cholla	5.00	1.20	0.80	7.10	4.50	3.72	12.07	
turpentine bush		0.15	3.20	5.45	5.05	2.77	8.99	
wolfberry	8.45					1.69	5.49	
yerba de venado	0.70					0.14	0.45	
jojoba	13.70	4.70	3.40	10.90	7.00	7.94	25.77	
Forbs - Perennial/Biennial								
spurge	0.60		0.60	0.65		0.37	1.20	
Total Cover								
TOTAL**	28.25	6.85	30.65	35.10	46.65	29.50		

* Number of decimal places does not imply level of precision
 ** Total cover accounts for inter-species overlap and is not the sum of individual species cover

Figure 18. Percent Ground Cover from University of Arizona Extension on Key Area SW-3

% Ground Cover Summary (Point)

Site Class: BLM > Tucson > Smith Wash

Site ID: SW-3 Date: 5/10/2017

Examiner(s): Mike McIntire, Peggy Monkemeier

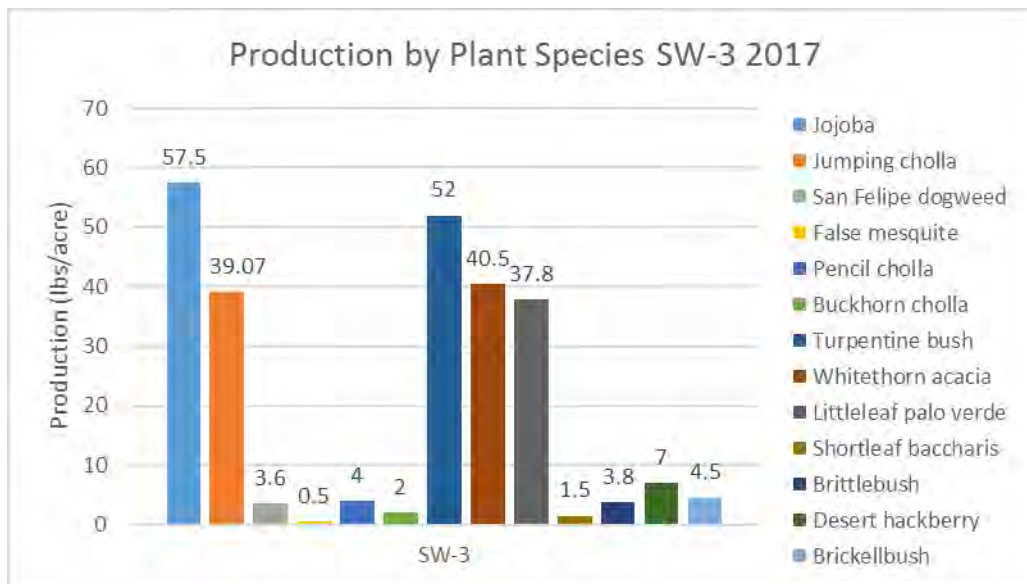
% Ground Cover							% Cover*
Species	Transect (#Hits)						
	1	2	3	4	5	Total	
Bare Soil	27	46	35	27	22	157	31.40
Gravel (1/4" - 3")	33	25	18	25	25	126	25.20
Litter	40	27	42	44	51	204	40.80
Rock >3"		1	5	2	1	9	1.80
Live Basal Veg.		1		2	1	4	0.80

* Number of decimal places does not imply level of precision

Figure 19. SW-3 Key Area on 5/10/2017



Figure 20. SW-3 Key Area Production Data on 5/10/2017



Conclusion:

The data at the trend plots show that cover and litter is adequate to ensure soil stabilization and appropriate permeability rates within the ecological site. The ESDs describe the ecological dynamics of the sites on the allotment as plant communities that are “naturally variable” (NRCS 2013). These variations occur due to site aspect, soils, and other natural conditions. TEAMs observed almost no signs of soil erosion, rills, gullies, or litter dams. Pedestalling was not occurring around the plant species present.

