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Bureau of Land Management

Rangeland Health Assessment and Evaluation Report

BILL WILLIAM COMPLEX, AND BISHOP ALLOTMENT



U.S. Department of the Interior
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Colorado River District
Lake Havasu Field Office
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TABLE OF CONTENTS

1.0 INTRODUCTION.....	3
2.0 BACKGROUND.....	5
2.1 Analysis Setting.....	5
2.2 Climate	8
2.3 Cultural History	8
2.4 Livestock Management	11
2.4.1 Special Ephemeral Rule	12
2.5 Riparian and Wetland Resources.....	13
2.6 Vegetation.....	13
2.7 Wildlife.....	14
2.7.1 Migratory Birds/Birds of Conservation Concern	16
2.7.2 Bats.....	17
2.8 Monitoring Methods/Protocols.....	17
3.0 RESOURCE MANAGEMENT PLAN OBJECTIVES	19
3.1 Bill Williams Complex Allotments	19
3.1.1 Rangeland Management/Grazing	19
3.2 Bishop Allotment.....	19
3.2.1 Livestock Grazing Management.....	19
4.0 RANGELAND HEALTH ASSESMENT AND EVALUATION REPORT.....	21
4.1 Bill Williams Complex.....	21
4.1.1 Historic Permitted AUMs and Current Allotment Management.....	21
4.1.2 Allotment Uses	22
4.1.3 Range Improvement Projects	24
4.1.4 Monitoring Setting.....	24
4.1.5 Crossman Peak Assessment	24
4.1.6 Crossman Peak Evaluation Report	33
4.1.7 Planet Assessment	36
4.1.8 Planet Evaluation Report.....	47
4.1.9 Alamo Crossing Assessment	50
4.1.10 Alamo Crossing Evaluation Report.....	56
4.1.11 Primrose Assessment.....	59
4.1.12 Primrose Evaluation Report	62
4.1.13 Trend Data	62
4.1.14 Evaluation Conclusion.....	67
4.2 Bishop Allotment.....	71
4.2.1 Historic Permitted AUMs and Current Allotment Management.....	71
4.2.2 Allotment Uses	71
4.2.3 Range Improvement Projects	71
4.2.4 Monitoring Setting.....	71
4.2.5 Bishop Assessment.....	72
4.2.6 Bishop Evaluation Report.....	82
4.2.7 Evaluation Conclusion.....	85
5.0 Interdisciplinary Team Members	86
References	87
Appendix 1	90
Appendix 2	93

LIST OF ACRONYMS

ACEC – Areas of Critical Environmental Concern
AIM – Assessment, Inventory, and Monitoring Strategy
AML – Animal Management Level
AUM – Animal Unit Month
BCR – Bird Conservation Region
BLM – Bureau of Land Management
BOR – Bureau of Reclamation
CRD – Colorado River District
DD – Determination Document
ER – Evaluation Report
ESD – Ecological Site Description
FLPMA – Federal Land Policy Management Act
HMA – Herd Management Area
IBA – Important Bird and Biodiversity Area
KFO – Kingman Field Office
LHFO – Lake Havasu Field Office
MLRA – Major Land Resource Area
PFC – Properly Functioning Conditions
RHA – Rangeland Health Assessment
RMP – Resource Management Plan
SGCN – Species of Greatest Conservation Need
USACE – US Army Core of Engineers
USFS – US Forest Service
USFWS – US Fish and Wildlife Service
YFO – Yuma Field Office

1.0 INTRODUCTION

In 1997, in accordance with 43 §CFR 4180.2(b), the Arizona Bureau of Land Management (BLM) adopted rangeland health standards and guidelines for livestock grazing management. Standards for rangeland health and guidelines for management of livestock are the result of the Bureau's grazing administration regulations (43 CFR §4100), which became effective August 21, 1995.

The purpose of developing standards and guidelines is to ensure that the BLM's administration of the public lands preserves currently healthy rangelands and restores healthy conditions to those areas that are not functioning properly. Standards and guidelines provide specific measures of rangeland health and identify acceptable or best management practices. The authority for these standards and guidelines is found in 43 CFR §4180.

Arizona Standards and Guidelines for grazing administration have been developed through a collaboration process involving the Bureau of Land Management State Standards and Guidelines Team and the Arizona Resource Advisory Council. The Standards and Guidelines, criteria for meeting Standards, and indicators are an integrated document that conforms to the fundamentals of rangeland health and the requirements when taken as a whole.

The following provides a brief overview of the assessment, evaluation, and determination process and the associated documents that the BLM uses to meet these requirements.

Rangeland Health Assessment (RHA) – The preliminary step in the process, the RHA is the compilation and summarization of all available data and information to compare the current resource conditions in the allotment to the applicable Arizona rangeland health standards and resource management plan objectives. The RHA does not state conclusions as to whether or not the standards are achieved.

Evaluation Report (ER) – The ER is the analysis of the assessed data to the applicable Arizona rangeland health standards. The ER contains the Rationale behind the determination for whether or not the standards are achieved and identifies RMP objectives. When the standards are not achieved, the ER discloses if trends in resource conditions indicate that significant progress towards meeting the standards is occurring.

Determination Document (DD) – A DD is required when the ER finds that rangeland health standards are not achieved and identifies the “causal factors” that led to not meeting the standards.

This specific documentation serves as the RHA and ER for the Crossman Peak, Planet Ranch, and Alamo Crossing Ephemeral Allotments, and the Perennial Bishop Allotment.

Rangeland Health Resources are measurable and attainable goals for desired conditions of the biological resources of the allotment. The Secretary of the Interior approved Arizona's Standards for Rangeland Health and Guidelines for Grazing Administration in 1997. The Decision Record, signed by the Bureau of Land Management State Director provides full implementation of the standards and guides in Arizona BLM Land Use Plans.

Three standards are used to evaluate the status of rangeland health:

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 vegetation 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)
 - Rock
- Signs of erosion
 - Flow Pattern
 - Gullies
 - Rills
 - Plant Pedestaling

Standard 2: Riparian-Wetland Sites

Riparian-Wetland areas are in Properly Functioning Conditions (PFC)

Criteria for meeting Standard 2:

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

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

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

Standard 3: Desired Resource Conditions

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

Criteria for meeting standard 3:

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

As applicable, DD's will be completed prior to the completion of the NEPA phase of this grazing permit renewal process.

2.0 BACKGROUND

2.1 Analysis Setting

The Crossman Peak, Planet, Primrose, and Alamo Crossing ephemeral allotments are located within Mohave County northeast and southeast of Lake Havasu City, Arizona (appendix 1). Elevations range within these four allotments, from about 1,100 feet on the valley floors to 5,100 feet on Crossman Peak in the Crossman Peak Allotment.

These four allotments are located within the Colorado River District (CRD), Lake Havasu Field Office (LHFO). These allotments are all adjacent from each other starting from Crossman Peak, east of

Highway 95, moving southeast to the Planet Allotment, followed by the Primrose allotment, and ending at the Alamo Crossing Allotment. Portions of the Bill Williams River, flowing east to west from Alamo Dam, run and boarder south of Alamo Crossing and through the Primrose and Planet Allotment to join the southern portion of Lake Havasu, above Parker Dam.

The Bishop Allotment is located south of Ehrenberg, Arizona in southwest La Paz County. Elevations range from 250 feet to 800 feet. This perennial allotment is within CRD, Yuma Field Office (YFO) administrative boundary and is administered by the LHFO under an agreement between the YFO and LHFO signed in 2018 by both field managers and the district manager. The Bishop Allotment is bounded by Cibola National Wildlife Refuge to the west and Trigo Mountains and Yuma Proving Grounds to the east (appendix 1).

Table 2.1.1 outlines ownership of land acreage within the boundaries of Crossman Peak, Planet, Primrose Alamo Crossing, and Bishop Allotments.

Table 2.1.1. Crossman Peak, Planet, Primrose, Alamo Crossing, and Bishop Acreage*

Allotment	BLM Acres	% BLM	Private Acres	% Private	State Acres	% State	BOR** Acres	% BOR	USFWS Acres	% USFWS	USACE Acres	% USACE	Total Acres
Crossman Peak #0025	102,690.5	75.7%	32,278.9	23.8%	723.4	0.5%	0	0	0	0	0	0	135,692.8
Planet #03067	177,780.6	87.7%	11,421.6	5.6%	3,217.6	1.6%	6,003.5	3%	4,262.6	2.1%	0	0	202,685.9
Primrose #03069	98,585.2	92.2%	2207.6	2.1%	6120.2	5.7%	0	0	0	0	0	0	106,913
Alamo Crossing #00001	18,204.9	71.9%	2,362.3	9.3%	0	0	0	0	0	0	4,763.1	18.8%	25,330.3
Bishop #05009	25,779.1	95.1%	42.2	0.2%	966.8	3.6%	318.7	1.2%	0	0	9	0%	27,115.8

* Acreages based on 2021 BLM GIS data

**BOR lands are administered by the BLM

2.2 Climate

The climate associated with these allotments are typical of the Sonoran Basin and Range Ecological Region and characterized as having dry, hot, summers and cooler winters.

The Alamo Dam, AZ US weather station, at 393.2 m (1290ft) in elevation, and located at the southern boundary of Alamo Crossing, for the 1981-2010 climatic norms capture the annual precipitation in this area at 8.82in with winters at 2.90in and 2.45in for summers. Summer average temperatures are indicated at 90.3 °F with winters at 51.9 °F.

The Lake Havasu City, AZ US weather station, at 136.9m (449ft) in elevation, put the annual precipitation of the western area of the Bill Williams Complex at 3.84in with winters at 1.65in and 0.49in for summers. Average temperatures are captured at 107.4 °F for the summer and 55.0 °F for the winter. The allotments of this complex are mostly characterized by the Natural Resource Conservation service (NRCS) as being part of the 3-7 inch precipitation zone (p.z.).

The Ehrenberg 2 E, AZ US weather station, located about 15 miles from the northern area of the Bishop allotment, sits at 141.7m (465ft) in elevation and capture annual precipitation at 4.41in with winters at 1.63in and 0.99in in summers. Average temperatures in the summers are 92.9 °F while winters are 56.3 °F. The NRCS also characterizes the Bishop Allotment area at a 3-7” p.z.

2.3 Cultural History

PALEOINDIAN

The Colorado River region which now comprises southwestern Arizona and southeastern California was first occupied during the Paleoindian period between 10,000 and 8500 B.C. (McGuire 1982a; Stone 1986, 1991). At this time, Clovis and Folsom lithic technologies were present, although these types of diagnostic projectile points are rare along the lower Colorado River (Mabry 1998a:43; North et al. 2005:300) and hunting of megafauna does not seem to have been a major activity in the area (Agenbroad 1967). Other lithic technologies, such as the San Dieguito I complex are defined by heavily patinated lithic tools such as large scrapers or cores and cleared circles (Rogers 1939). However, few sites have been recorded in the area that have added to our knowledge of the Paleoindian lifeways. The lack of Paleoindian sites may be due to highly mobile early settlement strategies, deeply buried early sites, or lack of preserved stratified sites with diagnostics or absolute dates.

ARCHAIC

The Archaic period followed the Paleoindian period, and is characterized by the climate warming and becoming drier, extinction of megafauna and alternative resource utilization. The Southwestern Archaic is categorized by small groups that foraged and hunted medium-sized game, although distinct adaptations to specific environments have been recognized (Arnold and Walsh 2010). This pattern continued through the Early (8500 B.C.–5000 B.C.) and Middle (5000 B.C.–2000 B.C.) Archaic periods, with seasonal rounds based on plants, indicated by larger amounts of grinding tools in the artifact assemblage. Horticulture was adopted by the Early Agricultural period (2000 B.C.–A.D. 50), and semisedentary settlements were located near water or upland areas with higher rainfall that were

suitable for growing plants (Huckell 1984, 1995; Mabry 1998a, 2008; Wilcox 1979). Larger, seasonally occupied villages, some with communal structures, are found in the Colorado River floodplain around 500 B.C. (Mabry 1998b). Maize agriculture was conducted there, but there was still exploitation of upland bajada resources. Continued hunting and foraging was practiced through the end of the Archaic period in areas not in proximity to water sources (Halbirt and Henderson 1993).

PATAYAN

Within the vicinity of the project areas, the Archaic continued as late as A.D. 700 (Rogers 1945; Schaefer 1994; Schaefer and Laylander 2007; Waters 1982). A transitional phase from the Archaic spanned from approximately A.D. 500-1000. This phase is characterized by the introduction of paddle-and-anvil pottery making, smaller projectile points, and the introduction of floodplain agriculture on the Colorado River (Schroeder 1979). It is theorized that these technologies were introduced from Mexico or the Gila River Hohokam.

Ceramic production in the Colorado River Valley is attributed to the Patayan culture, who were likely affiliated with Yuman groups, such as the Quechan (McGuire 1982a:218–219; Rogers 1945; Stone 1986:66–68, 1991). Colorado Desert rock art sites may have roots in the Archaic period, but show a progression toward distinctive Patayan symbolic systems (Hedges 2005). The Patayan cultivated maize, squash, and beans, which were supplemented with wild plants such as mesquite, saguaro, and other cacti (Castetter and Bell 1951; McGuire 1982a:220–221; Rogers 1945; Schroeder 1979). Site types associated with the Patayan include trail systems, rock cairns, geoglyphs (intaglios), petroglyphs, modified desert-pavement surfaces (“sleeping circles”), and ground-stone quarries and manufacturing sites.

The Patayan chronology is inferred based on the association of Patayan ceramics with typed Hohokam wares of accepted dates and chronometric data from southwestern Arizona and southern California (Schaeffer and Laylander 2007). Earlier ceramic typologies (McGuire 1982a; Waters 1982:281–296) have been refined, but a paucity of dated sites allows for only broad temporal spans (Schaeffer and Laylander 2007:252). The Patayan period spanned from around A.D. 700 to the late 1500s. The largest distribution of Patayan ceramics occurs post 1500 (Waters 1982:293–295). Ceramic types include Colorado Beige, Black Mesa Buff, Palomas and Colorado Buff and Colorado Red-on-buff (Waters 1982).

ETHNOHISTORY

The potential descendants of the Patayan culture are the Quechan, Mohave, Halchidhoma (now with the Maricopa) and possibly other Yuman-speaking groups. These groups were able to resist Spanish missionaries and Euro-American influences. The Colorado River Yumans maintained their cultural practices, including their language and religion, to a much greater degree than surrounding protohistoric groups.

The Lower Colorado River area was one of shifting tribal territory and tribal boundaries in ethnohistoric times due to intertribal warfare (Forbes 1965). When Díaz and Alarcón sailed up the lower Colorado River in 1540, they described a situation of incessant warfare. The Quiquima (Quicoma) and Koxwan or Ciana (koxkha'n) that were mentioned cannot be identified but may be the Quechan or Kouanas. During Oñate's 1605 expedition, he found the Halchidhoma living south of the Gila River confluence, along

with the Kouanas and Halyikwamais. Oñate traveled up the east side of the river and encountered the Ocaras (Ozares or Oseres) just north of the Coguana (probably the Kouanas). They were described as people of a different language who made cotton mantas. These may have been the Opas, a Piman group, who like so many others, moved east to assimilate into the Maricopas on the middle Gila River. Oñate failed to mention the Quechan who presumably lived exclusively on the west side of the river at this time. Quechan territory may have extended from just south of the Gila River-Colorado River confluence north to at least Palo Verde and Cibola valleys and probably as far north as the Big Maria and Riverside mountains where they abutted Mohave territory. Oñate did encounter the Mohave near the juncture of the Colorado and Bill Williams rivers and at points to the south.

EARLY EURO-AMERICAN SETTLEMENT

The lands along the Colorado River have long served as an agricultural resource to people living along the shores. The Quechan, whose presence along the Colorado River in this area dates to roughly A.D. 1000, seasonally planted crops on the silt left behind by the river from periods of heavy rain and flooding (Stene 1996). Beginning in the early 1700s, Europeans such as Jesuit Father Eusebio Francisco Kino, travelled along the Gila River to its confluence with the Colorado and encountered the Quechan, who they referred to as the Yumans (Coues 1900). In the late 1700s, Father Francisco Garces and Juan Bautista de Anza set out to create a trail along the Gila River to California, crossing the Colorado River in 1772 and reaching present day El Centro, California. They conducted the remainder of the expedition to the California coast, and arrived near present day Los Angeles in 1774 (Faulk 1973). The Spanish subsequently established two missions near Yuma in an attempt to convert and “civilize” the Quechan. One of these missions, established at the mouth of the Gila River in 1778, was later raided and destroyed by the Quechan in 1781 (Stene 1996). Further attempts at European settlement near the Colorado River did not occur until the mid-1800s. However, the confluence of the Colorado and Gila Rivers remained an important crossroads for travelers and survey expeditions (Woznicki 1968).

Beginning with the outbreak of the Mexican American War in 1846, military personnel crossed the Colorado River through Yuma in route to California with the mission of establishing a formal route from Santa Fe to San Diego (Faulk 1973). Many of the same personnel subsequently returned to the area to conduct boundary surveys following the signing of the Treaty of Guadalupe Hidalgo in 1848 which ended the war between the United States and Mexico. The surveyors established the southern United States border at the Gila River, in what would eventually become Arizona, and the southern border of what would become California extended along a western trajectory from the Gila River’s intersection with the Colorado River.

In 1849, the discovery of gold in California brought large numbers of migrants travelling through Yuma to California. Lieutenant Cave J. Couatts established a ferry service across the Colorado River in 1849 that transported people and goods from Arizona to California. The site of this river crossing became known as “Yuma Crossing” and remained a vital transportation conduit until the later construction of the Southern Pacific Railroad (SPRR) which connected Los Angeles, California, and Texas and crossed the Imperial Valley reaching Yuma in 1879 (Faulk 1973; Woznicki 1968). California became a state in 1850 and the U.S. military established Fort Yuma on the California side of the Colorado River in 1853. Settlements on the Arizona side of the Colorado River followed shortly thereafter.

The Atlantic and Pacific Railroad built a single-track line into California along the southern Colorado River in 1883. In 1890, the Atchison, Topeka, and Santa Fe Railway purchased the line. The line was renamed the Santa Fe Pacific Railroad in 1897. In 1923 a second track was added (McGinnis 2015). Thomas Blythe secured the first Euro-American water rights in the Palo Verde Valley in 1877, which was followed by a water diversion system on the California side of the Colorado River. The Palo Verde Valley Irrigation District was formed in 1921, after continued diversion and pumping systems that were developed in the late nineteenth and early twentieth centuries assisted in continued agricultural use of the land in the Palo Verde Valley. Irrigation supported farming became extremely risky due to seasonal flooding. With the building of several dams, including the Palo Verde Diversion Dam which was completed in 1957, the risk of flooding was alleviated. Currently over 130,000 acres of farmland are found in the Palo Verde Irrigation district (Schaefer 2015).

2.4 Livestock Management

In 1978 Congress affirmed through the Public Rangelands Improvement Act that,

The Secretary of the Interior...shall update, develop (where necessary), and maintain on a continuing basis thereafter, an inventory of range conditions and records of trends of range conditions on the public rangelands, and shall categorize or identify such lands on the basis of the range conditions and trends thereof.

In order to comply, BLM developed and finalized, through a collaborative process, the Final Grazing Management Policy, which introduced Rangeland Program Summaries and the selective management category process for allotment prioritization. This policy was implemented on March 5, 1982 by issuance of instruction memorandum; Washington Office Instruction Memorandum 1982-292.

The categorization process initially ranked allotments into a improve (I), maintain (M), or custodial (C) management category through an analysis of the allotment's current range conditions, resource potentials, presence of resource use conflicts or controversies, opportunity for positive economic return, the present management situation, and other criteria as appropriate.

Allotments in the Improve Category exhibit vegetative and watershed conditions not meeting objectives and standards; potential resource production is high to moderate, but production is below potential; use conflicts exist; and anticipated benefits from management changes would justify expenditure of public funds.

Allotments in the Maintain Category exhibit vegetative and watershed conditions meeting objectives and standards; resource production is high, and rangelands are producing near their potential; no critical use conflicts exist; existing management is maintaining objectives and standards, but some range developments could augment current management.

Allotments in the Custodial Category exhibit vegetative and watershed conditions which may or may not meet objectives and standards; resource production potential is very low; few if any resource conflicts; and virtually no potential to respond to management changes.

Both the Primrose and Alamo Crossing allotments have been categorized in the Improve Category, and the Crossman Peak, Planet, and Bishop allotments have been categorized in the Custodial Category. Allotments may be moved from one category to another, as new information becomes available, resource conditions change, or management activities are implemented.

2.4.1 Special Ephemeral Rule

Published in the *Federal Register*, Vol. 33, No. 238, Saturday, December 7, 1968 (Livestock Grazing Ephemeral Range: Arizona, California, Nevada).

In accordance with 43 CFR 4115.2-1 regarding special rules for grazing districts and pursuant to the receipt of recommendations of the State Directors for Arizona, California, and Nevada and a factual showing of its necessity, a special rule for range designated as ephemeral is hereby approved.

Ephemeral (annual) ranges lie within the general southwest desert region extending primarily into southern Arizona, southern California, and southern Nevada and include portions of the Mohave, Sonoran, and Chihuahuan deserts. The region is characterized by desert type vegetation some of which may be classified as ephemeral only. Ephemeral range does not consistently produce forage, but periodically provides annual vegetation suitable for livestock grazing. In years of abundant moisture and other favorable climatic conditions a large amount of forage may be produced. Favorable years are highly unpredictable, and the season is usually short lived. Ephemeral areas fall generally below the 3,200-foot contour and below the 8-inch precipitation isoline. A minor percentage of the total plant composition is made up of desirable perennial forage plants and potential to improve range conditions and produce a dependable supply of forage by applying intensive management practices is lacking.

Because of the unique characteristics of ephemeral range, the following special rule shall apply as follows:

- Applicable allotments or uses shall be formally designated by the District Manager as ephemeral range.
- An annual application by qualified licensees or permittees is not required unless grazing use is desired. On a year-to-year basis whenever forage exists or climate conditions indicate the probability of an ephemeral forage crop, livestock grazing may be authorized upon application pursuant to any management requirements for the allotment.
- Use of base property (water base) during nonforage years is not feasible or economical and no use of base properties is required except during these periods when ephemeral forage is available and livestock grazing occurs.