Overall throughout the allotment the soils are productive, stable and in a sustainable condition. There were no rills/gullies present at the ecological site, pedestals and/or terracettes were not observed. Wind-scouring and litter movement were none to slight. The allotment is within the variability of the state and transition models as delineated in the ecological site descriptions. (Figure 21 and 22).

Figure 21. State and transition model for Schist Hills

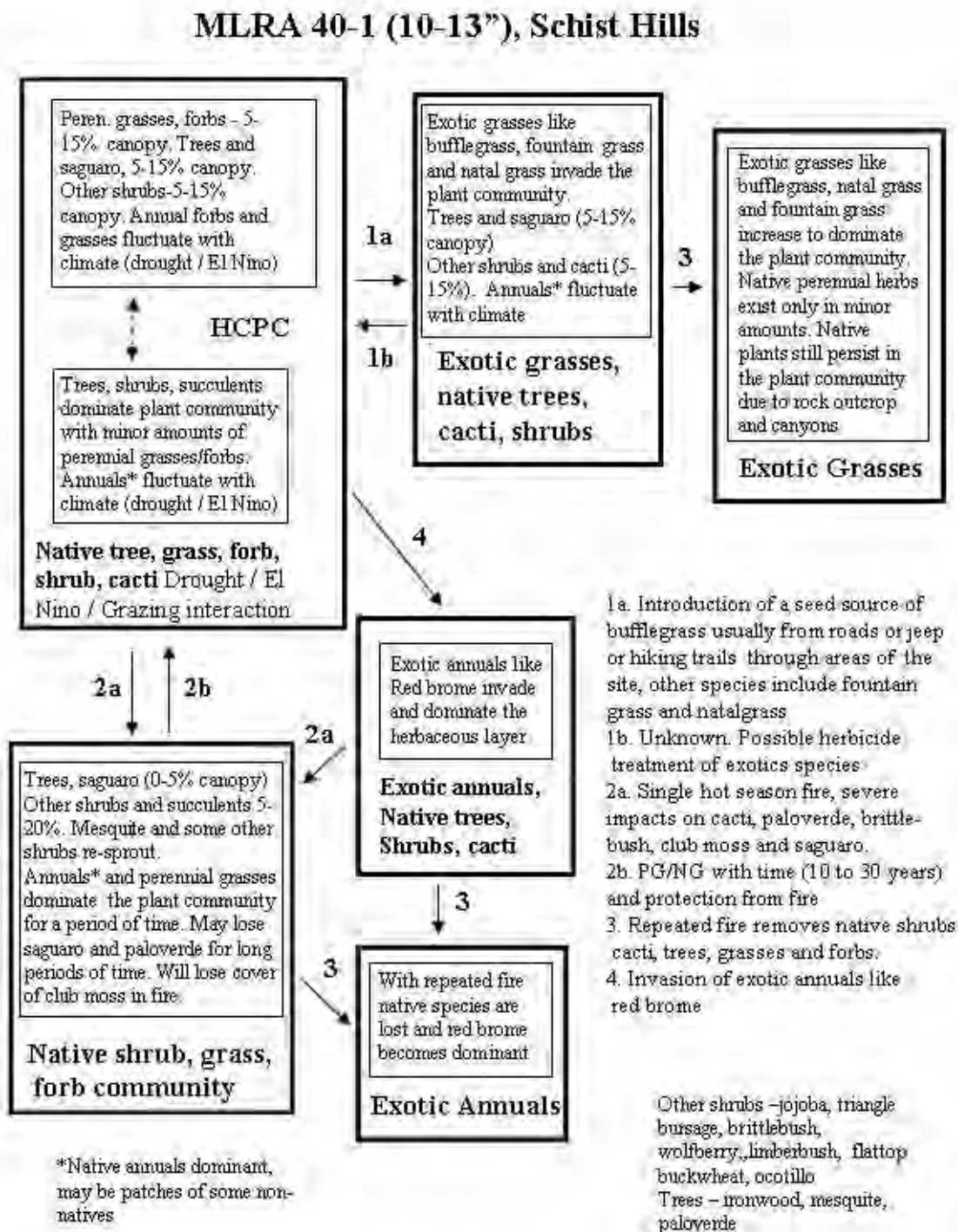
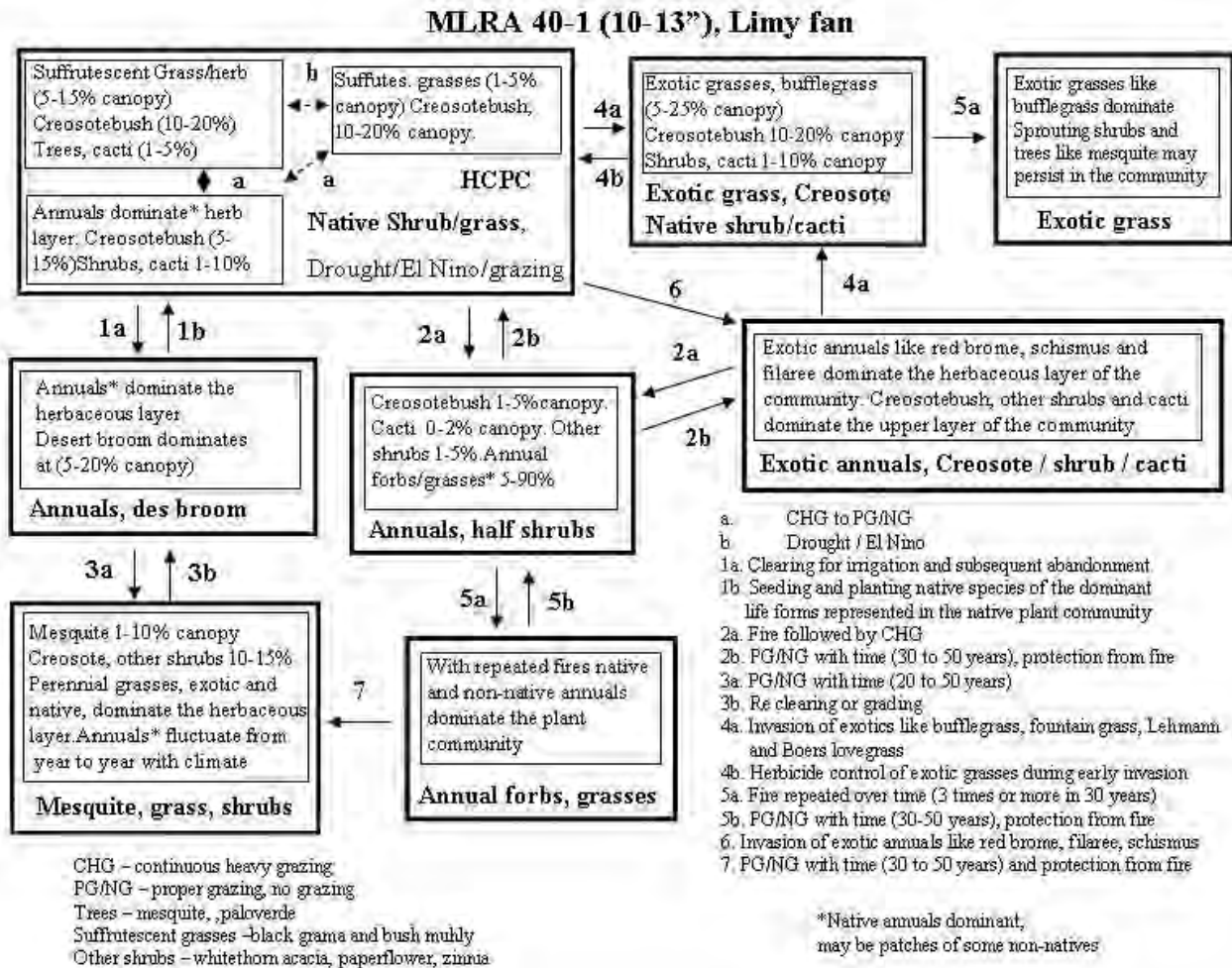