Therefore:

- An annual application per 43 CFR 4115.2-1(c)(9), is not required unless grazing use is described.
- Grazing capacity per 43 CFR 4115.2-1(c)(3) may be based on a reasonable potential for forage.
- Substantial use of grazing privileges per 43 CFR 4115(c)(10) is not required.
- A year-round operation per 43 CFR 4115.2(c)(1) is not required.
- Substantial use of base property per 43 CFR 4115.2-1(c)(7) is not required.

This special rule shall immediately apply to the Phoenix, Stafford, and Arizona Strip Districts in Arizona, the Bakersfield Districts in California, and the Las Vegas District in Nevada upon recommendation for adoption in that District by the respective District Advisory Board and concurrence by the State Director. (At the time the special ephemeral rule was drafted the CRD was not yet formed but was included in the Phoenix District.)

2.5 Riparian and Wetland Resources

Riparian and wetland sites must exhibit a properly functioning condition to meet Standard 2. Riparian and wetland areas are the transition zones between aquatic systems and adjacent uplands, reflecting vegetation and physical characteristics that indicate water availability at or near the ground surface. Healthy riparian and wetland areas provide many important resource values, such as enhancing water quality and availability, providing wildlife habitat, affording recreation opportunities, and others. These areas also attract livestock due to water availability, high forage production, and shade.

Riparian areas, or lotic systems, are characterized by actively moving water. These sites are comprised of perennial and intermittent streams, but not ephemeral systems. Wetland areas, or lentic systems, are characterized by relatively still water. These sites are comprised of springs, seeps, meadows, and ponds.

The Planet, Primrose, and Alamo Crossing Allotments are the only allotments in this RHA to exhibit lotic systems. Proper Functioning Condition (PFC) assessments have been conducted at stream sections of the Bill Williams River and will be presented in this document.

2.6 Vegetation

Both the Bill Williams Complex and the Bishop Allotment areas are located within what is characterized by the NRCS as the Major Land Resource Area (MLRA) (symbol-040X) Sonoran Basin and Range. This area supports desert shrub communities. The giant saguaro cactus is a major indicator of the Sonoran desert. Dominant desert shrubs include, white bursage, desert wolfberry, ocotillo, cholla, desert saltbush, mesquite, brittlebush, burweed, pricklypear, desert broom, and creosote bush. Bush muhly, Arizona cottontop, threeawn, and fluffgrass are the main understory plants. Winter annuals can grow in some areas, depending on the amount of precipitation. Joshua-tree and littleleaf palo verde mixed with some honey mesquite are on stony or rocky sites. These sites have an understory of Mormon tea, prickly pear, cholla, ocotillo, desert saltbush, and grasses, such as tridens, bush muhly, tobosa, Arizona cottontop, and desert needle grass. At the lower elevations, creosote bush, ironwood, mesquite, burweed, and catclaw are associated with an understory of threeawn and annuals, such as red fescue, bluegrasses, fiddleneck, indianwheat grass, globemallow, and filaree.

The Bill Williams Complex vegetation community can be further observed as a transitional zone between the Mohave Desert and the Sonoran Desert. A mix of both of these desert scrub communities can be seen in the norther parts of the Complex and further transitions into the Sonoran desert scrub heading south towards the Bill Williams River. Although the Bishop allotment is not near the Bill Williams Complex, it is consistent with the Sonoran desert scrub community; a mix of common perennial shrubs, cacti, and desert trees as described above. Vegetation communities will tend to change based on ecological site with a few differences in species presence, including desert grasses, but the majority of the difference is in vegetation densities of one common species versus another. Some

ecological sites will present creosote (*Larrea tridentata*) flats, barren sites like desert pavement areas, others will produce cacti communities, while desert washes (alluvial fans) will produce the majority of desert tree communities.

2.7 Wildlife

The Bill Williams Complex and the Bishop allotments are utilized by the same species with the exception of the Mountain Plover, which is exclusive to the Bishop unit. Table 2.7.1 lists the sensitive species associated with the allotments. Mule deer, Peccary, Mountain Lion, Desert Bighorn sheep, and other game species utilize the allotments year-round. Riparian areas associated with these allotments tend to have greater species richness due to the higher quality habitat. The majority of riparian habitat associated with these allotments occurs on Refuge and State trust lands adjacent to the allotments or within BLM wilderness areas.

The most recent land health assessment was completed in 2008 using different parameters than current efforts (see 2.8). Monitoring the current state of the habitat will establish the baseline needed to set goals for future wildlife habitat. Grazing on the Bill Williams Complex is minimal (see 4.1.1). Reduction of the burro population would be the most immediate and effective means by which the BLM could improve the quality of the wildlife habitat within the Bill Williams Complex.

Table 2.7.1 Bill Williams Complex and the Bishop allotments species list.

Name	Common Name	USFWS	BLM	USFS	SGCN
<i>Aix sponsa</i>	Wood Duck				1B*
<i>Ammospermophilus harrisi</i>	Harris' Antelope Squirrel				1B
<i>Anaxyrus microscaphus</i>	Arizona Toad	SC*	S*		1B
<i>Anthus spragueii</i>	Sprague's Pipit	SC			1A*
<i>Aquila chrysaetos</i>	Golden Eagle	BGA*	S		1B
<i>Aspidoscelis flagellicauda</i>	Gila Spotted Whiptail				1B
<i>Athene cunicularia hypugaea</i>	Western Burrowing Owl	SC	S	S	1B
<i>Baeolophus ridgwayi</i>	Juniper Titmouse				1C*
<i>Botaurus lentiginosus</i>	American Bittern				1B
<i>Buteo regalis</i>	Ferruginous Hawk	SC	S		1B
<i>Calypte costae</i>	Costa's Hummingbird				1C
<i>Castor canadensis</i>	American Beaver				1B
<i>Charadrius montanus</i>	Mountain Plover	SC			1B
<i>Cistothorus palustris</i>	Marsh Wren				1C
<i>Coccyzus americanus</i>	Yellow-billed Cuckoo (Western DPS)	LT*		S	1A
<i>Colaptes chrysoides</i>	Gilded Flicker		S		1B
<i>Corynorhinus townsendii pallescens</i>	Pale Townsend's Big-eared Bat	SC	S	S	1B
<i>Crotalus cerberus</i>	Arizona Black Rattlesnake				1B
<i>Empidonax traillii extimus</i>	Southwestern Willow Flycatcher	LE*			1A
<i>Empidonax wrightii</i>	Gray Flycatcher				1C
<i>Euderma maculatum</i>	Spotted Bat	SC	S	S	1B
<i>Eumops perotis californicus</i>	Greater Western Bonneted Bat	SC	S		1B

Name	Common Name	USFWS	BLM	USFS	SGCN
<i>Falco peregrinus anatum</i>	American Peregrine Falcon	SC	S	S	1A
<i>Gila elegans</i>	Bonytail Chub	LE			1A
<i>Gopherus morafkai</i>	Sonoran Desert Tortoise	C	S	S	1A
<i>Gymnorhinus cyanocephalus</i>	Pinyon Jay		S		1B
<i>Haliaeetus leucocephalus</i>	Bald Eagle	SC, BGA*	S	S	1A
<i>Heloderma suspectum</i>	Gila Monster				1A
<i>Incilius alvarius</i>	Sonoran Desert Toad				1B
<i>Ixobrychus exilis</i>	Least Bittern				1C
<i>Kinosternon sonoriense sonoriense</i>	Desert Mud Turtle		S		1B
<i>Lasiurus blossevillii</i>	Western Red Bat			S	1B
<i>Lasiurus xanthinus</i>	Western Yellow Bat			S	1B
<i>Laterallus jamaicensis coturniculus</i>	California Black Rail	SC	S		1B
<i>Lithobates yavapaiensis</i>	Lowland Leopard Frog	SC	S	S	1A
<i>Lontra canadensis sonora</i>	Southwestern River Otter	SC			1B
<i>Macrotus californicus</i>	California Leaf-nosed Bat	SC	S		1B
<i>Melanerpes uropygialis</i>	Gila Woodpecker				1B
<i>Melospiza lincolni</i>	Lincoln's Sparrow				1B
<i>Melospiza aberti</i>	Abert's Towhee			S	1B
<i>Micrathene whitneyi</i>	Elf Owl				1C
<i>Microtus mexicanus</i>	Mexican Vole				1B
<i>Micruroides euryxanthus</i>	Sonoran Coralsnake				1B
<i>Myiarchus tyrannulus</i>	Brown-crested Flycatcher				1C
<i>Myotis occultus</i>	Arizona Myotis	SC	S		1B
<i>Myotis velifer</i>	Cave Myotis	SC	S		1B
<i>Myotis yumanensis</i>	Yuma Myotis	SC			1B
<i>Nyctinomops femorosaccus</i>	Pocketed Free-tailed Bat				1B
<i>Oreoscoptes montanus</i>	Sage Thrasher				1C
<i>Oreothlypis luciae</i>	Lucy's Warbler				1C
<i>Ovis canadensis mexicana</i>	Mexican Desert Bighorn Sheep				1B
<i>Passerculus sandwichensis</i>	Savannah Sparrow				1B
<i>Perognathus longimembris</i>	Little Pocket Mouse	No Status			1B
<i>Phrynosoma solare</i>	Regal Horned Lizard				1B
<i>Rallus limicola</i>	Virginia Rail				1C
<i>Rallus obsoletus yumanensis</i>	Yuma Ridgway's Rail	LE			1A
<i>Setophaga petechia</i>	Yellow Warbler				1B
<i>Sigmodon arizonae plenus</i>	Colorado River Cotton Rat				1B
<i>Sphyrapicus nuchalis</i>	Red-naped Sapsucker				1C
<i>Spizella atrogularis</i>	Black-chinned Sparrow				1C
<i>Spizella breweri</i>	Brewer's Sparrow				1C
<i>Tadarida brasiliensis</i>	Brazilian Free-tailed Bat				1B

Name	Common Name	USFWS	BLM	USFS	SGCN
Toxostoma lecontei	LeConte's Thrasher		S		1B
Troglodytes pacificus	Pacific Wren				1B
Vireo bellii arizonae	Arizona Bell's Vireo				1B
Vulpes macrotis	Kit Fox	No Status			1B
Xyrauchen texanus	Razorback Sucker	LE			1A
Danaus plexippus	Monarch Butterfly	Candidate			

* SC- Special Concern, S- Sensitive, LT- Listed Threatened, LE- Listed Endangered, C- Candidate, BGA- Bald and Golden Eagle Protection Act. 1A, 1B, & 1C are tier rankings.

2.7.1 Migratory Birds/Birds of Conservation Concern

The Bill Williams Complex and the Bishop allotments fall within the Sonoran and Mohave deserts Region 33 Bird Conservation Region (BCR). The Mohave Desert covers southeastern California and southern Nevada and adjoins the Sonoran Desert, which extends from southwestern Arizona south on both sides of the Gulf of California into the Mexican states of Baja California, Sonora, and Sinaloa. This arid region is dominated by cacti, slow-growing grasses, creosote, and other desert shrubs. The Colorado River and adjacent wetlands provide habitat for ducks and other wetland birds, including some of the most important habitat in the arid southwest for Western and Clark's Grebes and American Avocets. This region also includes El Pinacate y Gran Desierto de Altar Biosphere Reserve in northern Mexico, which is a unique biome providing habitat for many raptors, such as Golden Eagle and wintering Northern Harrier, Shorteared Owl, and Merlin. Isla Tiburón, located off the coast of Sonora in the Gulf of California, is an Important Bird and Biodiversity Area (IBA) that harbors endemic forms of the Northern Flicker, Cactus Wren, and Xantus' Hummingbird and such pelagic birds as the Magnificent Frigatebird, Red-billed Tropicbird, Brown Booby, Blue-footed Booby, and Craveri's Murrelet. Another Mexican IBA, the Sistema Tóbari, supports large numbers of American Avocet, Marbled Godwit, Northern Pintail, and Lesser Scaup. This BCR is the center of distribution of the Rufous-winged Sparrow, LeConte's Thrasher, Lucy's Warbler, and Abert's Towhee. Riparian wetlands are habitat for the Yuma Clapper Rail and Southwestern Willow Flycatcher. The Salton Sea hosts large numbers of American White Pelicans, Eared Grebes, and other colonial waterbirds; shorebirds, such as the Black-necked Stilt and Long-billed Curlew; and waterfowl during both migration and winter.

Migratory birds utilizing the uplands in the Bill Williams Complex and the Bishop allotments are desert scrub obligate species such as the sage thrasher, Brewer's sparrow, and sage sparrow, which are listed on the Region 33 species list. Riparian areas habitats would provide habitat for such species as the willow flycatcher, yellow-billed cuckoo, black rail, Yuma Ridgway's rail, long billed curlew, and Virginia rail. The allotment does not contain large expanses of water and riparian habitat. Species strongly associated with water bodies and riparian habitat would be scarce to absent from most of the allotments. Species that prefer the more productive riparian habitat would therefore have little to no impacts associated from rangeland authorized activities. Other species such as the bald eagle, ferruginous hawk, golden eagle, burrowing owl, elf owl, and peregrine falcon may occur in all habitats and elevations.

2.7.2 Bats

There are 189 documented AML features that potentially provide habitat for the bat species within the Bill Williams Complex of allotments. The Bishop allotment has 3 AML features within the allotment. A review of AGFD species of greatest conservation need and Heritage data within the allotments, revealed 15 species of bats potentially utilizing the habitat within the allotments. These are: Brazilian free-tailed bat, Spotted Bat, Big Brown Bat, Greater Western Bonneted Bat, Hoary Bat, Pale Townsend's big-eared bat, Western Red Bat, Pallid Bat, Western Yellow Bat, California Leaf-nosed Bat, Arizona Myotis, Pocketed Free-tailed Bat, Cave Myotis, California Myotis, and Yuma myotis.

2.8 Monitoring Methods/Protocols

To assess rangeland health conditions and capture the required criteria for meeting the Arizona Rangeland Health Standards, several methods are used to gather the appropriate data. The results of qualitative and quantitative data gathered is then used to make comparisons to Ecological Site Descriptions (ESD) provided by the NRCS. ESDs provide described information and data of what can be expect at an ecological site based on geological, hydrological, biological, and agronomical components. ESDs are not always complete, therefore, professional judgement is also used to make appropriate evaluations.

Standard 1- Upland Health and; Standard 3 – Desired Resource Conditions

Interpreting Indicators of Rangeland Health (BLM Technical Reference 1734-6): This qualitative assessment protocol (respectively recognized as “17 indicators”) includes five descriptions for each of the 17 indicators which reflects a range of departure from what is expected for the site per the reference sheet (ecological site description), with “none to slight” being the least departure and “extreme to total” being the most. This protocol is partly designed to provide a preliminary evaluation of soil and site stability, hydrologic function, and biotic integrity at the ecological site level. Utilizing this qualitative assessment in conjunction with quantitative monitoring and inventory information, can be used to provide early warnings of resource problems on upland rangelands.

Assessment, Inventory, and Monitoring Strategy (AIM): The AIM Strategy utilizes a standard set of core methods and indicators. Like the qualitative assessment protocol described above, the core methods represent the minimum information necessary to describe three key ecosystem attributes: soil and site stability, watershed function, and biotic integrity. Through AIM, quantitative data is derived to be comparable to a reference state or past data to develop trend information.

Technical Reference 1734-6 defines qualitative data as “Observational data derived from visual observations and recorded descriptively but not measured (e.g., descriptive or non-numerical data).” Quantitative data is defined as “Data derived from measurements, such as counts, dimensions, weights, etc., and recorded numerically; may include ratios or other values. Qualitative numerical estimates, such as ocular cover and production estimates, are often referred to as “semi-quantitative”.”

Whenever possible, the LHFO conducts the 17 indicators at established monitoring sites alongside the AIM Strategy or other similar protocol methods. Because the 17 indicators method utilizes an ocular assessment in comparison to a sites potential, it is important that experienced, knowledgeable land

managers and specialist have knowledge of the rangeland ecological sites that are being evaluated. The Core methods of the AIM Strategy further our understanding of the conditions of the land by gathering quantitative information and assists with reinforcing what is being observed through the described data gathered by the 17 indicators.

Standard 2 – Riparian-Wetland Sites

Proper Functioning Condition for Lotic Areas (BLM Technical Reference 1737-15): The PFC assessment method was created to qualitatively evaluate the foundation of biological, physical, and chemical process; more specifically, the functionality of the physical processes occurring on a stream. These physical processes include the interactions of hydrology, stabilizing vegetation, and geomorphology (soils and landform). Because the PFC assessment compares each stream to its own potential, it is universally applicable to all but the most highly modified perennial and intermittent streams.

To assess the functioning conditions of these processes, information pertaining to 17 attributes and processes are used to determine a streams physical function. Based on the qualitative responses and comments captured on an assessment form an identification team places the stream reach in one of three rating categories:

Proper functioning condition: A lotic riparian area is considered to be “functioning properly” when adequate vegetation, landform, or woody material is present to dissipate stream energy, capture sediment and aid floodplain development, improve floodwater retention and ground-water recharge, develop root masses, and maintain channel characteristics.

Functioning-at risk: These riparian areas are in limited functioning condition; however, existing hydrological, vegetative, or geomorphic attributes make them susceptible to impairment.

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

It is important to note that the Bill Williams River can be categorized under highly modified perennial and intermittent streams. The river is about 24 miles long with different management entities in control at different sections of the river. Due to its bio-richness, there is a collaboration among some of the entities to maintain and preserve the integrity of the river; however, certain aspects cannot be controlled. At the top, the river is controlled by the USACE at Alamo Dam. The dam has changed the natural regiment of the Bill Williams River where natural flooding events are no longer possible, as a result, the integrity of the river depends highly on the time and amount of water that is released. The BLM has a large portion/stretch of the river following the dam with private property and state found along before ending at the Bill Williams Wildlife Refuge managed by the USFWS. Historically, much of the private lands along the river were used for farming. Currently, many of the wells are under the control of mining companies for the use of those waters. PFC has been conducted in stream stretches administered by the BLM, LHFO, with the knowledge that the natural regiment is no longer possible and the assessment is based on the streams current potential, as prescribed by the PFC handbook.

3.0 RESOURCE MANAGEMENT PLAN OBJECTIVES

In addition to achieving or making significant progress towards achieving the Arizona Rangeland Health Standards and conforming to livestock grazing management guidelines, the following Resource Management Plans (RMP) objectives represent the desired future conditions. Standards and RMP objectives are stand-alone requirements. Together, they may combine to inform future desired management actions and grazing management alternatives development in the NEPA document and may be incorporated as appropriate and required by policy into final decision documents at the grazing permit renewal step process.

3.1 Bill Williams Complex Allotments

The Record of Decision and Lake Havasu Field Office Approved Resource Management Plan was approved and signed in 2007 and covered grazing management for those allotments within the administration of the LHFO.

3.1.1 Rangeland Management/Grazing

Desired Future Conditions

- Provide forage on a sustained yield basis for livestock consistent with meeting Land Health Standards and multiple use objectives. Healthy, sustainable rangeland ecosystems will be maintained or improved to meet Land Health Standards and produce a wide range of public values such as wildlife habitat, livestock forage, recreation opportunities, clean water, and functional watersheds.
- Livestock use and associated management practices will be conducted in a manner consistent with other multiple use needs and objectives to ensure that the health of rangeland resources is preserved or improved so that they are productive for all rangeland values. Where needed, public rangeland ecosystems will be improved to meet objectives.

3.2 Bishop Allotment

The Yuma Field Office Record of Decision Approved Resource Management Plan approved was signed in 2010 and covered grazing management for those allotments within the administration of the YFO.

3.2.1 Livestock Grazing Management

Desired Future Conditions

- Arizona Guidelines for Grazing Administration to meet Land Health Standard 1
 - Management activities will maintain or promote ground cover that will provide for infiltration, permeability, soil moisture storage, and soil stability appropriate for the ecological sites. The ground cover should maintain soil organisms and plants and animals to support the hydrological and nutrient cycles, and energy flow. Ground cover and signs of erosion are surrogate measures for hydrologic and nutrient cycles and energy flow.

- When grazing practices alone are not likely to restore areas of low infiltration or permeability, land management treatments may be designed and implemented to attain improvement.
- Arizona Guidelines for Grazing Administration to meet Land Health Standard 2
 - Management practices maintain or promote sufficient vegetation to maintain, improve or restore riparian-wetland functions of energy dissipation, sediment capture, groundwater recharge and stream bank stability, thus promoting stream channel morphology (e.g., gradient, width/depth ratio, channel roughness and sinuosity) and functions appropriate to climate and landform.
 - New facilities are located away from riparian-wetland areas if they conflict with achieving or maintaining riparian-wetland function. Existing facilities are used in a way that does not conflict with riparian-wetland functions or are relocated or modified when incompatible with riparian-wetland functions.
 - The development of springs and seeps or other projects affecting water and associated resources shall be designed to protect ecological functions and processes.
- Arizona Guidelines for Grazing Administration to meet Land Health Standard 3
 - The use and perpetuation of native species will be emphasized. However, when restoring or rehabilitating disturbed or degraded rangelands, non-intrusive, non-native plant species are appropriate for use where native species (a) are not available, (b) are not economically feasible, (c) cannot achieve ecological objectives as well as non-native species, and/or (d) cannot compete with already established non-native species.
 - Conservation of Federal threatened or endangered, proposed, candidate, and other special status species is promoted by the maintenance or restoration of their habitats.
 - Management practices maintain, restore, or enhance water quality in conformance with State or Federal standards.
 - Intensity, season and frequency of use, and distribution of grazing use should provide for growth and reproduction of those plant species needed to reach desired plant community objectives.
 - Grazing on designated ephemeral (annual and perennial) rangeland may be authorized if the following conditions are met:
 - Ephemeral vegetation is present in draws, washes, and under shrubs and has grown to useable levels at the time grazing begins;
 - Sufficient surface and subsurface soil moisture exists for continued plant growth;
 - Serviceable waters are capable of providing for proper grazing distribution;
 - Sufficient annual vegetation will remain on site to satisfy other resource concerns (i.e., watershed, wildlife, wild horse and burro); and
 - Monitoring is conducted during grazing to determine if objectives are being met.
 - Management practices will target those populations of noxious weeds that can be controlled or eliminated by approved methods.
 - Management practices to achieve desired plant communities will consider protection and conservation of known cultural resources, including historical sites, and prehistoric sites and plants of significance to Native American peoples.
- Forage is provided on a sustained yield basis for livestock consistent with meeting Land Health Standards and multiple use objectives.
- Livestock use and associated management practices are conducted in a manner consistent with other multiple-use needs and objectives to ensure that the health of rangeland resources is

preserved or improved so that they are productive for all rangeland values. Where needed, improve public rangeland ecosystems to meet objectives.