Figure 22. State and transition model for Limy Fan



7.3.2.2 Standard 2: Riparian-Wetland Sites

Not Applicable to Smith Wash allotment

7.3.2.3 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 distribution of vegetation throughout the allotment are similar to what is described within the ESD. However, line point intercept (LPI) cover data collected at both of the key areas indicates that primary grass species are significantly reduced. These warm season grammanoid species are desirable/preferred species by livestock and wildlife and are decreased within a range site as a result of herbivory. None of these species were observed at the two monitoring locations. Historical livestock grazing combined with drought has caused a significant decrease in primary species within these ecological sites resulting in opportunities for annual species to increase. The state and transition model for Schist Hills states that trees, shrubs, and succulents dominate the plant community with minor amounts of perennial grasses/ forbs. Annuals fluctuate with climate (drought/ El Nino). The current vegetative composition of both perennial and annual native species within the allotment is appropriate for the range site during recent drought years 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. Small portions of Southwestern willow flycatcher designated critical habitat as well as yellow-billed cuckoo and Northern Mexican gartersnake proposed critical habitats overlap the allotment, but no overlap occurs on BLM lands. Fences, other control devices, and topography are functioning to exclude cattle from the Gila River on BLM lands (USDI 2012). No riparian habitat is present in the Smith Wash allotment.

Key Area SW-1

The vegetative community at SW-1 represents the composition, structure, and distribution of the HCPC community that has been disturbed. It was described (Table 21) as: “Perennial grasses, forbs 5 to 15 percent canopy cover, Trees and Saguaro, 5 to 15 percent canopy cover; annual forbs and grasses fluctuate with climate.” In the LPI transect read at SW-1, tree cover was 9 percent. Saguaros were present at the site, but did not fall within the transect. Shrub cover was also measured at 12 percent canopy cover. Composition was largely made up of trees and shrubs (Figure 23). The functional/structure group (Table 22) was found to have a slight to moderate deviation from the HCPC community as previously described largely due to the lack of perennial grasses. This is likely a result of grazing that occurred historically in the area as well as drought conditions.

Table 21. A comparison between the state and transition model in the ESD and the LPI data collected in January 2013 at SW-1.

Cover data described by the ESD	LPI Data SW-1 Canopy Cover
Perennial grasses and forbs – 5 to 15%	Perennial grasses – 0%

Cover data described by the ESD	LPI Data SW-1 Canopy Cover
	forbs – 5% Canopy cover
Trees and saguaro- 5 to 15% Canopy cover	Trees - 9% Canopy cover, ACGR also present but not in transect
Shrubs – 5 to 15% Canopy cover	Shrubs - 24% Canopy cover
Annual forbs and grasses fluctuate with climate (Drought/El Nino)	