- Healthy, sustainable rangeland ecosystems are maintained or improved to meet Standards and Guidelines (USDOI BLM 1997) and produce a wide range of public values such as wildlife habitat, livestock forage, recreation opportunities, clean water, and functional watersheds.

4.0 RANGELAND HEALTH ASSESMENT AND EVALUATION REPORT

4.1 Bill Williams Complex

The Crossman Peak, Planet, Primrose, and Alamo Crossing allotments were last evaluated in 2008 by the Kingman Field Office (KFO) during a time when the administration of the livestock grazing program within the LHFO was spilt between the YFO and KFO.

The 2008 evaluation found, based on information collected and recorded, Standard 1, 2, and 3 were all met at all areas where monitoring was conducted. As a result, a Decision Record was signed to approve and issue a 10-year grazing permit under the special ephemeral rule. However, in March 2009 in *Western Watersheds Project v. Bureau of Land Management* (AZ-LLAZCO1000-09-01) a summary judgment was granted to Western Watersheds Project and the BLM decision was reversed. Therefore, no grazing permit renewals were issued, but any expired permits were renewed under the Federal Land Policy Management 402(c)(2) Appropriations Act, which allows the ability to renew grazing permits with the same terms and conditions without fully processing pending a completed evaluation and decision.

Since the 2008 evaluation, limited monitoring was conducted until 2020 when permanent monitoring sites, key areas, were established to begin obtaining baseline data for long-term trend. The four allotments continue to be managed under the special ephemeral rule.

4.1.1 Historic Permitted AUMs and Current Allotment Management

Crossman Peak

Designated as ephemeral in 1977. Historical records show Crossman Peak last annual authorization for livestock grazing was in 1984 from May 15, 1984 to August 15, 1984 for 20 head of cattle for a total of 60 Animal Unit Months (AUMs). During the 2008 Final Decision to renew the grazing permit for a 10-year term, an existing permit authorized under the FLPMA 402(c)(2) Appropriations Act, with a term from 2002 to 2012 had been in effect. When the grazing permit of 2002 expired in 2012, a new permit under the FLPMA 402(c)(2) Appropriations Act was issued and set to expire in 2022. The Grazing Preference was transferred in 2019 and the current permittee has a grazing term from 2019 to 2022.

Planet

Designated as ephemeral in 1973. Historical records show Crossman Peak last known authorization for livestock grazing was 1983 from March 12, 1983 to May 31, 1983, for 129 head of cattle for a total of 314 AUMs. During the 2008 Final Decision to renew the grazing permit for a 10-year term, an existing

permit authorized under the FLPMA 402(c)(2) Appropriations Act, with a term from 2004 to 2014 had been in effect. For a period of time, communication had been lost for unknown reasons and the grazing permit expired in 2014 and no renewal had occurred. In 2017, efforts to communicate with the permittee was attempted in order to renew the grazing permit, however, there was no response. More recent efforts to understand events leading to the expiration and lack of communication led that in 2011 lands owned/controlled by the permittee were conveyed to a mining corporation, Freeport-McMoRan Corporation. As a result, the last known permittee on record no longer held a grazing preference. No evidence that this change was communicated to the BLM. The Allotment is now vacant.

Primrose

Designated as ephemeral in 1973. Historical records show Primrose last know authorization for livestock grazing was on January 15, 1988. Soon after, livestock was recorded on the range without authorization and fees were generated and paid as settlement for unauthorized gazing use. 61 head of livestock trespassed between January 16, 1988 to August 2, 1988 for a total of 217 AUMs. The last known grazing permit on record expired in 1989. Efforts to understand the history of the allotment led that the base property (base water) on record is now controlled by the Freeport-McMoRan Corporation. In accordance with 43 CFR §4110.2-1(d) the preference for renewal goes to the individual who owns or controls the base property. In 2019 the LHFO reached out, via mail, to a representative of the Freeport-McMoRan Corporation to know if there was any interest to apply for a grazing permit as they now owned/controlled the base property on record. It was expressed in an email response that Freeport McMoRan Corporation has no intention of managing livestock in the Primrose Allotment and thereby relinquishes the grazing preference. The Allotment is now vacant.

Alamo Crossing

Designated as ephemeral in 1983. The 2008 evaluation has the last know time grazing was authorized in Alamo Crossing in 1991 for 48 AUMs. This information could not be recently confirmed. During the 2008 Final Decision to renew the grazing permit for a 10-year term, an existing permit authorized under the FLPMA 402(c)(2) Appropriations Act, with a term from 2002 to 2012 had been in effect. There is no record to show a permit renewal occurred when the grazing term expired in 2012. The grazing preference was transferred in 2018 and under the FLPMA 402(c)(2) Appropriations Act, the new permittee received a grazing permit set to expire in 2028. The grazing preference has since been transferred two more times and now the current permittee has a grazing permit effective 2019 and set to expire in 2028.

4.1.2 Allotment Uses

1. Grazing: The Bill Williams Complex allotments, are managed as per the Special Ephemeral Rule and are only to be grazed in years of abundant moisture and other favorable climatic conditions producing an adequate amount of forage.
2. Wild Burros: There are two Herd Management Areas (HMAs), Alamo and Havasu. The Havasu HMA is within the Crossman Peak and Planet Allotments. The Alamo HMA is within the Alamo Crossing and Primrose Allotments. The following table describes the HMA status as of March 1, 2021.

Table 4.1.1. Alamo and Havasu Burro HMA Status as of 2021

HMA	Herd Code	BLM Acres	Total acres	AML Low End	AML High End	2021 Estimated Population	Most Recent Population Inventory	Last Gather
Alamo	AZ0005	288,122	341,055	128 Burros	160 Burros	1,221 Burros	April, 2012	June, 2003
Havasu	AZ0010	308,496	409,901	133 Burros	166 Burros	133 Burros	Nov., 2018	June, 2020

3. Cultural Resources: The four allotments have a rich and diverse cultural heritage. Hundreds of archaeological sites representing more than 7,000 years of human occupation have been recorded on BLM-administered lands within the four allotments. Prehistoric sites cluster near seeps and springs in mountain ranges, and in proximity to perennial streams such as the Bill Williams and Colorado Rivers. Historic site types consist of metal and glass scatters historic structures such as foundations and standing architecture, historic roads and railroad grades. Nearly all sites within the four allotments are open terrace sites with little or no depth (stratified layers built up over time). Nearly all of the river-bottom village sites have been wash by repeated heavy flooding or are very deeply buried. The lack of stratified sites and loss of sites due to flooding have left major gaps in the cultural record of the Colorado and Bill Williams Rivers and adjacent lands.

4. Wilderness: The Swansea Wilderness Area is 25 miles northeast of Parker in La Paz County, Arizona and is within the Planet Ranch Allotment. The Rawhide Mountains Wilderness is bisected by the Bill Williams River and is within the Alamo Crossing Allotment.

5. Wild and Scenic Rivers: The Bill Williams River within the Planet, Primrose, and Alamo Crossing allotments were analyzed in accordance with the Wild and Scenic Rivers Act (December 23, 1980) and BLM Information Memoranda 87-515 (July 23, 1987) and 88-570 (September 8, 1988) to determine their eligibility to be studied for inclusion in the National Wild and Scenic Rivers System. Three segments of the Bill Williams River were determined to meet the eligibility requirements of being “free flowing” and having one or more “outstandingly remarkable” values. In December 1994, the *Arizona State Wild and Scenic River Legislative Environmental Impact Statement* determined these segments as suitable for designation.

6. Areas of Critical Environmental Concern (ACEC): All four allotments contain lands designated as ACEC. These are designated areas where special management attention is required to protect and prevent damage to important cultural, historic, scenic values, fish and wildlife resources, and/or other natural systems or processes.

There is a potential of impacts from livestock operations and grazing; however, due to the ephemeral nature and expected future use, given the past 30-years of non-use, livestock operations and grazing activities would probably not transpire or would only occur limitedly during seasons when there is adequate availability of forage for grazing.

7. Recreation: Desert Recreation is a major activity in the Bill Williams Complex largely resulting from significant local and regional population growth along the Colorado River and metropolitan areas of Phoenix, Arizona; Las Vegas, Nevada; and southern California. Examples of recreation include, but not limited to off-road vehicles, dispersed camping, target shooting, organized races, winter visitors, hunting, birding, and hikers.

4.1.3 Range Improvement Projects

To date, not all projects have been recently inspected, and in some cases entire projects may no longer exist. Livestock range projects may compose of wells, corrals, drift fences, pipelines, dirt tanks/reservoirs, and springs. Wildlife catchments can be found in the Bill Williams Complex as well and are strictly designed for wildlife use only. Livestock range projects that have been inspected report they no longer function and require reconstruction. Above ground facilities are deteriorated or in part no longer exist (based on their presence in past inspections). Any existing wells may produce water, however, testing the wells integrity and water availability is needed to make an accurate determination of their functioning status. Fencing projects (i.e., drift fences, boundary fences) are down in certain areas of the allotments or do not exist in certain boundary areas.

As per the Special Ephemeral Rule, the use of base property (water base, i.e., well projects) during non-forage years is not feasible or economical and no use of base properties is required except during these periods when ephemeral forage is available and livestock grazing occurs.

Therefore:

The LHFO may approve a grazing application once the criteria for ephemeral use is met and the base property of an ephemeral allotment is functional.

4.1.4 Monitoring Setting

To capture information regarding rangeland health conditions and begin developing baseline data for establishing trend in the future, key areas are chosen based on which ecological sites would present the most noticeable changes due to grazing impacts. Therefore, monitoring plots are also placed at an appropriate distance from available waters (see appendix 2). Although these allotments have not had authorized grazing in over 20 to 30 plus years, gathering data at those key areas can capture impacts when livestock is authorized.

4.1.5 Crossman Peak Assessment

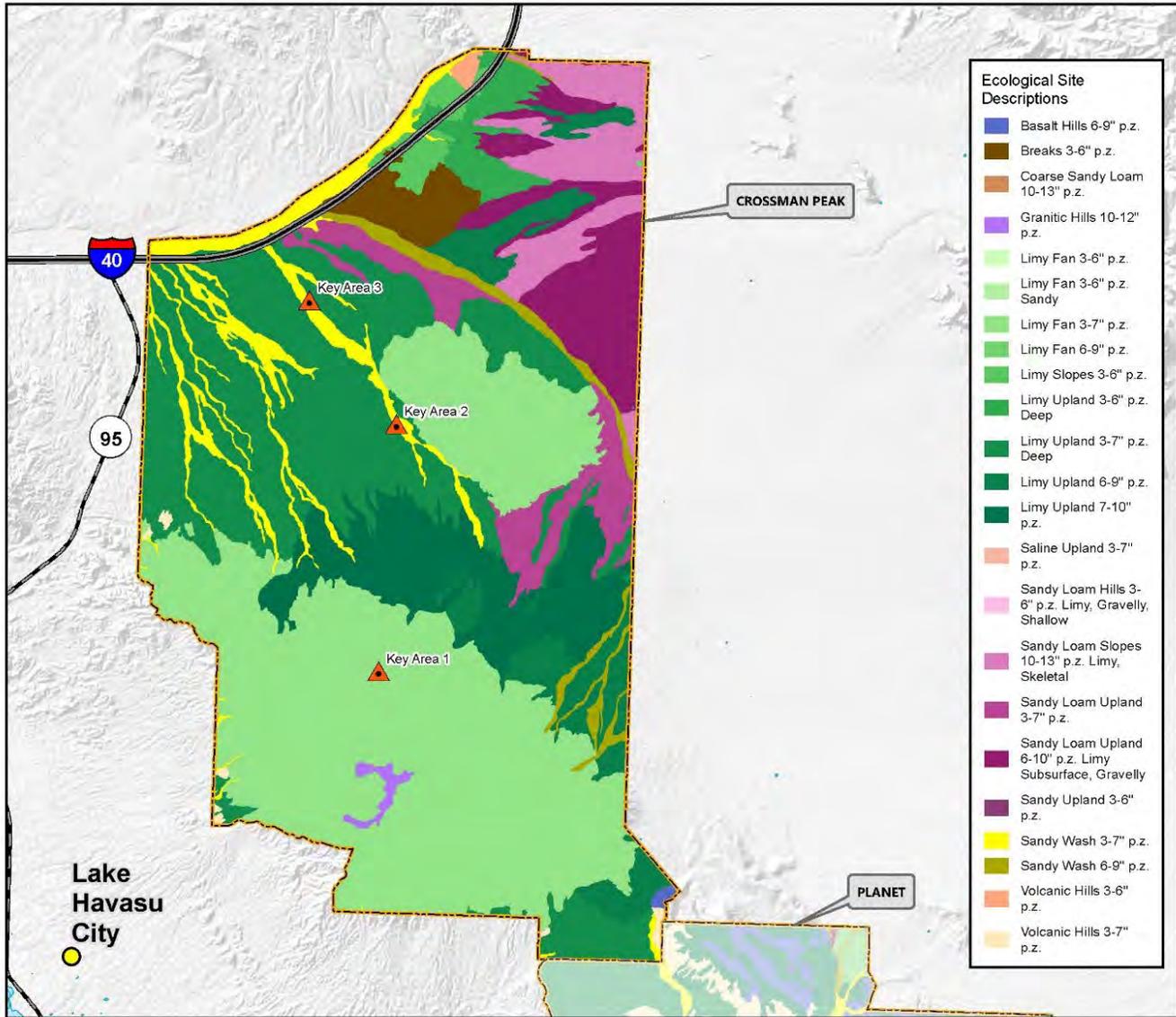
In 2020, three key areas were established in the Crossman Peak Allotment. The *Ecological Sites: Crossman Peak* Map (below) provide an ecological layout and the locations of the established key area monitoring plots.

The following table provides a breakdown of those ecological sites Crossman Peak encompasses. Those highlighted in yellow represent the ecological sites that have been monitored through the established key areas. The ecological sites with the largest presence in Crossman Peak are Limy Fan 3-7" p.z at 31.5% and Limy Upland Deep 3-7" p.z at 19.5%. These ecological sites at their climax communities are not

expected to produce much canopy cover and palatable forage. They are dominated by desert shrubs and typically only produce annual forage during above average rains. The Sandy Wash ecological site is where the plant community is expected to be more densely present than other sites and represents 4.5% of the ecological sites of the allotment.

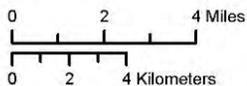
Table 4.1.2. Crossman Peak Ecological Site Breakdown

Ecological Site Description	Acres	Percentage of BLM Land
Breaks 3-6" p.z.	2,854.4	1.8%
Limy Fan 3-6" p.z.	17.2	<1%
Limy Slopes 3-6" p.z.	1,666.1	1.0%
Limy Upland 3-6" p.z. Deep	2,934.1	1.8%
Sandy Upland 3-6" p.z.	2,854.4	1.8%
Volcanic Hills 3-6" p.z.	267.7	<1%
Sandy Loam Hills 3-6" p.z. Limy, Gravelly, Shallow	36.4	<1%
Limy Fan 3-6" p.z. Sandy	2,854.4	1.8%
Basalt Hills 6-9" p.z.	152.0	<1%
Sandy Loam Upland 6-10" p.z. Limy Subsurface, Gravelly	7,824.5	5%
Limy Fan 6-9" p.z.	15.6	<1%
Limy Upland 6-9" p.z.	7,585.3	4.9%
Sandy Wash 6-9" p.z.	2,573.6	1.6%
Coarse Sandy Loam 10-13" p.z.	6,063.7	3.9%
Sandy Loam Slopes 10-13" p.z. Limy, Skeletal	6,063.7	3.9%
Limy Upland 7-10" p.z.	11,112.8	7.1%
Limy Fan 3-7" p.z.	48,912.6	31.5%
Granitic Hills 10-12" p.z.	462.9	<1%
Limy Upland 3-7" p.z. Deep	30,251.2	19.5%
Saline Upland 3-7" p.z.	7,343.4	4.7%
Sandy Wash 3-7" p.z.	7056.1	4.5%
Sandy Loam Upland 3-7" p.z.	5,536.7	3.5%
Volcanic Hills 3-7" p.z.	369.9	<1%



Ecological Sites: Crossman Peak
Colorado River District - Lake Havasu Field Office

- Land Health Evaluations**
- Monitoring Plots
 - Grazing Allotment
- Hydrology**
- Waterbody
- Administrative Units**
- City
- Transportation**
- Interstate Highway
 - State Highway

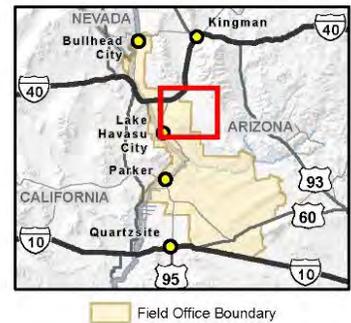


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Map Produced by BLM Lake Havasu Field Office Staff
 File: BLM_LHFD_2021LHE_BWC_Crossman_soil
 Date: 8/10/2021
 Map Scale: 1:240,000
 Coordinate System: NAD 1983 UTM Zone 12N
 AZ Reference System: U.S. PLSS GSR
 CA Reference System: U.S. PLSS SBM



Map Location within the Lake Havasu Field Office



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Key Area #1

Ecological Site: Limy Fan 3-7" p.z (R040XC306AZ)



This ESD is provisional and does not provide complete information to make a full comparative assessment between data captured and what is expected for this site.

Interpreting Indicators of Rangeland Health:

Of the 17 indicators, 15 were rated as *none to slight* departure from expected. Indicator #5, gullies, was rated *slight to moderate*. Gully development was minimally observed at some natural drainages that appeared to be at higher levels of cutting and soil movement than normal. Indicator #16, invasive species, was rated *slight to moderate*. The rating was a result of red brome being observed slightly throughout the site.

Overall ratings:

- Soil and Site Stability – *None to Slight*: Soil Stability is in good standing due to annual plants, little to no compaction, and soil protected by rock fragments.
- Hydrological Function – *None to Slight*: Soil Structure is found stable that hydrological processes are not disturbing soils out of what is expected for the site.
- Biotic Integrity – *None to Slight*: Site has a diversity of vegetation with little presence of invasive plants (Red Brome). The vegetation is showing signs of completing life cycles and recruitment.

Canopy Cover by Transect (Line-Intercept):

Total percent of canopy cover for the plot resulted in 18.6% from various forb, shrub, and tree species. No perennial grasses were captured by the monitoring plot at this ecological site. Based on canopy cover it can be determined that 81.4% is bare surface or a lack of vegetation. Bare surface includes soil cover by litter and rock fragments of various sizes. Kind of soil cover is not captured by this line-intercept canopy cover method.

Density by Transect:

Table 4.1.2 presents species of plants captured within the survey area of the monitoring plot. Survey area is one side of a transect line; 6ft in width for 10 transects. Each Transect is 100ft in length. The results in the Density/Acre column is the amount of plants estimated to occur within this ecological site per every acre.

Table 4.1.3. Species Richness for Key Area 1

Species Captured	Total Count	Density/Acre (plants per acre)*
<u>Perennial Grasses</u>		
None Captured	0	0
<u>Forbs</u>		
Adenophyllum porophylloides	6	43.5
Eriogonum fasciculatum	25	181.5
Mirabilis spp.	11	79.8
Mirabilis laevis	23	166.9
Sedum cockerellii	2	14.5
Total Plant Type Counted: 67		
<u>Shrubs</u>		
Ambrosia dumosa	14	101.6
Argythamnia lanceolata	1	7.26
Encelia farinosa	115	834.9
Ephedra viridis	7	50.8
Hymenoclea salsola	28	208.2
Krameria erecta	20	145.2
Larrea tridentata	8	58
Lycium spp.	11	79.8
Salazaria mexicana	12	87.1
Unknown (unidentified shrub)	4	29
Thamnosma montana	16	116.1
Total Plant Type Counted: 236		
<u>Cacti</u>		
Agave deserti	11	79.8
Cylindropuntia acanthocarpa	4	29.4
Total Plant Type Counted: 15		
<u>Trees</u>		
Parkinsonia florida	1	7.2
Total Plant Type Counted: 1		

*Density/acre is calculated by first dividing area surveyed by 43560 square feet (1 acre). Area surveyed is the area within 6ft of the side of a transect surveyed for 10 transects. Each transect is 100ft long. 6ft x 100ft = 6000sqft. So, 43560sqft./6000 = 7.26. Each total count is then multiplied by 7.26 to estimate the sites density (# of plants) of each specie per acre.

Composition Determined by Density Counts:

Total plant type (as provided in the above table) divided by *Sum of all plants counted* (in this case 319 plants) = Percent of *plant type composition*

Table 4.1.4. Community Plant Type Makeup

Plant Type	Composition Objective From ESD	Plant Type Composition Results
Perennial Grass	Not Provided	0%
Forb	Not Provided	21%
Shrub	Not Provided	73.9%
Cacti	Not Provided	4.7%
Tree	Not Provided	0.3%

Soil Stability

18 soil surface samples were collected at transect lines 6 and 8 at every 5ft. Depending on whether a sample was collected under a type of soil cover a code is recorded for that sample:

- NC= No Cover
- C=Cover or more defined;
 - G= perennial grass canopy and grass/shrub canopy,
 - F= perennial forb,
 - Sh= shrub canopy,
 - T= tree canopy,
- M= root mat (moss, duff, water)

Stability Values are rated from 1- 6 with a rating 6 being the most stable.

Results:

Table 4.1.5. Plot Average Soil Stability Rating

All Samples	Protected Samples (Samples w/Veg = G, Sh, or T)	Unprotected Samples (Samples w/Veg = NC)
4.72	5.4	4.46

Key Area # 2 and 3

Ecological Site: Sandy Wash 3-7" p.z. (R040XC318AZ)



This ESD is provisional and does not provide complete information to make a full comparative assessment between data captured and what is expected for this site.

Key area #2 and #3 are both located within the Franconia Wash at about 3.5 miles apart. Franconia Wash starts at the base of the Crossman Peak mountains and makes its way north where it drains and cherry stems to join the Sacramento Wash. Remnants of livestock range improvement projects can be seen at different sections of the wash. This wash presents one of the few areas of the Crossman Peak allotment with the most concentration of a plant community.

Interpreting Indicators of Rangeland Health:

Key area #2: Of the 17 indicators, 13 were rated as *none to slight* departure from expected. Indicator #9, soil surface loss or degradation, was rated *slight to moderate*. Franconia wash is a fairly large wash with various bank heights. This section showed signs of cutting and erosion on both sides; increasing in soil surface loss where the wash meets upland sites. Indicator #12, functional/structural groups, was rated *slight to moderate* due to the missing perennial grass species expected for the site. Indicator #13, plant mortality/decadence, was rated *slight to moderate* because although plant community was observed on a rise, evidence of decadence was higher than expected for the ecological site. Indicator #14, litter

amount, was rated *slight to moderate*. Due to the higher amount of decadence, litter amount was also higher than expected.

Overall ratings:

- Soil and Site Stability – *None to Slight*: Given the nature of a wash and expected soil movement, soil and site stability is meeting expectancy for site.
- Hydrological Function – *None to Slight*: Site shows signs of stability and is functioning in accordance with soil and biological functions.
- Biotic Integrity – *Slight to Moderate*: At the time of this evaluation, the season was considered a wet year and signs of improvement by biotic presence was evident. However, past stressors (likely environmental) have left the site at a slight to moderate departure from what is expected. Lack of perennial grasses, higher amount of decadence, and litter are all factors for the rating.

Key Area #3: Of the 17 indicators, 16 were rated none to slight departure from expected. Indicator #12, functional/structural groups, was rated slight to moderate due to missing perennial grasses. Other plant species were present as expected for site.

Overall ratings:

- Soil and Site Stability – *None to Slight*: Soil and Stability is as expected for the area.
- Hydrological Function – *None to Slight*: Hydrological function is at a proper functioning state and in alignment with soil and biotic states.
- Biotic Integrity – *None to Slight*: Although key perennial grasses are not present, the overall biotic integrity is intact.

Canopy Cover by Transect (Line-Intercept):

Total percent of canopy cover for key area #2 resulted in 22.8% from various forb, shrub, and tree species. No perennial grasses were captured by the monitoring plot at this ecological site. Based on canopy cover it can be determined that 77.2% is bare surface. Key area #3 resulted in 15.7% of total canopy cover and can be determined that 84.3% is bare surface.

Density by Transect:

Table 4.1.5 presents species of plants captured within the survey area of Key Area 2 and 3 monitoring plots. Survey area is one side of a transect line; 6ft in width for 10 transects. Each Transect is 100ft in length. The results in the Density/Acre column are the amount of plants estimated to occur within this ecological site per every acre.

Table 4.1.6. Species Richness for Key Area 2 and 3

Species Captured	Key Area 2 Total Count	Key Area 3 Total Count	Key Area 2 Density/Acre*	Key Area 3 Density/Acre*
<u>Perennial Grasses</u>				
None Captured	0	0	0	0
<u>Forbs</u>				
Eriogonum inflatum	10	2	72.6	14.52

Species Captured	Key Area 2 Total Count	Key Area 3 Total Count	Key Area 2 Density/Acre*	Key Area 3 Density/Acre*
Marina parryi	3	Not Captured	21.78	--
Senna covesii	Not Captured	1	--	7.26
	Total Plant Type Counted: 3	Total Plant Type Counted: 1		
<u>Shrubs</u>				
Ambrosia dumosa	52	26	406.56	188.76
Bebbia juncea	5	2	36.3	14.52
Encelia farinosa	1	Not Captured	7.26	--
Hymenoclea salsola	20	4	145.2	29.04
Krameria grayi	4	Not Captured	29.04	--
Larrea tridentata	20	28	145.2	203.28
	Total Plant Type Counted: 102	Total Plant Type Counted: 60		
<u>Cacti</u>				
Cylindropuntia echinocarpa	2	Not Captured	14.52	--
	Total Plant Type Counted: 2	Total Plant Type Counted: --		
<u>Trees</u>				
None Captured	0	0	0	0

*Density/acre is calculated by first dividing area surveyed by 43560 square feet (1 acre). Area surveyed is the area within 6ft of the side of a transect surveyed for 10 transects. Each transect is 100ft long. 6ft x 100ft = 6000sqft. So, 43560sqft./6000 = 7.26. Each total count is then multiplied by 7.26 to estimate the sites density (# of plants) of each specie per acre.

Composition Determined by Density Counts:

Total plant type (as provided in the table above) divided by *Sum of all plants counted* (In this case 107 plants for Key Area 2 and 61 plants for Key Area 3) = Percent of *plant type composition*

Table 4.1.7. Community Plant Type Makeup

Plant Type	Composition Objective From ESD	Key Area 2 Plant Type Composition Results	Key Area 3 Plant Type Composition Results
Perennial Grass	Not Provided	0%	0%
Forb	Not Provided	2.8%	1.7%
Shrub	Not Provided	95.3%	98.3%
Cacti	Not Provided	1.9%	0%
Tree	Not Provided	0%	0%

Soil Stability

Soil surface stability tests were not conducted at key areas 2 and 3. Although samples can be attainable, it is expected for soils to be highly erodible by nature. Within the wash, there are higher elevated portions (about 4 to 6 inches) where it would require for heavier flows to flood. Those areas can present more stability than the lowest portions of the wash where waterflow patterns are more evident. Biotic crust (dormant moss) was also present and represents soil stability. Overall, where monitoring plots are located within a wash, soil surface stability test where not conducted.

4.1.6 Crossman Peak Evaluation Report

Key Area 1:

Limy Fan 3-7” p.z. (R040XC306AZ) – This ESD describes the historical plant community as a mixture of desert shrubs dominated by creosote (*Larrea tridentata*). Winter and summer annual grasses and forbs are abundant in years with above-average moisture in their seasons. Continued overgrazing results in creosote becoming dominant. When the understory cover is depleted, sheet and rill erosion increase on the site. In advanced stages, gullies are common.

Perennial grasses like threeawn (*Aristida spp.*), bush muhly (*Muhlenbergia porteri*), and big galleta (*Pleuraphis rigida*) are described to produce an annual production of 3-6 pounds per acre. Dominant tree species is identified as yellow paloverde (*Parkinsonia microphylla*), dominant shrubs are creosote and white bursage (*Ambrosia dumosa*), and dominant herbaceous plants are big galleta and bush muhly.

Soils are classified as well drained with moderately slow to moderately rapid permeability.

The Limy Fan 3-7” p.z. ESD does not provide percent cover expected for site nor expected density. The ESD also does not have a state and transition model to describe a climax community, which would be the desired plant community. To fill in missing information from this site’s ecological description, ESDs from adjacent ecological sites need to be used to make a relatable comparison. Adjacent ESDs can provide some information, however, it is acknowledged that values will vary. It is also important to note that when the key areas in Crossman Peak were first established in 2020, there had been two consecutive wet seasons and may not fully represent average information for an area that has a history of drought for several consecutive years at a time.

The Limy Upland 6-9” p.z. (R030XB214AZ) is located in the Mohave Desert MLRA. This ecological site is largely found in the Crossman Peak allotment and borders much of the ecological site where key area 1 is located. Similar in soil functionality and dominant shrubs, this ESD does provide information regarding ground cover. Shrub foliar cover is expected between 0-2%, grass cover is between 0-1%, and forb cover is between 0-1%. Annual production from shrubs is 88%, forbs is 4%, grasses are 3% and trees are 4%.

Evaluation:

Standard 1-Upland Health

Based on the indicators, Standard 1 is being met.

Standard 3- Desired Resource Conditions

Based on the indicators and quantitative data, Standard 3 is not being met.

Rationale for Evaluation Finding:

The evaluation (17 indicators) of key area 1 found the majority of the indicators at a state that allows upland soils to exhibit infiltration, permeability, and at appropriate erosion rates. The soil stability test was rated an overall rating of 4.72 of 6. Where samples were taken under the protection of plant cover, stability increased and where exposed, soils were yet stable. Although a comparison of canopy cover cannot be made due to a lack of reference information, where there was no canopy cover, soil can be seen protected by litter and rock material of various sizes. The indication of gully formations occurred where natural small drainages existed and appeared gully like in nature, therefore, rated *slight to moderate*; however, it is unlikely these natural drainages will fully form into gullies. As described in the ESD, overgrazing can cause creosote to become dominant and when the understory is depleted erosion rates increase and in advanced stages, gullies will form. These are not the results gathered. Standard 1 is found to be meeting at this site.

The plant community is rich in plant diversity and density with low understory shrubs dominating the area. Though a side-by-side comparison cannot be made with the adjacent ecological site, the Limy Upland 6-9" p.z. provides information that shows annual production by shrubs is the highest compared to forbs, tress, and less so grasses. With a higher precipitation zone, it can be expected that those numbers will be less in an ecological area with 3-7" p.z. The monitoring at this site showed the community is dominated by a shrub community with a healthy composition of forbs. It is expected that production by the shrub community is at what would be expected without having direct reference for comparison, however, grasses were not present at all.

The ESD provides production values to be at 3-6 pounds per acre, which is a negligible presence of grasses in comparison to the rest of the community, nevertheless, grasses play a significant roll in any plant community where they are expected to be present. Without a state (state being a current plant community) and transition (transition being a transition of community type for better or worse caused by biotic and abiotic disturbances) model for comparison, it is difficult to assess whether a small expectancy of grasses that is missing is cause for worry for a plant community transition. Overall, plant community trend is appearing up with signs of reproduction capabilities (plants were flowering and producing seeds), but with the presence of invasive plants like red brome and a 0% presence of perennial grasses there is cause for desired resource condition concerns. Standard 3 at this sites is found not meeting.

Key Area 2 and 3:

Sandy Wash 3-7" p.z. (R040XC318AZ) – This ESD describes the historic climax plant community as a mixture of perennial grasses and forbs, desert trees and shrubs, and annual grasses and forbs. The active washy areas in the site have little vegetation except burrobush and annual grasses and forbs.

Continuous grazing use and the absence of natural fires have led to woody plant invasion. These areas are extremely sensitive and when plant cover has been reduced, the extra water concentrated on the site causes accelerated erosion and channel cutting. As a result, less and less of the original overflow areas still get flooded.

Annual production for this site presents representative values for gasses at 52%, shrubs at 28%, forbs at 16%, and trees at 3%.

Soils are featured as well drained to somewhat excessively drained at a moderately rapid to very rapid permeability class. With good vegetative cover, infiltration rates are high. Stability against erosion process is poor and plant-soil moisture are also poor.

Evaluation:

Standard 1-Upland Health

Based on the indicators, Standard 1 is being met.

Standard 3- Desired Resource Conditions

Based on the indicators and quantitative data, Standard 3 is not being met.

Rationale for Evaluation Finding:

Soils and hydrological function at these key areas allowed for infiltration, permeability, and erosion rates at an appropriate state. Soil surface loss along the banks of the wash were rated slight to moderate because there is the potential for the wash to continue expanding and remove soils located above the banks, however, based on the ESD, stability against erosion process is naturally poor. The increased litter amount can also impede hydrological functions to a certain extent by restricting flow, but it is not enough to disrupt plant and hydrological interactions. As a result, Standard 1 is being met at these sites.

The data results for species density, cover, and species richness (species captured) indicate that desired resource conditions are not being met. The Franconia Wash is fairly large in width, and it is typical to have the majority of plants located along the banks for any wash. The monitoring plot was placed within the wash itself where plant density is expected to be less, however, it is also highly expected for the site to exhibit grasses. Both key area 2 and 3 did not capture grasses nor were grasses observed outside the monitoring plot. Plant decadence was also higher than expected and therefore the presence of litter was also higher. Dominant plant species (perennial grasses) expected for the site were not captured nor observed outside of the monitoring plots. Although the presence of recreational off-roading can be seen outside the wash or in few locations in the wash, it is not likely that historically this activity is the cause for this current state. As off-road activities increase, it may pose as a contributing factor for conditions to remain the same or worsen in the future. Historic stressors and present climate trend (lack of moisture) has left this site with missing species and sparser than expected. As a result, Standard 3 at these sites is not being met.

Crossman Peak Summary:

Table 4.1.8. Rangeland Health Standards Evaluation Findings for Ecological Sites Monitored

Standard #	Key Area 1 Eco Site: Limy Fan 3-7” p.z	Key Area 2 Eco Site: Sandy Wash 3-7” p.z.	Key Area 3 Eco Site: Sandy Wash 3-7” p.z.
1- Upland Sites	Meeting	Meeting	Meeting
2- Riparian-Wetland Sites	Not present at this allotment.		
3- Desired Resource Conditions	Not Meeting	Not Meeting	Not Meeting

It is very possible that the current plant communities within these ecological sites that were monitored have reached a state in which the present community is at its current climax and reaching historical climax communities would require significant management intervention. Though very small population sizes of the big galleta perennial grass (*Pleuraphis rigida*) have been observed in the Crossman Peak allotment, this and other missing grasses are signs that community degradation has occurred.

4.1.7 Planet Assessment

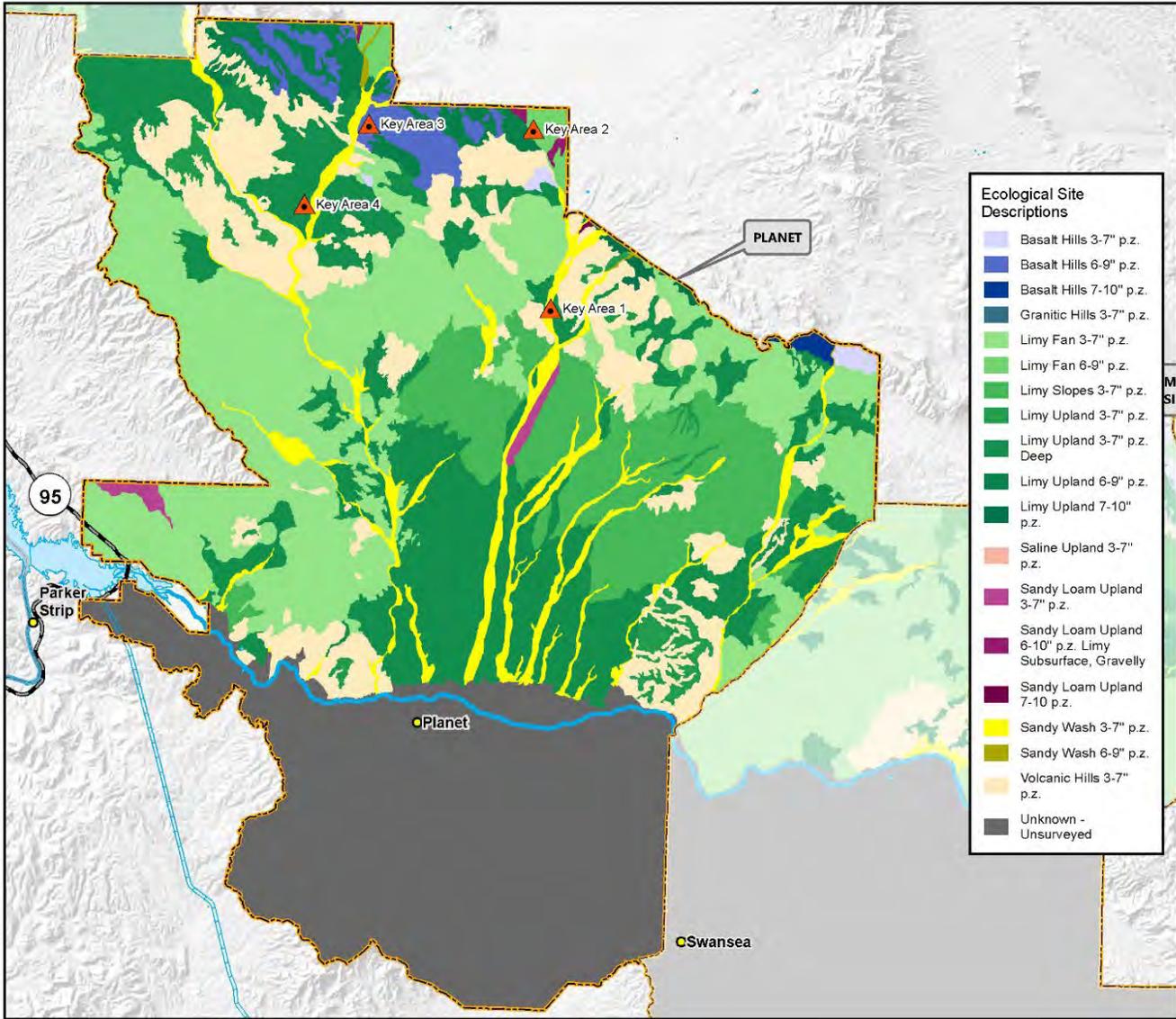
In 2020, four Key Areas were established in the Planet Allotment. The *Ecological Sites: Planet Map* (below) provide an ecological layout and the locations of the established key area monitoring plots.

The following table provides a breakdown of those ecological sites the Planet Allotment encompasses. Those highlighted in yellow represent the ecological sites that have been monitored through the established key areas. The ecological sites with the largest presence in Crossman Peak are Limy Fan 3-7” p.z at 22.4% and Limy Upland Deep 3-7” p.z at 18.7%. These ecological sites at their climax communities are not expected to produce much canopy cover and palatable forage. They are dominated by desert shrubs and typically only produce annual forage during above average rains. The Sandy Wash ecological site is where the plant community is expected to be more densely present than other sites and represents 4.8% of the ecological sites of the allotment.

Table 4.1.9. Plant Ecological Site Breakdown

Ecological Site Description	Acres	Percentage of BLM Land
unassigned	51,764.5	25.5%
Basalt Hills 6-9" p.z.	3,706.8	1.8%
Sandy Loam Upland 6-10" p.z. Limy Subsurface, Gravelly	235.6	<1%
Limy Fan 6-9" p.z.	1,323.5	<1%
Limy Upland 6-9" p.z.	4,292.0	2.1%
Sandy Wash 6-9" p.z.	195.6	<1%

Ecological Site Description	Acres	Percentage of BLM Land
Basalt Hills 7-10" p.z.	374.9	<1%
Limy Upland 7-10" p.z.	438.5	<1%
Sandy Loam Upland 7-10 p.z.	28.8	<1%
Granitic Hills 3-7" p.z.	0.6	<1%
Limy Fan 3-7" p.z.	45,452.0	22.4%
Basalt Hills 3-7" p.z.	639.9	<1%
Limy Slopes 3-7" p.z.	19,375.0	9.5%
Limy Upland 3-7" p.z.	3,120.2	1.5%
Limy Upland 3-7" p.z. Deep	37,955.6	18.7%
Sandy Wash 3-7" p.z.	9,838.7	4.8%
Sandy Loam Upland 3-7" p.z.	809.2	<1%
Volcanic Hills 3-7" p.z.	23,135.3	11.4%



Ecological Sites: Planet

Colorado River District - Lake Havasu Field Office

Land Health Evaluations

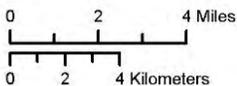
- Monitoring Plots
- Grazing Allotment

Hydrology

- Waterbody
- River
- Central Arizona Project

Administrative Units

- Town or Place of Interest
- State Boundary

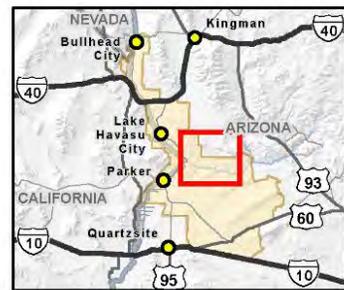


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Map Produced by BLM Lake Havasu Field Office Staff
 File: BLM_LHFO_2021LHE_BWC_Planet_soil
 Date: 8/10/2021
 Map Scale: 1:250,000
 Coordinate System: NAD 1983 UTM Zone 12N
 AZ Reference System: U.S. PLSS GSR
 CA Reference System: U.S. PLSS SBM



Map Location within the Lake Havasu Field Office



Field Office Boundary

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Key Area # 1 and 3

Ecological Site: Sandy Wash 3-7" p.z. (R040XC318AZ)



This ESD is provisional and does not provide complete information to make a full comparative assessment between data captured and what is expected for this site.

Interpreting Indicators of Rangeland Health:

Key area #1: Of the 17 indicators, 14 were rated as *none to slight* departure from expected. Indicator #12, functional/structural groups, was rated *moderate to extreme* due to the missing perennial grass species expected for the site. Indicator #13, plant mortality/decadence, was rated *slight to moderate*. Cacti species such as ocotillo and paloverde trees showed signs of decadence. Indicator #14, litter amount, was rated *slight to moderate*. Due to the higher amount of decadence from perennial plants, litter amount was also higher than expected.

Overall ratings:

- Soil and Site Stability – *None to Slight*: Given the nature of a wash and expected soil movement, soil and site stability is meeting expectancy for site.
- Hydrological Function – *None to Slight*: Site shows signs of stability and is functioning in accordance with soil and biological functions.

- Biotic Integrity – *Slight to Moderate*: It is evident that this site has gone through stress factors. The recent rains of the previous year and during the year of this evaluation has helped with this sites reproductive capability; however, missing functional groups, plant mortality, and litter amount does not meet desired biotic conditions to an extent. Present plant community does appear in a healthy state.

Key Area #3: All 17 indicators were rated *none to slight*.