Figure 23. Species Composition at Key Area SW-1

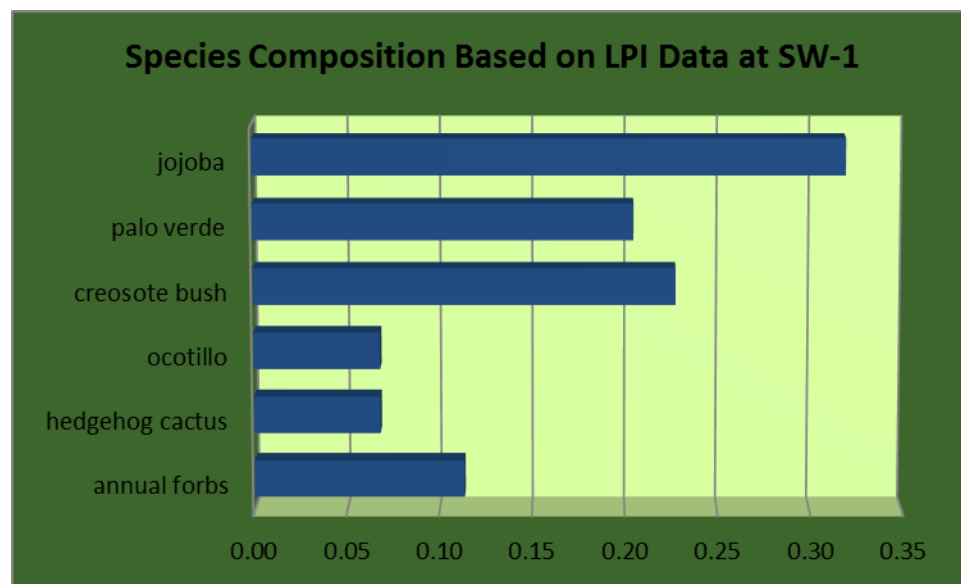


Table 22. Functional/structural plant groups at SW-1

Ranking	Species List for Functional/Structural Groups at SW-1
D	Yellow paloverde (<i>Parkinsonia microphylla</i>)
S	Creosote bush (<i>Larrea tridentata</i>)
S	Jojoba (<i>Simmondsia chinensis</i>)
M	Teddybear cholla (<i>Cylindropuntia bigelovii</i>)
M	Saguaro (<i>Carnegiea gigantea</i>)
M	Ocotillo (<i>Fouquieria splendens</i>)
T	Annual grasses
T	Annual forbs
T	Buck-horn cholla (<i>Cylindropuntia acanthocarpa</i>)
T	catclaw acacia (<i>Senegalia greggii</i>)
	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.

SW-3

Table 23 shows the expected vegetative community and associated Limy Fan 10-13” ESD at SW-3. In the LPI transect read at SW-3, trees and saguaros do not fall within the transect. However, they were present on the site, and made up an estimated 5-7 percent of the canopy cover in the area. Shrubs dominated the mid-level canopy, making up 24 percent of the foliar cover, and annual grasses and forbs (present but not in LPI transect) were abundant. Composition was largely made up of jojoba and annual grasses. (Figure 24). The functional/structure group was found to have a slight deviation from the state and transition community as described within the ESD (Table 24). The site is lacking in grasses, which is likely a result of grazing that occurred historically in the area.

Table 23. A comparison between the state and transition model in the ESD and the LPI data collected in January 2013 at SW-3.

Cover data described by the ESD	LPI Data SW-3 Canopy Cover
Perennial grasses and forbs – 5 to 15%	Perennial grasses – 0% forbs – 5% Canopy cover
Trees and saguaro- 1 to 5% Canopy cover	Trees - 3% Canopy cover; ACGR, PRVE, and ACCO2 also present but not in LPI transect
Shrubs – 10 to 20% Canopy cover	Shrubs - 16% Canopy cover
Annual forbs and grasses fluctuate with climate (Drought/El Nino)	Annual forbs – 5% Canopy cover Annual grasses – 8% Canopy cover

Figure 24. Species Composition at Key Area SW-3.