Overall ratings:

- Soil and Site Stability – *None to Slight*: Soil stability is good in upper areas of the wash. Biological crust is present; signifying stability. Erosion presence is as expected for the site due to erodible soils.
- Hydrological Function – *None to Slight*: Water flow and infiltration rate is not impeded.
- Biotic Integrity – *None to Slight*: Community group is as expected. Area does not appear to support perennial grasses due to flash floods that may occur in this particular area. Various annuals were observed including the presence of Joshua trees and Saguaros (evidence of the transitional zone between the two deserts).

Canopy Cover by Transect (Line-Intercept):

Total percent of canopy cover for key area #1 resulted in 20.9% from various forb, shrub, and tree species. Based on canopy cover it can be determined that 79.1% is bare surface. Key area #3 resulted in 29.8% of total canopy cover and can be determined that 70.2% is bare surface. Bare surface includes soil cover by litter and rock fragments of various sizes. Kind of soil cover is not captured by this line-intercept canopy cover method.

Density by Transect:

Table 4.1.10 presents species of plants captured within the survey area of Key Area 1 and 3 monitoring plots. Survey area is one side of a transect line; 6ft in width for 10 transects. Each Transect is 100ft in length. The results in the Density/Acre column is the amount of plants estimated to occur within this ecological site per every acre.

Table 4.1.10. Species Richness for Key Area 1 and 3

Species Captured	Key Area 1 Total Count	Key Area 3 Total Count	Key Area 1 Density/Acre*	Key Area 3 Density/Acre*
<u>Perennial Grasses</u>				
None Captured	0	0	0	0
<u>Forbs</u>				
Mirabilis spp.	Not Captured	1	--	7.2
	Total Plant Type Counted: 0	Total Plant Type Counted: 1		
<u>Shrubs</u>				
Acacia greggii	1	Not Captured	7.26	--
Ambrosia dumosa	39	18	283.14	130.6
Bebbia juncea	9	Not Captured	65.34	--
Encelia farinosa	2	1	14.52	7.2

Species Captured	Key Area 1 Total Count	Key Area 3 Total Count	Key Area 1 Density/Acre*	Key Area 3 Density/Acre*
Hymenoclea salsola	16	4	116.16	29
Krameria grayi	1	3	7.26	21.7
Larrea tridentata	19	27	137.94	196
Lycium andersonii	Not Captured	12	--	87.1
	Total Plant Type Counted: 87	Total Plant Type Counted: 65		
Cacti				
Cylindropuntia acanthocarpa	1	Not Captured	7.26	--
Cylindropuntia ramosissima	33	Not Captured	239.58	--
Fouquieria splendens	1	Not Captured	7.26	--
	Total Plant Type Counted: 35	Total Plant Type Counted: 0		
Trees				
Parkinsonia microphylla	Not captured	4	--	29
	Total Plant Type Counted: 0	Total Plant Type Counted: 4		

*Density/acre is calculated by first dividing area surveyed by 43560 square feet (1 acre). Area surveyed is the area within 6ft of the side of a transect surveyed for 10 transects. Each transect is 100ft long. 6ft x 100ft = 6000sqft. So, 43560sqft./6000 = 7.26. Each total count is then multiplied by 7.26 to estimate the sites density (# of plants) of each specie per acre.

Composition Determined by Density Counts:

Total plant type (as provided in the table above) divided by *Sum of all plants counted* (In this case 122 plants for Key Area 1 and 69 plants for Key Area 3) = Percent of *plant type composition*

Table 4.1.11. Community Plant Type Makeup

Plant Type	Composition Objective From ESD	Key Area 1 Plant Type Composition Results	Key Area 3 Plant Type Composition Results
Perennial Grass	Not Provided	0%	0%
Forb	Not Provided	0%	1.4%
Shrub	Not Provided	71.3%	92.9%
Cacti	Not Provided	28.7%	5.7%
Tree	Not Provided	0%	0%

Soil Stability

Soil surface stability tests were not conducted at key areas 1 and 3. Although samples can be attainable, it is expected for soils to be highly erodible by nature. Within the wash, there are higher elevated portions (about 4 to 6 inches) where it would require for heavier flows to flood. Those areas can present more stability than the lowest portions of the wash where waterflow patterns are more evident. Biotic crust (dormant moss) was also present and represents soil stability. Overall, where monitoring plots are located within a wash, soil surface stability test were not conducted.

Key Area #2

Ecological Site: Limy Fan 6-9" p.z (R030XB211AZ)



This ESD is provisional and does not provide complete information to make a full comparative assessment between data captured and what is expected for this site. However, unlike other ESDs thus far, this ESD does provide representative canopy cover that can be expected based on plant height.

Interpreting Indicators of Rangeland Health:

Key area #2: Of the 17 indicators, 15 were rated as *none to slight* departure from expected. Indicator #4, bare ground, was rated *slight to moderate* due to noticeable exposed ground that what would appear normal. Vegetation cover by type is not where it should be. Indicator #12, functional/structural groups, was rated *moderate*. Structural groups are present, however, the balance between what is present and expected is off.

Overall ratings:

- Soil and Site Stability – *None to Slight*: More on the slight of the rating, soil structure is intact and site is stable, but it can be worsened by disturbance.
- Hydrological Function – *None to Slight*: Site shows signs of stability and is functioning in accordance with soil and biological functions.

Biotic Integrity – *Slight to Moderate*: Site has signs of past stress and area has been known to have livestock trespass from adjacent allotment. Any significant disturbance will continue to worsen this sites health condition.

Canopy Cover by Transect (Line-Intercept):

Total percent of canopy cover for key area #2 resulted in 25.9%. Total canopy cover came from only shrub species; no trees, cacti, or grasses were captured. Highest canopy cover came from *Larrea tridentata* at 12.8% of total canopy cover, which turns out to be 49.4% of species composition for canopy cover. Second highest came from *Ambrosia dumosa* at 6.37%, which is 24.58% of species composition for canopy cover at this site. The following table provides more detail of the canopy cover data compiled and what is expected from the ESD. Percent cover provided from the ESD includes canopy cover by expected height. Height was not captured at this site, therefore, a full side by side comparison cannot be made but can lead to prudent information for making a more thorough evaluation.

Table 4.1.12. Canopy Cover Results and Expectancy

Species	Common Name	Total % Cover by Specie	% Composition of Specie	Total % Cover of Monitoring Plot	Expected Cover from ESD for Shrubs at a Height (Ft) of: >2 <= 4.5
Ambrosia dumosa	White bursage	6.37%	24.58%		
Krameria grayi	White ratany	1.65%	6.36%		
Lycium spp.	Wolf berry	3.08%	11.88%		
Hymenoclea salsola	Burrobush/cheeseweed	2.01%	7.75%		
Larrea tridentata	Creosote bush	12.8%	49.4%		

Density by Transect:

Table 4.1.13 presents species of plants captured within the survey area of Key Area 2 monitoring plot. Survey area is one side of a transect line; 6ft in width for 10 transects. Each Transect is 100ft in length. The results in the Density/Acre column is the amount of plants estimated to occur within this ecological site per every acre.

Table 4.1.13. Species Richness for Key Area 2

Species Captured	Total Count	Density/Acre (plants per acre)*
<u>Perennial Grasses</u>		
Pleuraphis rigida	2	14.5
	Total Plant Type Counted: 2	
<u>Forbs</u>		
Sphaeralcea ambigua	3	21.7
	Total Plant Type Counted: 3	
<u>Shrubs</u>		
Ambrosia dumosa	217	1575.2
Hymenoclea salsola	44	319.4
Krameria erecta	30	217.8
Larrea tridentata	39	283.1
Lycium spp.	14	101.6

Species Captured	Total Count	Density/Acre (plants per acre)*
	Total Plant Type Counted: 344	
<u>Cacti</u>		
None Captured	0	0
<u>Trees</u>		
None Captured	0	0

*Density/acre is calculated by first dividing area surveyed by 43560 square feet (1 acre). Area surveyed is the area within 6ft of the side of a transect surveyed for 10 transects. Each transect is 100ft long. 6ft x 100ft = 6000sqft. So, 43560sqft./6000 = 7.26. Each total count is then multiplied by 7.26 to estimate the sites density (# of plants) of each specie per acre.

Composition Determined by Density Counts:

Total plant type (as provided in the table above) divided by *Sum of all plants counted* (In this case 349 plants for Key Area 2) = Percent of *plant type composition*

Table 4.1.14. Community Plant Type Makeup

Plant Type	Composition objective from ESD	Key Area 2 Plant Type Composition Results
Perennial Grasses	Not Provided	0.6%
Forbs	Not Provided	0%
Shrubs	Not Provided	98.6%
Cacti	Not Provided	0.8%
Trees	Not Provided	0%

Soil Stability:

18 soil surface samples were collected at transect lines 7 and 9 at every 5ft. Depending on whether a sample was collected under a type of soil cover a code is recorded for that sample:

- NC= No Cover
- C=Cover or more defined;
 - G= perennial grass canopy and grass/shrub canopy,
 - F= perennial forb,
 - Sh= shrub canopy,
 - T= tree canopy,
- M= root mat (moss, duff, water)

Stability Values are rated from 1- 6 with a rating 6 being the most stable.

Results:

Table 4.1.15. Plot Average Soil Stability Rating

All Samples	Protected Samples (Samples w/Veg = G, Sh, or T)	Unprotected Samples (Samples w/Veg = NC)
4.05	6	3.66

Key Area #4

Ecological Site: Limy Upland, Deep 3-7" p.z. (R040XC311AZ)



This ESD is provisional and does not provide complete information to make a full comparative assessment between data captured and what is expected for this site.

Interpreting Indicators of Rangeland Health:

Key Area #4: All 17 indicators were rated *none to slight*.

Overall ratings:

- Soil and Site Stability – *None to Slight*: Soil indicators show good stability for the site.
- Hydrological Function – *None to Slight*: Hydrological function is as expected.
- Biotic Integrity – *None to Slight*: Little presence of invasive species. Good diversity of plant community is present. Not captured by plot read include desert globe-mallow, saguaros, barrel cactus, and big galleta grass.

Canopy Cover by Transect (Line-Intercept):

Total percent of canopy cover for key area #4 resulted in 32.7%. Based on canopy cover it can be determined that 67.3% is bare surface.

Density by Transect:

Table 4.1.16 presents species of plants captured within the survey area of Key Area 4 monitoring plot. Survey area is one side of a transect line; 6ft in width for 10 transects. Each Transect is 100ft in length. The results in the Density/Acre column are the amount of plants estimated to occur within this ecological site per every acre.

Table 4.1.16. Species Richness for Key Area 4

Species Captured	Total Count	Density/Acre (plants per acre)*
Perennial Grasses		
Pleuraphis rigida	7	50.8
Total Plant Type Counted: 7		
Forbs		
Adenophyllum porophylloides	1	7.2
Total Plant Type Counted: 1		
Shrubs		
Ambrosia dumosa	117	849.4
Acacia greggii	2	14.5
Hymenoclea salsola	2	14.5
Krameria grayi	12	87.1
Larrea tridentata	37	268.6
Lycium andersonii	1	7.2
Total Plant Type Counted: 171		
Cacti		
Cylindropuntia acanthocarpa	3	21.7
Cylindropuntia ramosissima	22	159.7
Total Plant Type Counted: 25		
Trees		
Parkinsonia microphylla	1	7.2
Total Plant Type Counted: 1		

*Density/acre is calculated by first dividing area surveyed by 43560 square feet (1 acre). Area surveyed is the area within 6ft of the side of a transect surveyed for 10 transects. Each transect is 100ft long. 6ft x 100ft = 6000sqft. So, 43560sqft./6000 = 7.26. Each total count is then multiplied by 7.26 to estimate the sites density (# of plants) of each specie per acre.

Composition Determined by Density Counts:

Total plant type (as provided in the table above) divided by *Sum of all plants counted* (In this case 205 plants for Key Area 4) = Percent of *plant type composition*

Table 4.1.17. Community Plant Type Makeup

Plant Type	Composition objective from ESD	Key Area 2 Plant Type Composition Results
Perennial Grasses	Not Provided	3.4%
Forbs	Not Provided	0.5%
Shrubs	Not Provided	83.4%
Cacti	Not Provided	12.2%
Trees	Not Provided	0.5%

Soil Stability:

18 soil surface samples were collected at transect lines 5 and 7 at every 10ft. Depending on whether a sample was collected under a type of soil cover a code is recorded for that sample:

- NC= No Cover
- C=Cover or more defined;
 - G= perennial grass canopy and grass/shrub canopy,
 - F= perennial forb,
 - Sh= shrub canopy,
 - T= tree canopy,
- M= root mat (moss, duff, water)

Stability Values are rated from 1- 6 with a rating 6 being the most stable.

Results:

Table 4.1.18. Plot Average Soil Stability Rating

All Samples	Protected Samples (Samples w/Veg = G, Sh, or T)	Unprotected Samples (Samples w/Veg = NC)
5.5	6	5.18

4.1.8 Planet Evaluation Report

Key Area 1 and 3:

Sandy Wash 3-7” p.z. (R040XC318AZ) – This ESD describes the historic climax plant community as a mixture of perennial grasses and forbs, desert trees and shrubs, and annual grasses and forbs. The active washy areas in the site have little vegetation except burrobrush and annual grasses and forbs.

Continuous grazing use and the absence of natural fires have led to woody plant invasion. These areas are extremely sensitive and when plant cover has been reduced, the extra water concentrated on the site causes accelerated erosion and channel cutting. As a result, less and less of the original overflow areas still get flooded.

Annual production for this site presents representative values for gasses at 52%, shrubs at 28%, forbs at 16%, and trees at 3%.

Soils are featured as well drained to somewhat excessively drained at a moderately rapid to very rapid permeability class. With good vegetative cover, infiltration rates are high. Stability against erosion process is poor and plant-soil moisture are also poor.

Evaluation:

Standard 1-Upland Health

Based on the indicators, Standard 1 is being met.

Standard 3- Desired Resource Conditions

Based on the indicators and quantitative data, Standard 3 is not being met.

Rationale for Evaluation Finding:

The evaluation (17 indicators) of key areas 1 and 3 found soil stability and hydrological functions to be at normal conditions. Increased litter was rated slight to moderate at key area 1, but the increased amount can be expected when there is more decadence; decadence likely caused by previous years of drought. Overall, upland health is being met that ecological interactions between soils and hydrological processes are not at risk. The present vegetation at both key area sites is adequate to further support any capable soil stability (respectively due to erodible soils); however, the missing of perennial grasses expected are not present. It is likely that some washy areas may not be able to support grasses, however, it is historically expected for both annual and perennial grasses to be highly present with perennial grasses being the highest contributors of annual production as indicated by the ESD. The lack any grasses can be attest by stressors and disturbance from past overgrazing and extreme drought, which is common for the region. Though the community that is present is stable, it is likely that this ecological site has reach a different state in where the dominated community consist of low shrubs.

Key Area 2:

Limy Fan 6-9” p.z (R030XB211AZ) – This ESD describes the dominant aspect of this ecological site is a desert shrub with sparse stands of grasses and forbs. Creosote and white bursage are the major shrubs. Joshua tree and Nevada Mormon tea are noticeable due to their size. With severe disturbance, creosote and white bursage will increase. Introduced annual forbs and grasses, such as red brome and filaree will invade.

Canopy cover is expected to be between 0-2% for forbs at a height of <0.5ft, 0-2% for grasses at a height of >0.5 <=1ft, 8-12% for shrubs at a height of >2 <=4.5ft, and 0-2% for trees at a height of >4.5 <=13ft.

Soils are moderately well drained to well drained with a moderately slow to moderate permeability class.

Evaluation:

Standard 1-Upland Health

Based on the indicators, Standard 1 is being met.

Standard 3- Desired Resource Conditions

Based on the indicators and quantitative data, Standard 3 is being met.

Rationale for Evaluation Finding:

Though the ESD does not provide significant information regarding cover or density, the results of species richness, cover, density, and indicators overall place this site as meeting both standards 1 and 3. The major dominant plants, creosote and white bursage are present. The site does exhibit low presence of forbs and perennial grasses as expected from the ESD. Soils and hydrological functions are meeting expectancy for the site. Soil stability test results are fair. And cover is higher than what is expected at 25.9%. Though height was not recorded, the majority of the shrub plants present fall within the >2 <=4.5ft category for expected shrub cover of 8-12%.

The results also show that this area is at a sensitive point. Soil test suggest that further disturbance can worsen stability. Although there is no comparative data for density, as per the historical climax community, disturbance will increase both the presence of creosote and white bursage. Density results place white bursage at about five times higher than any other specie surveyed. Cover results are higher than expected but this could be contributed by the large density size of white bursage. Livestock has been known to trespass into the area and can contribute into placing this sensitive ecological site towards a downward trend if not addressed.

Key Area 4:

Limy Upland, Deep 3-7" p.z (R040XC311AZ) – This ESD describes the plant community as predominantly a desert shrub and cacti with creosote dominant area. Perennial grass cover is sparse and annual grasses and forbs make up a small percentage of the community. As palatable forage production on this site is very low, the plant community has changed very little, from potential, since the introduction of domestic grazing.

Representative values for annual production is very low overall though the area does exhibit a rich diversity of plant type.

Soils are well drained with a moderately slow to rapid permeability class.

Evaluation:

Standard 1-Upland Health

Based on the indicators, Standard 1 is being met.

Standard 3- Desired Resource Conditions

Based on the indicators and quantitative data, Standard 3 is being met.

Rationale for Evaluation Finding:

Based on the qualitative and quantitative results and in comparison to the ESD, Standards 1 and 3 are being met from all aspects of expectancy for this site. All indicators are rated slight to none from departure. Site exhibits dominant plant species including other shrubs, trees, cacti, grasses, and forbs as

expected. Though difficult to compare with the ESD, the site exhibits what appears to be appropriate canopy cover if not higher, high soil stability ratings, and healthy levels of plant diversity and density.

Planet Summary:

Table 4.1.19. Rangeland Health Standards Evaluation Findings for Ecological Sites Monitored

Standard #	Key Area 1 Eco Site: Sandy Wash 3-7" p.z.	Key Area 2 Eco Site: Limy Fan 6-9" p.z.	Key Area 3 Eco Site: Sandy Wash 3-7" p.z.	Key Area 4 Eco Site: Limy Upland, Deep 3-7" p.z.
1- Upland Sites	Meeting	Meeting	Meeting	Meeting
2- Riparian-Wetland Sites	Not Meeting for the reach segment portion of the Bill Williams River within the Planet Allotment (see PFC results in section 4.1.11, Reach ID:BWR-7)			
3- Desired Resource Conditions	Not Meeting	Meeting	Not Meeting	Meeting

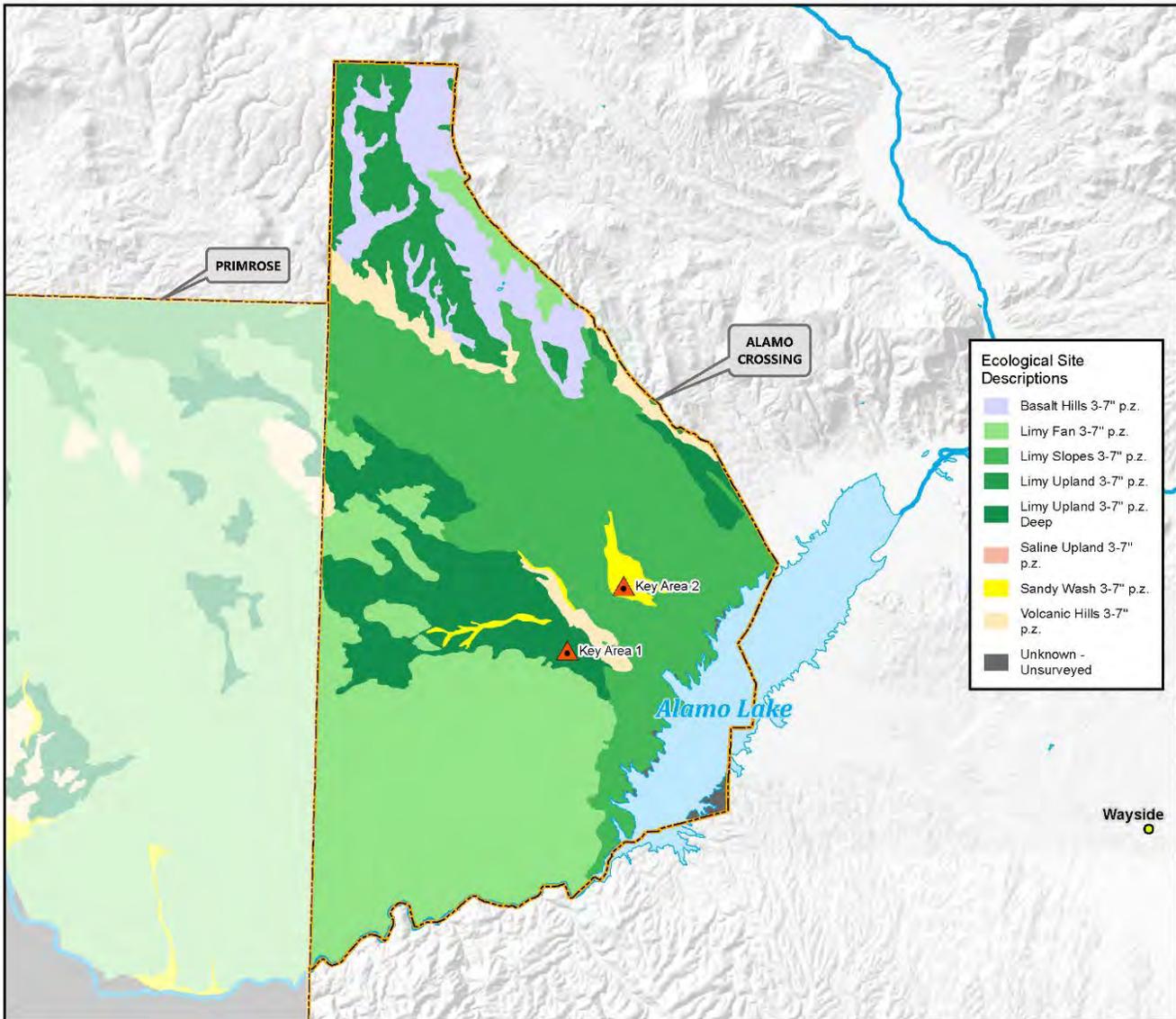
4.1.9 Alamo Crossing Assessment

In 2020, two Key Areas were established in the Alamo Crossing Allotment. The *Ecological Sites: Alamo Crossing Map* (below) provide an ecological layout and the locations of the established key area monitoring plots.

The following table provides a breakdown of those ecological sites the Alamo Crossing Allotment encompasses. Those highlighted in yellow represent the ecological sites that have been monitored through the established key areas. The ecological sites with the largest presence in Alamo Crossing are Limy Fan 3-7" p.z at 31.3% and Limy Slopes 3-7" p.z at 29.9%. These ecological sites at their climax communities are not expected to produce much canopy cover and palatable forage. Limy Slopes may produce a fair amount of usable forage; however, this site is usually found in less than good condition.

Table 4.1.20. Alamo Crossing Ecological Site Breakdown

Ecological Site Description	Acres	Percentage of BLM Land
unassigned	1,462.8	5.6%
Limy Fan 3-7" p.z.	8,089.3	31.3%
Basalt Hills 3-7" p.z.	1,956.0	7.5%
Limy Slopes 3-7" p.z.	7,725.6	29.9%
Limy Upland 3-7" p.z.	1,835.5	7.1%
Limy Upland 3-7" p.z. Deep	3,117.6	12%
Saline Upland 3-7" p.z.	482.8	1.8%
Sandy Wash 3-7" p.z.	300.5	1.1%
Volcanic Hills 3-7" p.z.	825.8	3.2%



Ecological Sites: Alamo Crossing

Colorado River District - Lake Havasu Field Office

Land Health Evaluations

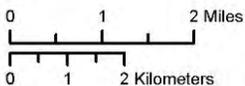
- Monitoring Plots
- Grazing Allotment

Hydrology

- Waterbody
- River

Administrative Units

- Town or Place of Interest



Map Location within the Lake Havasu Field Office



DISCLAIMER: No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Decisions in this document only apply to BLM lands. Routes depicted on non-BLM lands are displayed for information purposes only and do not grant access to non-BLM lands.

Map Produced by BLM Lake Havasu Field Office Staff
 File: BLM_LHFO_2021LHE_BWC_AlamoCross_soil
 Date: 8/10/2021
 Map Scale: 1:120,000
 Coordinate System: NAD 1983 UTM Zone 12N
 AZ Reference System: U.S. PLSS GSR
 CA Reference System: U.S. PLSS SBM



U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Key Area #1

Ecological Site: Limy Upland, Deep 3-7" (R040XC311AZ)



This ESD is provisional and does not provide complete information to make a full comparative assessment between data captured and what is expected for this site.

Interpreting Indicators of Rangeland Health:

Key Area #1: Of the 17 indicators, 14 were rated *None to Slight*. Indicator #13, plant mortality/decadence, was rated *slight to moderate*. Many past signs of mortality and decadence was seen throughout the area. Indicator #14, litter amount, was rated *slight to moderate*. The increased amount of decadence had increased litter. Large pieces of branches were observed. Indicator #17, reproductive capability of perennial plants, was rated *slight to moderate*. Seed production was seen lacking on perennial shrubs and trees. Vegetation was in “green up” but no development of flowers or seeds were present as expected for that period of season.

Overall ratings:

- Soil and Site Stability – *None to Slight*: Soil was observed to be stable and protected by various rock sizes; mainly gravel layer. Annual plants this season further helped with developing structure and stability.
- Hydrological Function – *None to Slight*: Hydrological function is as expected.

- Biotic Integrity – *Moderate*: Site shows signs of recovery, but past stressors has left site at a degraded biotic state and needs more time to recover without disturbance. Further decadence is a continuous possibility; however, this site is also not expected to produce any large amounts of annual production. The rating given has more to do with visible signs of past stressors.

Canopy Cover by Transect (Line-Intercept):

Total percent of canopy cover for key area #1 resulted in 18.7%. Based on canopy cover it can be determined that 81.3% is bare surface.

Density by Transect:

Table 4.1.21 presents species of plants captured within the survey area of Key Area 1 monitoring plot. Survey area is one side of a transect line; 6ft in width for 10 transects. Each Transect is 100ft in length. The results in the Density/Acre column is the amount of plants estimated to occur within this ecological site per every acre.

Table 4.1.21. Species Richness for Key Area 1

Species Captured	Total Count	Density/Acre (plants per acre)*
<u>Perennial Grasses</u>		
Not Captured	0	0
<u>Forbs</u>		
Not Captured	0	0
<u>Shrubs</u>		
Ambrosia dumosa	4	29
Bebbia juncea	2	14.5
Larrea tridentata	27	196
Lycium spp.	2	14.5
Unknown 1	4	29
Unknown 2	8	58
Total Plant Type Counted: 47		
<u>Cacti</u>		
Cylindropuntia acanthocarpa	6	43.5
Total Plant Type Counted: 6		
<u>Trees</u>		
Olneya tesota	16	116.1
Total Plant Type Counted: 16		

*Density/acre is calculated by first dividing area surveyed by 43560 square feet (1 acre). Area surveyed is the area within 6ft of the side of a transect surveyed for 10 transects. Each transect is 100ft long. 6ft x 100ft = 6000sqft. So, 43560sqft./6000 = 7.26. Each total count is then multiplied by 7.26 to estimate the sites density (# of plants) of each specie per acre.

Composition Determined by Density Counts:

Total plant type (as provided in the table above) divided by *Sum of all plants counted* (In this case 69 plants for Key Area 1) = Percent of *plant type composition*

Table 4.1.22. Community Plant Type Makeup

Plant Type	Composition objective from ESD	Key Area 2 Plant Type Composition Results
Perennial Grasses	Not Provided	0%
Forbs	Not Provided	0%
Shrubs	Not Provided	68.1%
Cacti	Not Provided	8.7%
Trees	Not Provided	23.2%

Soil Stability:

A soil stability test was not conducted at this site.

Key Area #2

Ecological Site: Sandy Wash 3-7” p.z. (R040XC318AZ)



This ESD is provisional and does not provide complete information to make a full comparative assessment between data captured and what is expected for this site.

Interpreting Indicators of Rangeland Health:

Key Area #2: Of the 17 indicators, 14 were rated *none to slight*. Indicator #10, plant community composition and distribution relative to infiltration, was rated slight to *slight to moderate*. Site is likely

to exhibit more runoff than expected permeability. Indicator #11, compaction layer, was rated *slight to moderate*. Defined compaction layer was at about 1-2in in depth from surface and site had a desert pavement like structure. Indicator #12, functional/structural groups were rated *moderate*. The present community is normal; however, the only perennial grasses present can only be found growing within other species like white bursage due to the protection they provided. No exposed/standalone grasses found.

Overall ratings:

- Soil and Site Stability – *None to Slight*: Overall soil structure and stability is stable. Though runoff may be assumed to be higher, soil and water interactions are functioning from only a slight departure from expectancy for the site.
- Hydrological Function – *None to Slight*: Hydrological function is well. Improvement could occur with the presence of more perennial grasses. Water, soil, and plant interactions would improve with the presence of missing grasses.
- Biotic Integrity – *Slight to Moderate*: Plant community and plant cycle is good but with the presence of *Pleuraphis rigida* only found hidden within other shrubs shows that this site has degraded over time and any grasses present is extremely limited.

Canopy Cover by Transect (Line-Intercept):

Total percent of canopy cover for key area #2 resulted in 32.5%. Based on canopy cover it can be determined that 67.5% is bare surface or lack of vegetation. Bare surface includes soil cover by litter and rock fragments of various sizes. Kind of soil cover is not captured by this line-intercept canopy cover method.

Density by Transect:

Table 4.1.23 presents species of plants captured within the survey area of Key Area 2 monitoring plot. Survey area is one side of a transect line; 6ft in width for 10 transects. Each Transect is 100ft in length. The results in the Density/Acre column is the amount of plants estimated to occur within this ecological site per every acre.

Table 4.1.23. Species Richness for Key Area 2

Species Captured	Total Count	Density/Acre (plants per acre)*
<u>Perennial Grasses</u>		
<i>Pleuraphis rigida</i>	2	14.5
	Total Plant Type Counted: 2	
<u>Forbs</u>		
Not Captured	0	0
<u>Shrubs</u>		
<i>Ambrosia dumosa</i>	41	297.4
<i>Hymenoclea salsola</i>	3	21.7
<i>Krameria grayi</i>	2	14.5
<i>Larrea tridentata</i>	64	464.6
	Total Plant Type Counted: 110	
<u>Cacti</u>		
<i>Cylindropuntia acanthocarpa</i>	1	7.2

Species Captured	Total Count	Density/Acre (plants per acre)*
	Total Plant Type Counted: 1	
<u>Trees</u>		
Not Captured	0	0

*Density/acre is calculated by first dividing area surveyed by 43560 square feet (1 acre). Area surveyed is the area within 6ft of the side of a transect surveyed for 10 transects. Each transect is 100ft long. 6ft x 100ft = 6000sqft. So, 43560sqft./6000 = 7.26. Each total count is then multiplied by 7.26 to estimate the sites density (# of plants) of each specie per acre.

Composition Determined by Density Counts:

Total plant type (as provided in the table above) divided by *Sum of all plants counted* (In this case 113 plants for Key Area 2) = Percent of *plant type composition*

Table 4.1.24. Community Plant Type Makeup

Plant Type	Composition objective from ESD	Key Area 2 Plant Type Composition Results
Perennial Grasses	Not Provided	1.8%
Forbs	Not Provided	0%
Shrubs	Not Provided	97.3%
Cacti	Not Provided	0.9%
Trees	Not Provided	0%

Soil Stability:

A soil stability test was not conducted at this site.

Proper Functioning Condition:

A Lotic PFC assessment was conducted at a reach segment that borders the southern boundary of the Alamo Crossing Allotment and enters the Primrose Allotment from the east.

Reach ID: BWR-1

Date: 2020

Length: 9.91 km (6.2 miles)

Functional Rating: Proper Functioning Condition

Rating Rationale: Reach is close to the best example of PFC in the LHFO.

4.1.10 Alamo Crossing Evaluation Report

Key Area 1:

Limy Upland, Deep 3-7” p.z (R040XC311AZ) – This ESD describes the plant community as predominantly a desert shrub and cacti with creosote dominant area. Perennial grass cover is sparse and annual grasses and forbs make up a small percentage of the community. As palatable forage production on this site is very low, the plant community has changed very little, from potential, since the introduction of domestic grazing.

Representative values for annual production are very low overall though the area does exhibit a rich diversity of plant type. Dominant plant species include shrubs like white bursage and creosote and herbaceous plants like big galleta and bush muhly. Dominate tree species are not specified but include yellow paloverde.

Soils are well drained with a moderately slow to rapid permeability class. Slopes range from 0-6% and the type of landforms this ecological site is found is terraces and alluvial fans.

Evaluation:

Standard 1-Upland Health

Based on the indicators, Standard 1 is being met.

Standard 3- Desired Resource Conditions

Based on the indicators and quantitative data, Standard 3 is not meeting.

Rationale for Evaluation Finding:

The evaluation (17 indicators) determined that upland health is being met due to soil stability and functioning hydrological processes. Though litter is higher than expected for the site, observations and ratings of the other indicators suggest hydrological processes are not impeded.

As per the ESD, this site does not naturally provide much forage for livestock or wildlife. Decadence and plant mortality presence is likely due to past environmental stressors as no signs of animal disturbance was observed. The monitoring results can tell us that this site is recovering slowly, but overall biotic integrity is at a downward trend. It is important to note that monitoring was conducted during the second rainy season, and the presence of annuals was highly present (no quantitative annual plant data collected using this monitoring protocol). The site does exhibit a fair density of trees that can provide shade cover and some browsing opportunities, however, though perennial grasses are expected to be very low, they were not observed and continuous drought will place more stress on this site. As a result, Standard 3 at this site is not meeting.

Key Area 2:

Sandy Wash 3-7" p.z. (R040XC318AZ) – This ESD describes the historic climax plant community as a mixture of perennial grasses and forbs, desert trees and shrubs, and annual grasses and forbs. The active washy areas in the site have little vegetation except burrobush and annual grasses and forbs.

Continuous grazing use and the absence of natural fires have led to woody plant invasion. These areas are extremely sensitive and when plant cover has been reduced, the extra water concentrated on the site causes accelerated erosion and channel cutting. As a result, less and less of the original overflow areas still get flooded.

Annual production for this site presents representative values for gasses at 52%, shrubs at 28%, forbs at 16%, and trees at 3%.

Soils are featured as well drained to somewhat excessively drained at a moderately rapid to very rapid permeability class. With good vegetative cover, infiltration rates are high. Stability against erosion process is poor and plant-soil moisture are also poor.

Evaluation:

Standard 1-Upland Health

Based on the indicators, Standard 1 is being met.

Standard 3- Desired Resource Conditions

Based on the indicators and quantitative data, Standard 3 is being met.

Rationale for Evaluation Finding:

Based on the indicators, soils and the sites overall stability are stable. Hydrological functions can improve but are meeting upland standards of infiltration, permeability, and plant and soil interactions. More runoff than expected is possibly occurring but there were no signs of gullies, no signs of soil surface loss, pedestal formations, and water-flow patterns were present and expected. Improvements would mainly come from the presence of more perennial grasses as standalone populations versus those hidden within other plants to allow for further soil structure and infiltration.

Desired resource conditions are being met because the expected plant community is present, plants were showing signs of reproductive potential from flowers and fruits observed. The site did not present signs of high mortality or decadence. Recent rains allowed for production of annual plants and in comparison, to other sandy wash sites, this site did exhibit a key grass, big galleta. This site is not at its climax potential, but is meeting desired conditions. It is important to note though big galleta is present, it is very limited. The only galleta grasses present were those growing through other shrubs. This is likely due to the protection they receive from those shrubs from being grazed on. They are also protected from water stress due to water held longer by the immediate soil and shrub roots. It is very likely that standalone galleta bunches were once more predominant in the area. This allotment has also experienced trespass livestock and signs were observed at this monitoring site.

Alamo Crossing Summary:

Table 4.1.25. Rangeland Health Standards Evaluation Findings for Ecological Sites Monitored

Standard #	Key Area 1 Eco Site: Limy Upland, Deep 3-7” p.z.	Key Area 2 Eco Site: Sandy Wash 3-7” p.z.
1- Upland Sites	Meeting	Meeting
2- Riparian-Wetland Sites	Meeting for the segment reach of the Bill Williams River within/bordering the Alamo Crossing Allotment.	
3- Desired Resource Conditions	Not Meeting	Meeting

4.1.11 Primrose Assessment

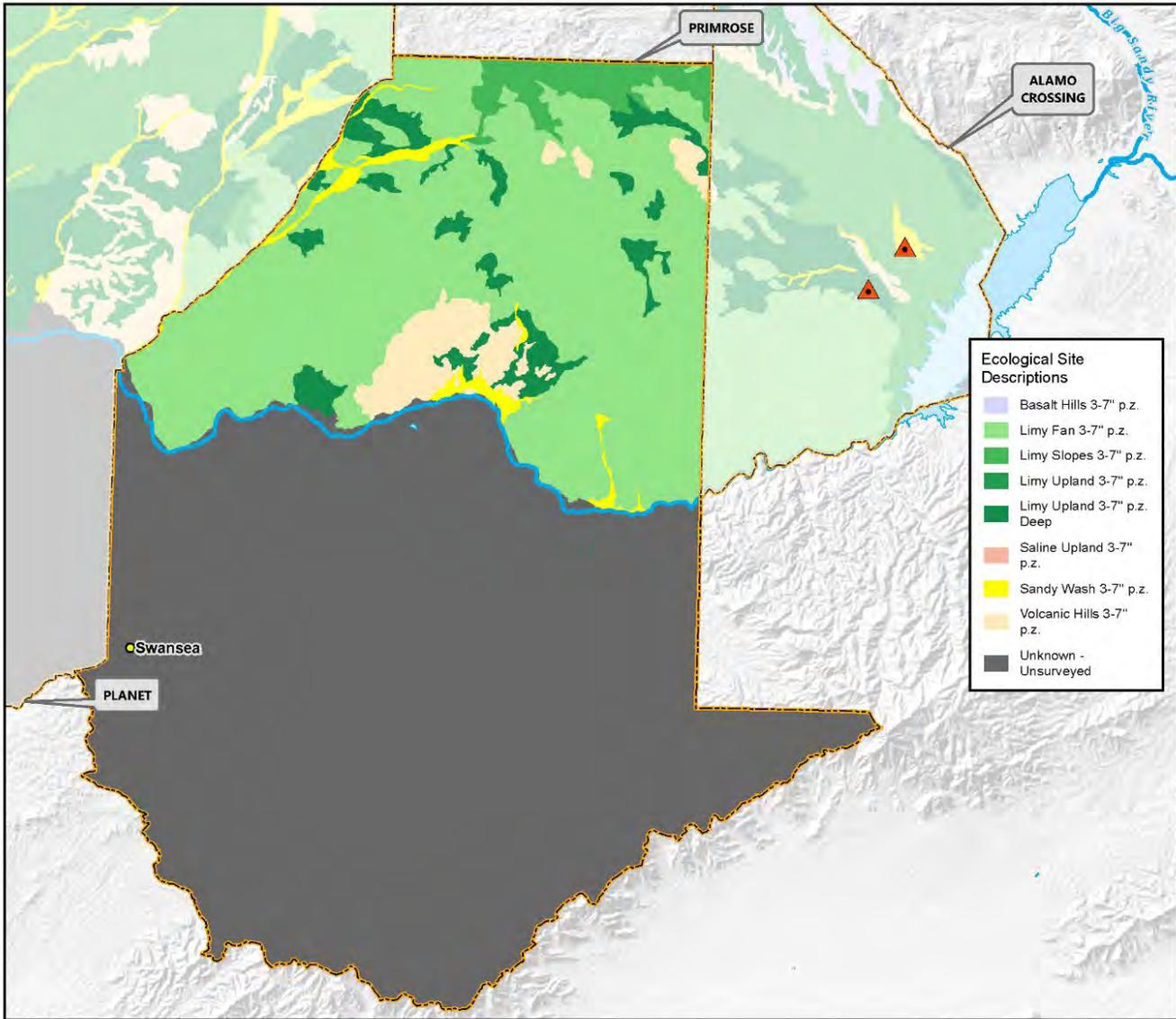
In 2020 when key areas were being established in the Crossman Peak, Planet, and Alamo Crossing Allotments, key area monitoring plots were not established in the Primrose Allotment. The Primrose Allotment is roughly split in half by the Bill Williams River. The northern half has ecological sites mapped and are available by the NRCS (see *Ecological Sites: Primrose* map below). The southern half is currently designated as unknown/unsurveyed. Due to unavailable ecological site information of the southern half of the allotment, attempts for monitoring establishment were focused within the northern half. However, Primrose does not exhibit any known livestock waters to place a key area at an appropriate distance for capturing any potential impacts from livestock use in the north or even in the south half of the allotment. Areas near and north of the Bill Williams River were scouted for potential monitoring sites, however, the northern half exhibits remote extreme terrain and difficult/dangerous trekking. As a result, key areas were not established. Currently, the only available data is PFC assessments which are presented below. Though it is important to monitor ecological sites within individual allotments, all of the Bill Williams Complex allotments share similarities. Those similarities include historical and current livestock management, utilization, biological resources, and they also encompass the same geological ranges. Therefore, monitoring results and evaluations of ecological sites from the other allotments can provide insight of the health condition of the Primrose Allotment. An evaluation of the Primrose Allotment is presented further below in the evaluation conclusion of the Bill Williams Complex (section 4.1.14)

Since the monitoring season of 2020, a monitoring protocol new to the LHFO has been adopted (AIM protocol), which randomly generate plots across a given landscape for monitoring. Training is also now more readily available for determining where a plot is ecologically located regardless if ecological maps are unavailable. During the next season of monitoring for this allotment and complex, the AIM protocol will be implemented and those established key areas will be converted into AIM Plots.

The following table provides a breakdown of those ecological sites the Primrose Allotment encompasses. The ecological sites with the largest presence in Alamo Crossing are Limy Fan 3-7" p.z at 27.8% and Limy Upland Deep 3-7" p.z at 3.1%. These ecological sites at their climax communities are not expected to produce much canopy cover and palatable forage. They are dominated by desert shrubs and typically only produce annual forage during above average rains.

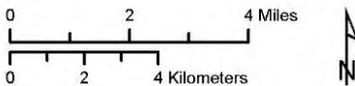
Table 4.1.26. Primrose Ecological Site Breakdown

Ecological Site Description	Acres	Percentage of BLM Land
unassigned	67441.0	63%
Limy Fan 3-7" p.z.	29810.5	27.8%
Limy Slopes 3-7" p.z.	2164.2	2%
Limy Upland 3-7" p.z. Deep	3396.2	3.1%
Saline Upland 3-7" p.z.	38.0	<1%
Sandy Wash 3-7" p.z.	1196.6	1.1%
Volcanic Hills 3-7" p.z.	2904.6	2.7%



Ecological Sites: Primrose
 Colorado River District - Lake Havasu Field Office

- Land Health Evaluations**
- Monitoring Plots
 - Grazing Allotment
- Hydrology**
- Waterbody
 - River
- Administrative Units**
- Town or Place of Interest



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Map Produced by BLM Lake Havasu Field Office Staff
 File: BLM_LHFO_2021LHE_BWC_Primrose_soil
 Date: 3/6/2021
 Map Scale: 1:185,000
 Coordinate System: NAD 1983 UTM Zone 12N
 AZ Reference System: U.S. PLSS GSR
 CA Reference System: U.S. PLSS SBM



Map Location within the Lake Havasu Field Office



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Proper Functioning Condition:

Lotic PFC assessments were conducted at 5 reach segments of the Bill Williams River that crosses through the Primrose Allotment. Reach segment BWR-7 also enters into the Planet Allotment for about a mile when the river enters into private lands and BLM management of the Bill Williams River ends.