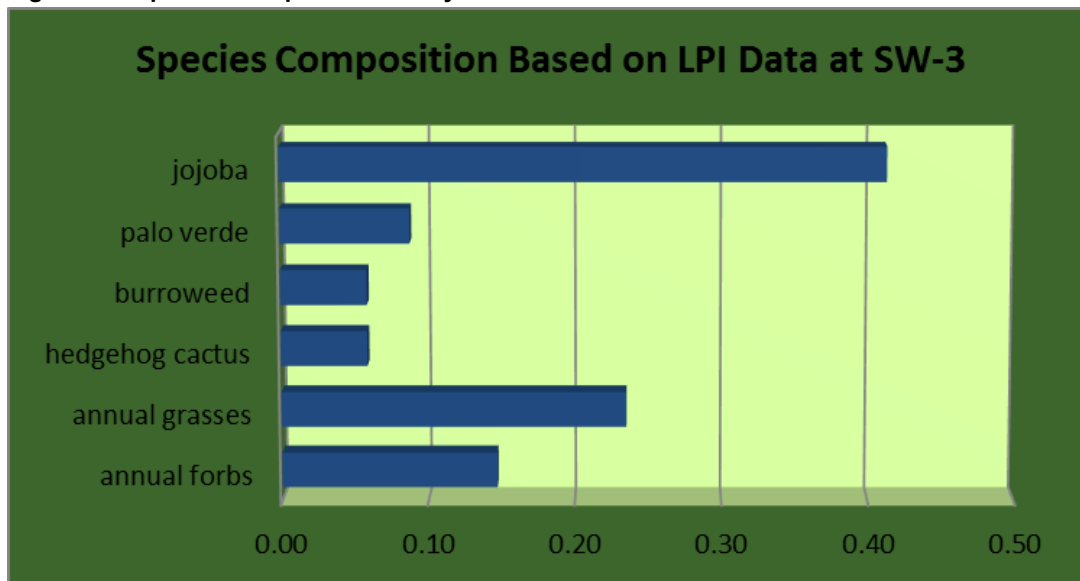


Table 24. Functional/structural plant groups at SW-3

Ranking	Species List for Functional/Structural Groups at SW-3
S	Buck-horn cholla (<i>Cylindropuntia acanthocarpa</i>)
S	Teddy bear cholla (<i>Cylindropuntia bigelovii</i>)
S	Yellow paloverde (<i>Parkinsonia microphylla</i>)

Ranking	Species List for Functional/Structural Groups at SW-3
M	Jobba (<i>Simmondsia chinensis</i>)
M	Catclaw acacia (<i>Acacia greggii</i>)
M	Velvet mesquite (<i>Prosopis velutina</i>)
M	Whitethorn acacia (<i>Acacia constricta</i>)
M	Turpentine bush (<i>Ericameria laricifolia</i>)
T	Christmas cactus (<i>Cylindropuntia leptocaulis</i>)
T	Burrowed (<i>Isocoma tenuisecta</i>)
	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.

Conclusions:

Key Area SW-1

- Maintain Grasses/Grasslike plants composition of ≥5% NOT ACHIEVED
- Maintain annual grass and forb composition of ≥5% ACHIEVED
- Maintain a palatable shrub composition of ≥30% NOT ACHIEVED
- Maintain vegetative foliar cover at ≥10% ACHIEVED

Rationale: The grass composition objective is not being met at SW-1. The most current long-term monitoring data shows that no annual or perennial grasses were detected along the transect, and the objective for composition for grasses/grasslike plants is ≥5%. Assessment of the general area around the transect shows only traces (roughly less than 2 percent composition) of annual grass presence within SW-1. Threeawns and fluffgrass are the two perennial grass species recorded on the most recent plant list from 2017 for the site but were not detected within the transect. The objective for annual grass and forb composition is achieved, with annual forbs totaling 5% of composition. Palatable shrub composition on the site is not met for Sonoran desert tortoise and mule deer. Palatable browse for desert tortoise consisting of *Simmondsia chinensis* (Van Devender, et al. 2002; Oftedal 2002) constitutes 14 percent of plant composition which is below the objective of ≥30%. Mule deer browse consists of (*S. chinensis*; Krausman et al. 1997; Heffelfinger et.al. 2006) which constitutes 17 percent composition of the plant community in 2013 and in the most recent 2017 data 25 percent compared to the objective of ≥30%. Additional amounts (up to 9 percent) of *Parkinsonia microphylla* (3.6 percent) would contribute to available browse where it occurs in younger (shrub-like) form. Palatable shrub presence described for the area surrounding the transect, included dominant amounts (roughly 40-100 percent composition) of *P. microphylla* and subdominant amounts (roughly 10-40 percent composition) of *S. chinensis* on the site. The vegetative foliar cover objective is being met at this site, with foliar cover of 42 percent which is well above the objective of ≥10%. No sign of utilization (0 percent) by livestock was observed at the site in 2013.