Reach ID: BWR-2

Date: 2020

Length: 1.75 km (1.08 miles)

Functional Rating: Functional-At Risk

Rating Rationale: Some stream incision and willow die offs. Downward trend appears to be due to 1000cfs release.

Trend for Functional-At Risk: Downward

Reach ID: BWR-3

Date: 2020

Length: 4.28 km (2.7 miles)

Functional Rating: Functional-At Risk

Rating Rationale: Damaged riparian area due to flooding and blown beaver ponds.

Trend for Functional-At Risk: Not Apparent (first assessment)

Reach ID: BWR-5&6 (assessed together)

Date: 2020

Length: 6.05 km (3.8 miles)

Functional Rating: Functional-At Risk

Rating Rationale: 1000cfs dam release caused beaver dam failure and channel incision.

Trend for Functional-At Risk: Not Apparent (first assessment)

Reach ID: BWR-7

Date: 2020

Length: 9.93 km (6.2 miles)

Functional Rating: Functional-At Risk

Rating Rationale: Stream is impaired

Trend for Functional-At Risk: Not Apparent (first assessment)

Summary:

Table 4.1.27. Rangeland Health Standards Evaluation

Standard #	All Key Areas
1- Upland Sites	No assessment data. See 4.1.14 Evaluation Conclusion for final evaluation of Primrose.
2- Riparian-Wetland areas	Not Meeting for all the segment reaches assessed within the Primrose Allotment and the portion that enters the Planet Allotment.
3- Desired Resource Conditions	No assessment data. See 4.1.14 Evaluation Conclusion for final evaluation of Primrose.

4.1.12 Primrose Evaluation Report

See section 4.1.14

4.1.13 Trend Data

The following data was obtained in 2008 during the last evaluations. This information can provide a snapshot of the plant community and its health state over 10 years ago; a basis for trend and an overall health status of the Bill Williams Complex at that time. We acknowledge that there are minor inconsistencies in how certain aspects of information were read across ecological sites and calculated based on raw data and final data sheets. This summary of data is presented for supplemental information and are not used to make evaluations. Side by side comparisons cannot be made as the location and ecological sites of data collected are different from the recent key areas established. Though, if health changes are captured from one ecological site, assumptions can be made for other ecological sites and their state of rangeland health conditions.

Dry Weight Rank and Daubenmire Frequency methodologies were used to collect ground cover, species composition, and frequency (percent of occurrence within an area). PFC and Interpretation Indicators of Rangeland Health (17 indicators) were also conducted.

Crossman Peak

Ecological Site: Limy Upland, Deep 3-7" p.z

Frame size: 40x40"

Number of frames: 212

Table 4.1.28. Ground Cover Summary

Ground Cover	Total Captured of 212 Frames Placed	% Frequency
Bare Ground	3	1.4
Gravel < ¼"	41	19.3
Rock >3"	70	33
Litter	77	36.3
Grass/forb canopy	0	0
Grass/forb basal	0	0
Tree/shrub canopy	21	9.9
Tree/shrub basal	0	0
Cryptogam	0	0

Table 4.1.29. Species Frequency (Daubenmire Frequency Method) and Composition (Dry Weight Rank) Summary

Species	Total Captured	% Frequency of 212 Frames	% Composition
Larrea tridentata	35	16.5	61.5
Krameria spp.	3	1.4	3.6
Parkinsonia spp.	2	0.9	3.4
Lycium spp.	2	0.9	1.9
Unknown forb 1	3	1.4	29.1
Unknown forb 2	1	0.4	0.1

Ecological Site: Granit Hills 7-10" p.z

Frame size: 40x40"

Number of frames: 108

Table 4.1.30. Ground Cover Summary

Ground Cover	Total Captured of 108 Frames Placed	% Frequency
Bare Ground	7	6.4
Gravel < ¼"	15	13.8
Rock ¼ - 3"	35	32.4
Litter	42	38.8
Grass/forb canopy	0	0
Grass/forb basal	0	0
Tree/shrub canopy	9	8.3
Tree/shrub basal	0	0
Cryptogam	0	0

Table 4.1.31. Species Frequency (Daubenmire Frequency Method) and Composition (Dry Weight Rank) Summary

Species	Total Captured	% Frequency of 108 Frames	% Composition
Hilaria rigida	2	1.8	5.2
Viguiera dentata	21	19.4	44.7
Bebbia juncea	7	6.4	16.9
Fouquieria splendens	6	5.5	11.6
Psilostrophe cooperi	3	2.7	5.55
Janusia gracilis	2	1.8	5.0
Larrea tridentata	2	1.8	5.2
Krameria spp.	1	0.9	2.6
Lycium spp.	1	0.9	--
Eriogonum inflatum	2	1.8	2.9

Planet

Ecological Site: Limy Slopes 3-7" p.z

Frame size: 40x40"

Number of frames: 199

Table 4.1.32. Ground Cover Summary

Ground Cover	Total Captured of 199 Frames Placed	% Frequency
Bare Ground	9	4.5
Gravel < ¼"	41	20.6
Rock ¼ - 3"	86	43.2
Litter	38	19.0

Ground Cover	Total Captured of 199 Frames Placed	% Frequency
Grass/forb canopy	0	0
Grass/forb basal	0	0
Tree/shrub canopy	24	12
Tree/shrub basal	1	0.5
Cryptogam	0	0

Table 4.1.33. Species Frequency (Daubenmire Frequency Method) and Composition (Dry Weight Rank) Summary

Species	Total Captured	% Frequency of 108 Frames	% Composition
<i>Encelia farinosa</i>	17	8.5	28.3
<i>Larrea tridentata</i>	13	6.5	21.4
<i>Ambrosia dumosa</i>	12	6	17.6
<i>Psilostrophe cooperi</i>	5	2.5	8.9
<i>Krameria</i> spp.	4	2	5.5
<i>Fouquieria splendens</i>	4	2	7.1
<i>Parkinsonia</i> spp.	5	2.5	7.3
<i>Carnegiea gigantea</i>	1	0.5	1.7
<i>Lycium</i> spp.	1	0.5	1.7

Ecological Site: Limy Upland, Deep 3-7" p.z

Frame size: 40x40"

Number of frames: 194

Table 4.1.34. Ground Cover Summary

Ground Cover	Total Captured of 194 Frames Placed	% Frequency
Bare Ground	6	3
Gravel	10	5.1
Rock	92	47.4
Litter	49	25.5
Grass/forb canopy	0	0
Grass/forb basal	0	0
Tree/shrub canopy	37	19
Tree/shrub basal	0	0
Cryptogam	0	0

Table 4.1.35. Species Frequency (Daubenmire Frequency Method) and Composition (Dry Weight Rank) Summary

Species	Total Captured	% Frequency of 194 Frames	% Composition
<i>Encelia farinosa</i>	12	6.1	11.3
<i>Larrea tridentata</i>	37	19	49.7
<i>Ambrosia dumosa</i>	18	9.2	21.9
<i>Carnegiea gigantea</i>	2	1	2.6
<i>Fouquieria splendens</i>	3	1.5	2.8
<i>Acacia greggii</i>	2	1	1.5
<i>Cylindropuntia acanthocarpa</i>	1	0.5	1.4
<i>Parkinsonia</i> spp.	6	3	7
<i>Olneya tesota</i>	1	0.5	1.4

17 Indicators Evaluations:

- Granitic Hills 7-10” p.z – Two sites evaluated. Both Rated *none to slight* for all indicators at both sites.
- Sandy Bottom 3-7” p.z – One site evaluated. Rated *none to slight* for all indicators.
- Volcanic Hills 3-7” p.z – One site evaluated. Rated *none to slight* for all indicators.
- Limy Upland, Deep 3-7” p.z – One site evaluated. Rated *none to slight* for 16 indicators
- Limy Slopes, 3-7” p.z – One site evaluated. Rated *none to slight* for 16 indicators

Primrose

Ecological Site: Volcanic Hills 3-7” p.z

Frame size: 40x40”

Number of frames: 212

Table 4.1.36. Ground Cover Summary

Ground Cover	Total Captured of 212 Frames Placed	% Frequency
Bare Ground	12	5.6
Gravel ¼-3”	34	16
Rock ≥3”	84	39.6
Litter	35	16.5
Grass/forb canopy	0	0
Grass/forb basal	0	0
Tree/shrub canopy	47	22.1
Tree/shrub basal	0	0
Cryptogam	0	0

Table 4.1.37. Species Frequency (Daubenmire Frequency Method) and Composition (Dry Weight Rank) Summary

Species	Total Captured	% Frequency of 212 Frames	% Composition
Encelia farinosa	53	25	62
Larrea tridentata	13	6.1	13.2
Odora (unknown name)	1	0.4	1.2
Cylindropuntia acanthocarpa	2	0.9	2.4
Krameria spp.	2	0.9	2.4
Parkinsonia spp.	10	4.7	8.8
Olneya tesota	1	0.4	6
Eriogonum inflatum	3	1.4	3.6

Ecological Site: Granitic Hills 7-10” p.z

Frame size: 40x40”

Number of frames: 168

Table 4.1.38. Ground Cover Summary

Ground Cover	Total Captured of 168 Frames Placed	% Frequency
Bare Ground	7	4.1
Gravel <1/4”	64	38
Rock ¼-3”	36	21.4
Litter	44	26.1
Grass/forb canopy	0	0
Grass/forb basal	0	0

Ground Cover	Total Captured of 168 Frames Placed	% Frequency
Tree/shrub canopy	17	10.1
Tree/shrub basal	0	0
Cryptogam	0	0

Table 4.1.39. Species Frequency (Daubenmire Frequency Method) and Composition (Dry Weight Rank) Summary

Species	Total Captured	% Frequency of 168 Frames	% Composition
Hilaria rigida	3	1.7	2
Echinocereus spp.	1	0.5	0.1
Agave spp.	2	1.1	0.9
Encelia farinosa	18	10.7	13.5
Eriogonum fasciculatum	39	23.2	35.2
Fouquieria splendens	5	2.9	3.2
Cylindropuntia acanthocarpa	5	2.9	2.2
Adenophyllum spp.	7	4.1	5
Krameria spp.	7	4.1	5
Ambrosia dumosa	2	1.1	1.1
Acacia greggii	1	0.5	0.2
Ephedra spp.	1	0.5	0.1
Viguiera dentata	2	1.1	0.2
Lonicera involucrata	1	0.5	0.2
Janusia gracilis	8	4.7	4.4
Acamptopappus sphaerocephalus	1	0.5	1
Parkinsonia spp.	29	17.2	25.1

17 Indicators Evaluations:

- Volcanic Hills 3-7” p.z – One site evaluated. Rated *none to slight* for all indicators.

Proper Functioning Conditions:

Two 2-mile segments were evaluated. One segment starting at N34°13.8413, W113°46.9859 was given a functional rating of Proper Functioning Condition with an upward trend. Factors contributing to unacceptable conditions outside management control are flow regulations, road encroachment, and recreational activities (All terrain vehicles). The other segment starting at N34°14.9801, W113°55.9979 was given a functional rating of Proper Functioning Condition with a not apparent downward or upward trend. Factors contributing to unacceptable conditions outside management control are flow regulations.

Alamo Crossing

Ecological Site: Sandy Bottom 3-7” p.z

Frame size: 40x40”

Number of frames: 201

Table 4.1.40. Ground Cover Summary

Ground Cover	Total Captured of 201 Frames Placed	% Frequency
Bare Ground	31	15.4
Gravel ¼-3”	57	28.3

Ground Cover	Total Captured of 201 Frames Placed	% Frequency
Rock ≥3"	26	12.9
Litter	45	22.3
Grass/forb canopy	0	0
Grass/forb basal	0	0
Tree/shrub canopy	42	20.8
Tree/shrub basal	0	0
Cryptogam	0	0

Table 4.1.41. Species Frequency (Daubenmire Frequency Method) and Composition (Dry Weight Rank) Summary

Species	Total Captured	% Frequency of 212 Frames	% Composition
Larrea tridentata	91	45.2	89.9
Cylindropuntia acanthocarpa	1	0.4	1
Ambrosia dumosa	9	4.4	8.1
Lycium spp.	1	0.4	1

17 Indicators Evaluation:

- Sandy Bottom 3-7" p.z – One site evaluated. Rated *none to slight* for all indicators.

4.1.14 Evaluation Conclusion

Based on the available data, specialists knowledge and expertise, and available ecological site descriptions, the following table presents a summary finding for the Bill Williams Complex Rangeland Health Condition Standards.

Table 4.1.41 Bill Williams Complex Rangeland Health Standards Overall Evaluation Findings

Standards	Crossman Peak	Planet	Primrose	Alamo Crossing
1- Upland Sites	Meeting	Meeting	Meeting	Meeting
2- Riparian-Wetland Sites	N/A	Not Meeting	Not Meeting	Meeting
3- Desired Resource Condition	Not Meeting	Not Meeting	Not Meeting	Not Meeting

Standard 1 is found to be meeting across the Complex based on qualitative and quantitative data findings. Soils and hydrological processes are found to be functioning at their expected rates of soil movement, infiltration, erosion, and stability. Standard 2 is only rated at PFC within Alamo Crossing and found at Functional-At-Risk within the Primrose, and Planet Allotments. PFC is found at the first 6-miles from Alamo Dam. The topography of these 6-miles and the narrow riparian gorge areas protects the riverbanks from further expansion and allows for riparian stabilization during release schedules from the Dam. Where the rest of the evaluated stream segments are found Functioning-At-Risk, the river is found exposed and less resistant to disturbance. A rare release of 1000cfs (before the evaluation) caused beaver dam failure and channel incisions causing these stream segments to be minimally functioning but at risk of failure.

Standard 3 across the Complex varied from meeting and not meeting within individual sites. The main reason for their not meeting status is due to the missing perennial grasses as expected per the ESD's. Some areas also exhibited decadence and plant mortality with the expectation that as climate conditions worsen (drought) resource conditions will continue towards a downward trend. The provisional Sandy Wash 3-7" p.z ESD describes grasses as being a large portion of the annual production produced. This indicates that sandy wash sites account for a large grass population (density) within its plant community, however, this was not the case. Perennial grasses have been sparsely observed in such ecological site but not near the expectation.

The following table is a compilation of all the ecological sites found within the Bill Williams Complex. The purpose of this table and the *Ecological Sites: Bill Williams Complex* map (below) is to provide a breakdown of this complex and to showcase the similarities of the landscape across these allotments. The yellow highlighted rows represent the ecological sites most predominant within the Complex.

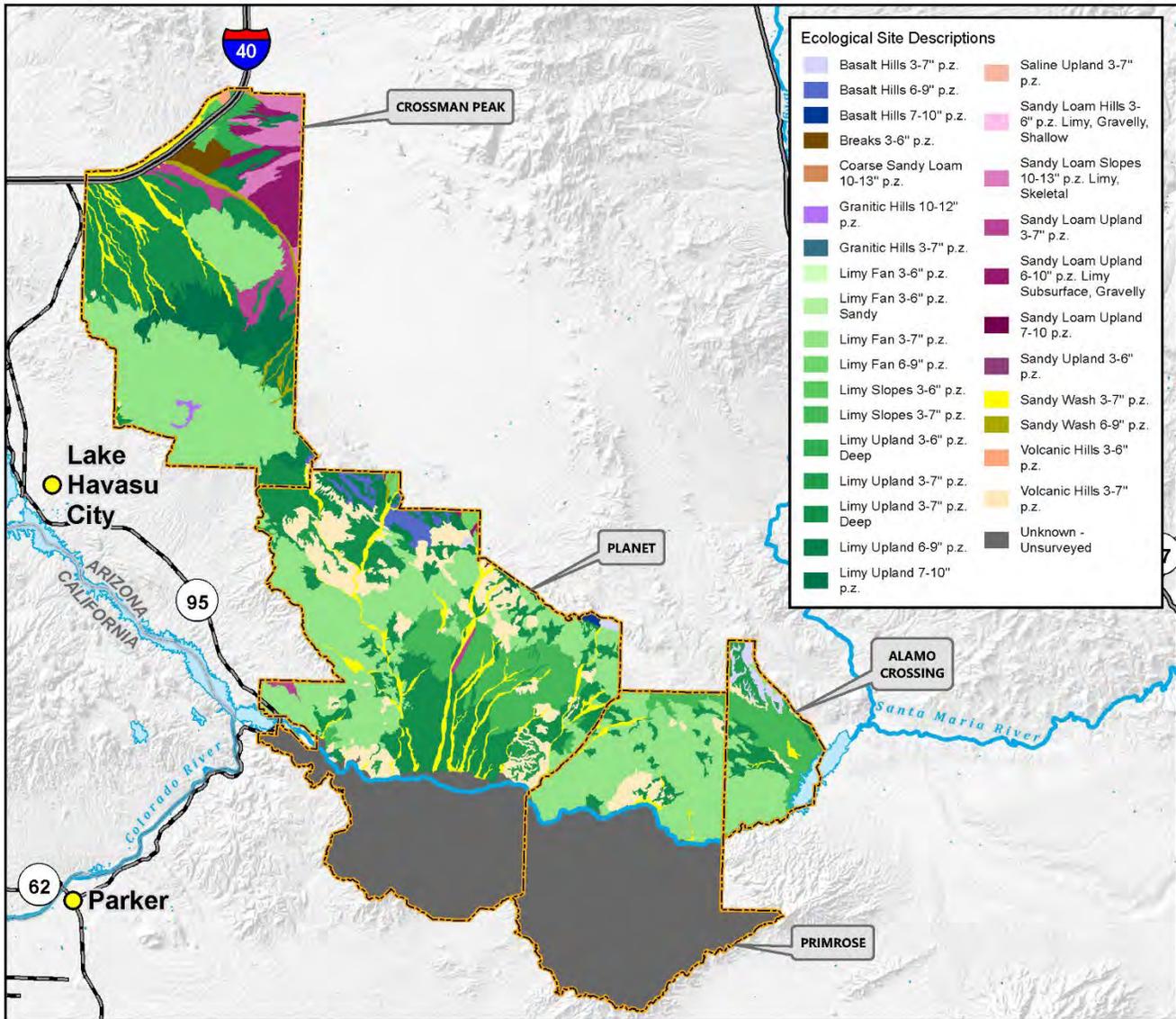
Table 4.1.42 Bill Williams Complex Ecological Site Breakdown.

Ecological Site Description	Acres	Percentage of BLM Land
Basalt Hills 3-7" p.z.	1,891.9	<1%
Basalt Hills 6-9" p.z.	3,812.8	1%
Basalt Hills 7-10" p.z.	374.9	<1%
Breaks 3-6" p.z.	1,859.1	<1%
Coarse Sandy Loam 10-13" p.z.	365.9	<1%
Granitic Hills 10-12" p.z.	462.9	<1%
Limy Fan 3-6" p.z.	12.6	<1%
Limy Fan 3-6" p.z. Sandy	1,859.1	<1%
Limy Fan 3-7" p.z.	121,430.3	29.7%
Limy Fan 6-9" p.z.	1,116.7	<1%
Limy Slopes 3-6" p.z.	937.8	<1%
Limy Slopes 3-7" p.z.	26,060.5	6.3%
Limy Upland 3-6" p.z. Deep	804.3	<1%
Limy Upland 3-7" p.z.	4,207.0	1%
Limy Upland 3-7" p.z. Deep	64,823.5	15.8%
Limy Upland 6-9" p.z.	9,388.7	2.3%
Limy Upland 7-10" p.z.	9,595.4	2.3%
Saline Upland 3-7" p.z.	6,504.7	1.5%
Sandy Loam Hills 3-6" p.z. Limy, Gravelly, Shallow	20.0	<1%
Sandy Loam Slopes 10-13" p.z. Limy, Skeletal	365.9	<1%
Sandy Loam Upland 3-7" p.z.	5,974.1	1.4%
Sandy Loam Upland 6-10" p.z. Limy Subsurface, Gravelly	1,102.7	<1%
Sandy Upland 3-6" p.z.	1,859.1	<1%
Sandy Wash 3-7" p.z.	14,979.8	3.6%
Sandy Wash 6-9" p.z.	2,410.5	<1%
unassigned	100,755.4	24.7%

Ecological Site Description	Acres	Percentage of BLM Land
Volcanic Hills 3-6" p.z.	226.0	<1%
Volcanic Hills 3-7" p.z.	24,634.1	6%

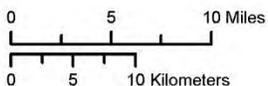
With the allotments compiled, Limy Fan 3-7" p.z at 29.7%, Limy Upland Deep 3-7" p.z at 15.8%, Limy Slops 3-7" p.z at 6.3%, and Sandy wash 3-7" p.z at 3.6% make up the majority of the ecological sites within the Complex. As previously described, Limy Fan and Limy Upland Deep ecological sites at their climax communities are not expected to produce much canopy cover and palatable forage. They are dominated by desert shrubs and typically only produce annual forage during above average rains.

The Primrose Allotment does not have upland monitoring and as previously stated, it is important to monitor ecological sites within individual allotments. However, the Primrose allotment and the others share similarities that include historical and current livestock management, utilization, biological resources, and they also encompass the same geological ranges that the monitoring sites located outside of Primrose can also represent the major ecological makeup of Primrose. The Limy Fan ecological site is highly present within Primrose and where Limy Fan and Limy Upland Deep ecological sites have been monitored in the other allotments, they are meeting Upland Standards. However it can be concluded that overall, the Primrose Allotment may also not be meeting Desired Resource Condition Standards.



Ecological Sites: Bill Williams Complex

Colorado River District - Lake Havasu Field Office



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Map Produced by BLM Lake Havasu Field Office Staff
 File: BLM_LHFO_2021LHE_BWC_soil
 Date: 8/17/2021
 Map Scale: 1:550,000
 Coordinate System: NAD 1983 UTM Zone 12N
 AZ Reference System: U.S. PLSS GSR
 CA Reference System: U.S. PLSS SBM



Map Location within the Lake Havasu Field Office



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4.2 Bishop Allotment

The Bishop Allotment was last evaluated in 2014. The data concluded that 9 of the 10 key areas were meeting Standard #1 while 7 of the 10 were meeting Standard #3. The Bishop allotment does not exhibit riparian or wetland areas, so Standard 2 was not included in the Evaluation.