Key Area SW-3

- Maintain Grasses/Grasslike plants composition of ≥5% ACHIEVED
- Maintain annual grass and forb composition of ≥5% ACHIEVED
- Maintain a palatable shrub composition of ≥30% NOT ACHIEVED
- Maintain vegetative foliar cover at ≥10% ACHIEVED

Rationale: The grass composition objective is being met at SW-3. The most current long-term monitoring data shows a grass composition of 8 percent; however, no perennial grasses palatable to Sonoran desert tortoise were detected on the Key Area in 2013. In 2017 threeawns and fluffgrass were detected on the site. As discussed above and shown in the precipitation section (7.2), there is a correlation between the amount of local recent rainfall presence or absence of annual grasses within the HCPC state for each ecological site. Assessment of the general area around the SW-3 transect shows no additional perennial grass presence. The objective for annual grass and forb composition is achieved, totaling 13 percent of composition in 2013, above the objective of $\geq 5\%$. Palatable shrub composition on the site is not met for Sonoran desert tortoise and mule deer. Palatable browse for desert tortoise consisting of *Simmondsia chinensis* (Van Devender, et al. 2002; Oftedal 2002) constitutes 14 percent of plant composition in 2013 and 26 percent in 2017, below the objective of $\geq 30\%$. Similarly, mule deer browse (*S. chinensis* and *Fouquieria splendens*; Krausman et al. 1997; Heffelfinger et.al. 2006) constitutes 17 percent of the plant community (Table 5), well below the $\geq 30\%$ objective. Additional amounts (up to 9 percent) of *Parkinsonia microphylla* would contribute to available browse where it occurs in younger (shrub-like) form. Palatable shrub presence described for the area surrounding the transect, included subdominant amounts (roughly 10-40 percent composition) of *P. microphylla* and minor amounts (roughly 2-5 percent composition) of *S. chinensis* on the site. The vegetative foliar cover objective is being met at this site, with foliar cover of 32 percent. No sign of utilization (0 percent) by livestock was observed at the site in 2013.

8 CONCLUSIONS

8.1 Determination of Land Health Standards

8.1.1 Standard 1: Upland Sites

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

Determination:

- Meeting the Standard
- Not Meeting the Standard, but making significant progress towards standard
- Not Meeting the Standard, not making significant progress toward standard

Conclusion: (Standard Achieved)

Rationale: The data at the trend plots 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 sites on the allotment as plant communities that are “naturally variable” (NRCS 2008). These variations occur due to site aspect, soils, and other natural conditions. We observed almost no signs of soil erosion, rills, gullies, or litter dams. Pedestalling was not occurring around the plant species present.

Energy flow and nutrient cycling is occurring on the allotment as plant vigor, diversity, and cover is high. Other shrubs and some succulents tend to dominate these sites. Annual forbs and grasses (both native and non-native) are important in their respective seasons and provide litter to minimize the effects of erosion. With continuous, heavy grazing, perennial grass species are removed from the plant community and shrubs like triangle bursage and snakeweed can increase to dominate the understory. Mesquite tends to be shrubby on this site due to the thin surfaces over clayey horizons. Paloverde reach moderate size on the site. With thin soil surfaces, this site can be a very ineffective user of intense summer rainfall if the herbaceous cover has been depleted. A 5 to 10% tree canopy is important on the site to keep diversity in the plant community. The potential of the site to produce grass is reduced as tree cover exceeds these amounts. In severe drought, the cover of perennial grasses and herbs as well as bursage and burroweed can be greatly reduced in the plant community. Recovery can go back to perennial grasses and herbs if good summer rains follow drought. Recovery can go back to the half shrubs if good cool season rains follow the drought. Jumping cholla can increase due to poor grazing management or such increases can be episodic due to climate. Stand lifespans range from 50-70 years without reproduction. The data collected from the key areas reflect the conditions described within the ESDs as the HCPC state (Figures 21 and 22). Overall, throughout the allotment, the soils are productive, stable, and in a sustainable condition as described in one of the states of the state in transition model in the ESD.

8.1.2 Standard 2: Riparian-Wetland Sites

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

Determination:

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

Rationale: There are no wetland-riparian sites within the Smith Wash allotment.

8.1.3 Standard 3: Desired Resource Condition

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

Determination:

- Meeting the Standard
- Not Meeting the Standard, but making significant progress towards standard
- Not Meeting the Standard, not making significant progress toward standard

Conclusion: (Standard Achieved)

Rationale: Desired resource conditions are set based on a site's potential based on site descriptions and state-transition models as well as consideration of the habitat needs for specific species. The current vegetative composition of native vegetation species within the allotment, though skewed towards annual species of grasses and increases in desert shrubs, is appropriate for the range site and is conducive to meeting 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 diverse native biotic community. Although the frequency of desirable native primary grammanoid species is less than what is recommended in the ESDs, the presence of the species within the allotment is an indicator that the overall ecological condition within the community is functioning within the parameters of the ESDs. In order for ecological site improvements to occur, a reduction in severity or cessation of ongoing drought conditions may be necessary for longer periods of time.

On Key Area SW-1, the most recent data shows the perennial grass composition falling below the desired 5 percent composition. Perennial grass species are still present on the site but are in low numbers. This is most likely due to climate factors as shown in the state and transition model for Schist Hills which predicts reduced composition of perennial grasses following extended drought periods. No utilization by livestock was observed on the Key Area so recent livestock grazing is not likely to be a factor. Shrub composition also fell below the 30 percent desired percent composition on this Key Area. In May of 2017, jojoba was recorded as 25 percent composition on SW-1. Palatable mule deer browse was referenced from jojoba and a percentage of palo verde. The 40 percent composition of paloverde measured in 2017 plus the 25

percent jojoba along with the forbs available bring the available forage very close to the 30 percent objective.

On SW-3 shrub composition fell below the 30 percent desired percent composition. In May of 2017 Jojoba was recorded as 26 percent composition on SW-3. Mule deer browse was referenced from jojoba and a percentage of palo verde. The 17 percent composition of palo verde in 2017 plus the 65 percent jojoba along with the forbs available bring the available forage very close to the 30 percent objective.

Both sites are meeting standards and vegetation composition falls within the historic climax plant community state within the state and transition model for each respective site and associated ecological site description. The 30 percent desired palatable shrub composition objective considers jojoba and paloverde. However, the site description includes false mesquite, jumping cholla, flattop buckwheat, fishhook barrel cactus, jojoba and desert globemallow as mule deer plant preferences. The palatable species for tortoise include fluffgrass, slender janusia, Engelmann pricklypear and desert globemallow.

9 RECOMMENDED MANAGEMENT ACTIONS

Based on existing information there are no resource concerns related to current livestock use that should be considered before lease issuance. Therefore, the 10-year grazing lease may be renewed with the following existing terms and conditions:

9.1 Proposed Terms and Conditions:

Terms:

Allotment	Livestock # and Kind	Grazing Period of Use	Percent Public Land	AUMs	Type Use
Smith Wash	46 Cattle	3/1 to 2/28	100	552	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.
6. The permittee's/lessee's 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 BLMTFO. The immediate area of the discovery shall be protected until notified by the BLMTFO Manager that operations may resume.

10 LIST OF PREPARERS

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11 AUTHORIZED OFFICER CONCURRENCE

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

I concur with the determinations and recommendations as written.

I do not concur.

I concur, but with the following modifications:

/s/ Karen Simms acting for _____

9/14/17 _____

Melissa Warren

Date

Field Office Manager

BLM Tucson Field Office

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