4.2.1 Historic Permitted AUMs and Current Allotment Management

Current records provide a vague history into the Bishop Allotment with gaps of historical use, transfers, range improvement records, and administrative changes. It is not entirely certain when livestock were last on Bishop. A grazing bill was paid for in 2011 but no actual use reports were submitted to support any evidence of actual grazing use on the Bishop range. Prior, is a bill paid in 1992 for 43 head of livestock for the grazing year.

The Bishop Allotment is currently permitted for year-round grazing for 50 head of livestock, 588 AUMs. The current permittee holds a grazing term set to expire in 2028. Recent records (2018-present) show the permittee applying for non-use and being approved by the authorized officer.

4.2.2 Allotment Uses

1. Wild Burros: This allotment includes a small portion of the Cibola-Trigo HMA. Wild burros occur throughout the allotment and wild horses have been known to occur in the area as well. For about the last 5 consecutive years, wild burro nuisance gathers have occurred on private lands and on the Cibola National Wildlife Refuge just directly west of the allotment. It is estimated that burro population is currently at well above AML.
2. Recreation: Due to the proximity of the allotment to the Colorado River, there is dispersed recreation throughout the year. During the winter months, recreation use includes camping, off road vehicle use, and site seeing. During the summer months, recreational use is primarily water-based activities outside the allotment.

4.2.3 Range Improvement Projects

Livestock operations have historically utilized private lands and waters outside of public lands to support livestock. There are no waters or other livestock range improvements in the Bishop Allotment. Any fencing mainly exists along the western boundary of Bishop and Cibola Lake Rd. Northern fences are down or non-existent and other areas like the eastern areas never had fencing due to natural barriers.

4.2.4 Monitoring Setting

In 2012, five permanent key areas were established to begin developing baseline data for trend information. In 2013 and 2014, two more key areas were established. With the exception of one key area all others were established in the sandy wash ecological site. Much of the areas that makeup the Bishop Allotment are baren of perennial vegetation, however, this does not mean ecological sites are failing. Desert pavement for example is a natural phenomenon of interlocking fragments of various gravel sizes where very little to no vegetation grows. These areas are a natural part of the allotment and represent

part of the soil, hydrological, and biotic capabilities of the allotment; however, the goal of the established key areas is to capture data where changes will be more evident by livestock presence. Washes represent a large portion of the allotments ecological makeup where forage may be available and are found throughout the allotment at an east to west direction. The seven plots were distributed across the allotment where they can represent the allotment as a whole.

In 2021, the LHFO and the YFO adopted the AIM protocol for obtaining terrestrial data. This protocol has been designed to capture a more in-depth amount of information by implementing a minimalist bias approach for establishing monitoring plots and placing steps for gathering quality data. In the spring of 2021, seven plots were randomly generated and read in the Bishop Allotment. This data has been collected but has not gone through a quality check and quality assurance step as required per the AIM protocol. Therefore, this data is not available to present. Interpreting Indicators of Rangeland Health evaluations were conducted at 4 of the 7 AIM monitoring plots; these will be presented below.

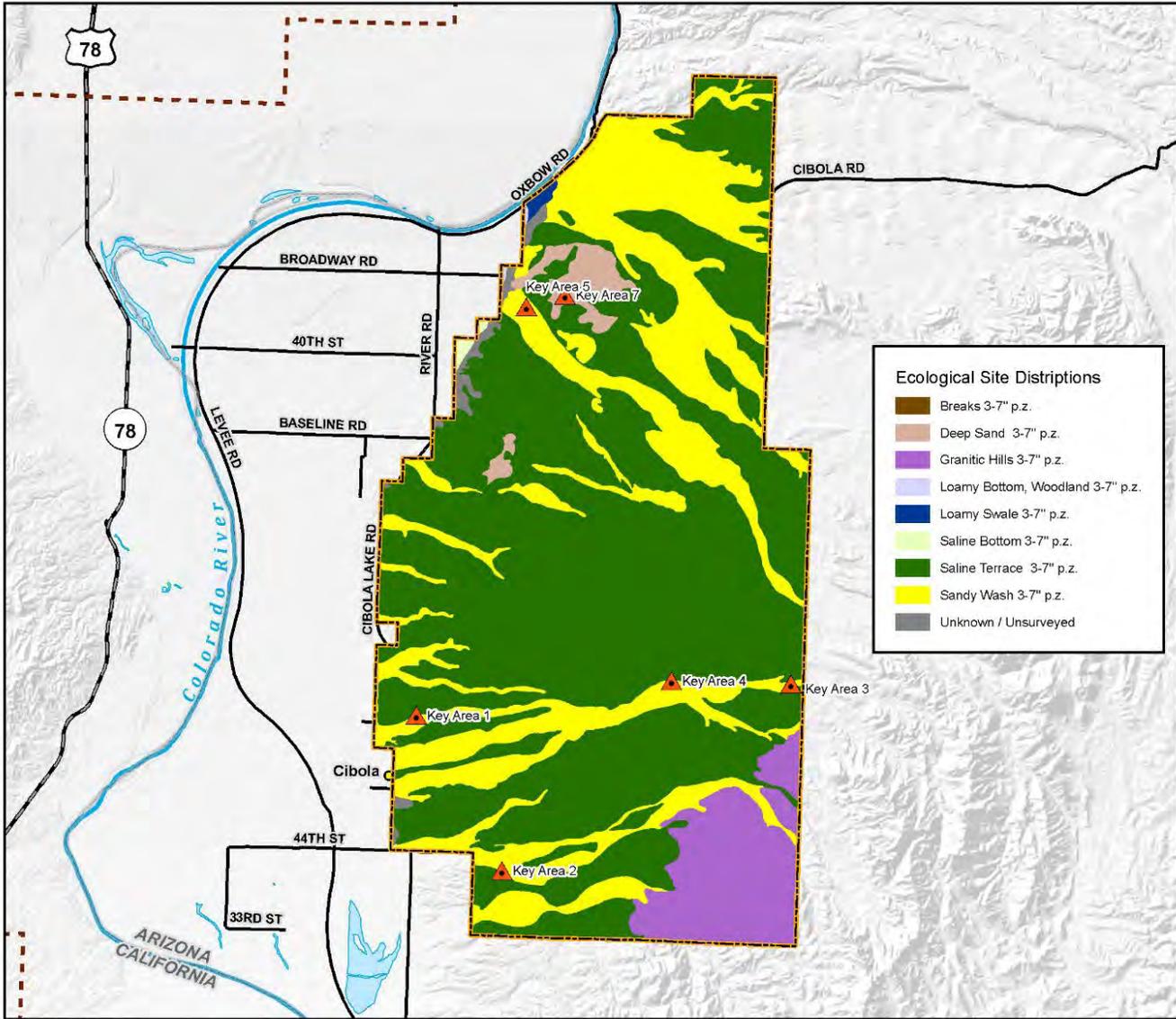
4.2.5 Bishop Assessment

Within the Bishop Allotment there are eight known ecological sites. The most predominant site at 61% within the allotment is Saline Terrace. This site can be further described as an area that largely encompasses Desert Pavement. Desert Pavement ecological sites produce very little to no perennial vegetation. The second most predominant site is Sandy Wash at 24%. Sandy washes or ephemeral washes provide the most concentrated amount of vegetation within the allotment. The *Ecological Sites: Bishop Map* (below) provide an ecological layout and the locations of the established key area monitoring plots. They do not provide locations for the 2021 AIM plots established.

The following table provides a breakdown of those ecological sites the Bishop Allotment encompasses. Those highlighted in yellow represent the ecological sites that have been monitored.

Table 4.1.1. Bishop Ecological Site Breakdown

Ecological Site Description	Acres	Percentage of BLM Land
Breaks 3-7" p.z.	1321.5	4.8%
Deep Sand 3-7" p.z.	471.9	1.7%
Granitic Hills 3-7" p.z.	2001	7.3%
Loamy Bottom, Woodland 3-7" p.z.	9.3	<1%
Loamy Swale 3-7" p.z.	2.5	<1%
Saline Bottom 3-7" p.z.	45.1	<1%
Saline Terrace 3-7" p.z.	16604.5	61.2%
Sandy Wash 3-7" p.z.	6507.1	24%
Unknown	140.1	<1%



Ecological Sites: Bishop

Colorado River District - Yuma Field Office

Land Health Evaluations

- Monitoring Plots
- Grazing Allotment

Administrative Units

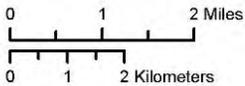
- Town or Place of Interest
- Field Office Boundary
- State Boundary

Hydrology

- Waterbody
- River

Transportation

- U.S. Highway
- State Highway
- County or Major Routes



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Map Produced by BLM Yuma Field Office Staff
 File: BLM_YFO_2021LHE_Bishop_soil
 Date: 8/10/2021
 Map Scale: 1:120,000
 Coordinate System: NAD 1983 UTM Zone 12N
 AZ Reference System: U.S. PLSS GSR
 CA Reference System: U.S. PLSS SBM

Map Location within the Yuma Field Office



Field Office Boundary



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Key Area 1-6

Ecological Site: Sandy Wash 3-7” p.z (R040XC318AZ)/Very Gravelly Wash (R031XY021CA)



The R040XC318AZ ESD is provisional and does not provide complete information to make a full comparative assessment between data captured and what is expected for this site. For a more comparative assessment the Very Gravelly Wash (R031XY021CA) ESD will be used. With the Bishop allotment just outside of the Lower Colorado Desert (031X) Major Land Resource Area and the monitored ecological sites possibly being more closely related to the Very Gravelly Wash ESD, it will provide a more comprehensive assessment.

Canopy Cover by Transect (Line-Intercept)

The following table provides a summary of canopy cover results for all years monitored.

Table 4.2.2 Average Totals of Canopy Cover at Key Areas

Monitoring Year	Key Area 1	Key Area 2	Key Area 3	Key Area 4	Key Area 5	Key Area 6
2012	20.79%	--	--	--	--	35.3%
2013	16.63%	21.91%	25.87%	19.32%	34.55%	35.9%
2014	--	19.51%	15.84%	15.35%	27.39%	--
2016	19.54%	20.43%	17.22%	17.69%	30.54%	39.3%
2017	19.83%	21.14%	18.17%	11.21%	33.70%	38.3%
Averaged Totals	19.20%	20.75%	19.27%	15.89%	31.54%	37.2%

Density by Transect:

The following tables presents species of plants captured per their respective years within the survey area of each key areas. Survey area is one side of a transect line; 6ft in width for 10 transects. Each Transect is 100ft in length. The outcomes in the Average Density/Acre column are the amount of plants estimated to occur within this ecological site per every acre based on the average of the years monitored.

Table 4.2.3. Key Area 1

Species Captured	Total Counts and Estimated Density/Acre Per Year				Average** Density/acre*
	2012	2013	2016	2017	
Hymenoclea salsola	2 (14.52/acre)	2 (14.52/acre)	2 (14.52/acre)	2 (14.52/acre)	14.5
Larrea tridentata	16 (116.16/acre)	19 (137.94/acre)	18 (130.68/acre)	13 (94.38/acre)	119.7
Lycium spp.	4 (29.04/acre)	5 (36.3/acre)	4 (29.04/acre)	2 (14.52/acre)	27.2
Olneya tesota	--***	1 (7.26/acre)	1 (7.26/acre)	1 (7.26/acre)	5.4
Parkinsonia microphylla	1 (7.26/acre)	--	1 (7.26/acre)	--	3.6

Table 4.2.4. Key Area 2

Species Captured	Total Counts and Estimated Density/Acre Per Year				Average** Density/acre*
	2012	2014	2016	2017	
Acacia greggii	1 (7.26/acre)	2 (14.52/acre)	1 (7.26/acre)	1 (7.26/acre)	9
Ambrosia dumosa	2 (14.52/acre)	2 (14.52/acre)	1 (7.26/acre)	--	9
Hymenoclea salsola	6 (43.56/acre)	6 (43.56/acre)	8 (58.08/acre)	10 (72.60/acre)	54.4
Larrea tridentata	2 (14.52/acre)	4 (29.04/acre)	3 (21.78/acre)	2 (14.52/acre)	19.9
Lycium spp.	4 (29.04/acre)	3 (21.78/acre)	11 (79.86/acre)	6 (43.56/acre)	43.5
Olneya tesota	1 (7.26/acre)	1 (7.26/acre)	2 (14.52/acre)	2 (14.52/acre)	10.8
Parkinsonia microphylla	5 (36.3/acre)	3 (21.78/acre)	7 (50.82/acre)	6 (43.56/acre)	38.1
Ziziphus obtusifolia	--***	--	1 (7.26/acre)	1 (7.26/acre)	3.6

Table 4.2.5. Key Area 3

Species Captured	Total Counts and Estimated Density/Acre Per Year				Average** Density/acre*
	2012	2014	2016	2017	
Acacia greggii	--***	--	1 (7.26/acre)	--	1.8
Ambrosia dumosa	2 (14.52/acre)	2 (14.52/acre)	1 (7.26/acre)	1 (7.26/acre)	18.8
Argythamnia spp.	2 (14.52/acre)	2 (14.52/acre)	--	4 (29.04/acre)	14.5
Bebbia juncea	29 (210.54/acre)	31 (225.06/acre)	36 (261.36/acre)	16 (116.16/acre)	203.2
Dasyochloa pulchella	29 (210.54/acre)	--	--	1 (7.26/acre)	54.4
Encelia farinosa	19 (137.94/acre)	25 (181.50/acre)	27 (196.02/acre)	15 (108.90/acre)	156
Eriogonum inflatum	--	3 (21.78/acre)	5 (36.3/acre)	--	14.5
Fagonia laevis	6 (43.56/acre)	1 (7.26/acre)	9 (65.34/acre)	--	29
Hyptis emoryi	1 (7.26/acre)	2 (14.52/acre)	2 (14.52/acre)	1 (7.26/acre)	10.8
Justicia californica	7 (50.82/acre)	12 (87.12/acre)	34 (246.84/acre)	12 (87.12/acre)	117.9
Larrea tridentata	4 (29.04/acre)	4 (29.04/acre)	3 (21.78/acre)	3 (21.78/acre)	25.4
Lycium spp.	5 (36.3/acre)	4 (29.04/acre)	7 (50.82/acre)	--	29
Parkinsonia microphylla	5 (36.3/acre)	7 (50.82/acre)	11 (79.86/acre)	5 (36.3/acre)	50.8
Physalis crassifolia	--	--	1 (7.26/acre)	--	1.8
Psoralea argemone	--	1 (7.26/acre)	3 (21.78/acre)	1 (7.26/acre)	9
Stephanomeria paniculata	--	1 (7.26/acre)	--	4 (29.04/acre)	9

Species Captured	Total Counts and Estimated Density/Acre Per Year				Average ** Density/acre*
	2012	2014	2016	2017	
Ziziphus obtusifolia	--	--	1 (7.26/acre)	5 (36.3/acre)	10.8
Unknown (2012)	1 (7.26/acre)	--	--	--	1.8
Unknown (2014)	--	2 (14.52/acre)	--	--	3.6
Unknown (2017)	--	--	--	1 (7.26/acre)	1.8

Table 4.2.6. Key Area 4

Species Captured	Total Counts and Estimated Density/Acre Per Year				Average ** Density/acre*
	2012	2013	2016	2017	
Acacia greggii	--***	--	1 (7.26/acre)	--	1.8
Argythamnia spp.	2 (14.52/acre)	--	--	--	3.6
Bebbia juncea	--	--	1 (7.26/acre)	--	1.8
Eriogonum inflatum	--	1 (7.26/acre)	1 (7.26/acre)	1 (7.26/acre)	5.4
Justicia californica	--	--	1 (7.26/acre)	--	1.8
Larrea tridentata	--	2 (14.52/acre)	1 (7.26/acre)	--	5.4
Lycium spp.	7 (50.82/acre)	12 (87.12/acre)	10 (72.60/acre)	10 (72.60/acre)	70.7
Oleña tesota	--	--	1 (7.26/acre)	1 (7.26/acre)	3.3
Parkinsonia microphylla	5 (36.3/acre)	5 (36.3/acre)	6 (43.56/acre)	7 (50.82/acre)	41.7

Table 4.2.7. Key Area 5

Species Captured	Total Counts and Estimated Density/Acre Per Year				Average ** Density/acre*
	2012	2014	2016	2017	
Acacia greggii	4 (29.04/acre)	6 (43.56/acre)	9 (65.34/acre)	14 (101.64/acre)	59.8
Ambrosia dumosa	--***	1 (7.26/acre)	1 (7.26/acre)	1 (7.26/acre)	5.4
Atriplex polycarpa	4 (29.04/acre)	1 (7.26/acre)	1 (7.26/acre)	3 (21.78/acre)	16.3
Argythamnia spp.	--	2 (14.52/acre)	17 (123.42/acre)	7 (50.82/acre)	47.1
Bebbia juncea	28 (203.28/acre)	12 (87.12/acre)	25 (181.50/acre)	19 (137.94/acre)	152.4
Encelia farinosa	1 (7.26/acre)	1 (7.26/acre)	2 (14.52/acre)	1 (7.26/acre)	9.0
Epilobium canum-spp.	--	--	--	5 (36.3/acre)	9.0
Ferocactus wislizeni	1 (7.26/acre)	1 (7.26/acre)	1 (7.26/acre)	--	5.4
Hymenoclea salsola	32 (232.32/acre)	30 (217.80/acre)	35 (254.10/acre)	31 (225.06/acre)	232.3
Justicia californica	2 (14.52/acre)	3 (21.78/acre)	3 (21.78/acre)	--	14.5
Larrea tridentata	2 (14.52/acre)	2 (14.52/acre)	5 (36.3/acre)	6 (43.56/acre)	27.2
Lycium spp.	--	3 (21.78/acre)	2 (14.52/acre)	2 (14.52/acre)	12.7
Nicotiana obtusifolia	--	--	6 (43.56/acre)	1 (7.26/acre)	12.7
Oleña tesota	4 (29.04/acre)	3 (21.78/acre)	13 (94.38/acre)	--	36.3
Parkinsonia florida	10 (72.60/acre)	2 (14.52/acre)	13 (94.38/acre)	7 (50.82/acre)	58
Parkinsonia microphylla	3 (21.78/acre)	1 (7.26/acre)	16 (116.16/acre)	5 (36.3/acre)	45.3
Prosopis spp.	--	--	3 (21.78/acre)	--	5.4
Psoralea argemone	7 (50.82/acre)	6 (43.56/acre)	10 (72.60/acre)	7 (50.82/acre)	54.4
Unknown (2014)	--	2 (14.52/acre)	--	--	3.6

Table 4.2.8. Key Area 6

Species Captured	Total Counts and Estimated Density/Acre Per Year				Average ** Density/acre*
	Jan. 2013	Dec. 2013	2016	2017	
Acacia greggii	3 (21.78/acre)	2 (14.52/acre)	2 (14.52/acre)	2 (14.52/acre)	16.3
Bebbia juncea	3 (21.78/acre)	2 (14.52/acre)	1 (7.26/acre)	3 (21.78/acre)	16.3
Colubrina californica	--***	--	1 (7.26/acre)	--	1.8
Encelia farinosa	1 (7.26/acre)	--	--	1 (7.26/acre)	3.6

Species Captured	Total Counts and Estimated Density/Acre Per Year				Average ** Density/acre*
	Jan. 2013	Dec. 2013	2016	2017	
Fagonia laevis	--	--	2 (14.52/acre)	1 (7.26/acre)	5.4
Hymenoclea salsola	9 (65.34/acre)	13 (94.38/acre)	13 (94.38/acre)	9 (65.34/acre)	79.8
Larrea tridentata	4 (29.04/acre)	10 (72.60/acre)	9 (65.34/acre)	8 (58.08/acre)	56.2
Lycium spp.	6 (43.56/acre)	6 (43.56/acre)	9 (65.34/acre)	18 (130.68/acre)	70.7
Nicotiana obtusifolia	--	--	--	7 (50.82/acre)	12.7
Olneya tesota	5 (36.3/acre)	4 (29.04/acre)	4 (29.04/acre)	4 (29.04/acre)	123.4
Parkinsonia spp.	1 (7.26/acre)	3 (21.78/acre)	3 (21.78/acre)	4 (29.04/acre)	19.9

*Density/acre is calculated by first dividing area surveyed by 43560 square feet (1 acre). Area surveyed is the area within 6ft of the side of a transect surveyed for 10 transects. Each transect is 100ft long. 6ft x 100ft = 6000sqft. So, 43560sqft./6000 = 7.26. Each total count is then multiplied by 7.26 to estimate the sites density (# of plants) of each specie per acre.

** Average density/acre is the sum of all estimated density/acre per year and divided by the amount of years monitoring was conducted. In this case, four years of monitoring.

*** Note: The -- symbol means that specific plant was not captured/read by the plot that year; however, a non-captured year still goes into the calculating the average density/acre. The fact that it was not captured one year versus another means there is a decreased average that the specific plant will be found.

Key Area 7

Ecological Site: Sandy Deep 3-7" p.z.



The NRCS web soil map describes where Key Area 7 is located as a Sandy Deep ecological site. No ESD is available for Sandy Deep, therefore, Sandy Upland 3-7" p.z. (R040XC319AZ) will be used. This ESD is provisional and does not provide complete information to make a full comparative assessment between data captured and what is expected for this site.

Canopy Cover by Transect (Line-Intercept)

The following table provides a summary of canopy cover results for all years monitored.

Table 4.2.9. Average Totals of Canopy Cover at Key Areas

Monitoring Year	Key Area 7
2014	5.6%
2016	6.80%
2017	6.41%
Averaged Totals	6.27%

Density by Transect:

The following table presents species of plants captured per their respective years within the survey area of each key areas. Survey area is one side of a transect line; 6ft in width for 10 transects. Each Transect is 100ft in length. The outcomes in the Average Density/Acre column is the amount of plants estimated to occur within this ecological site per every acre based on the average of the years monitored.

Table 4.2.10. Key Area 7

Species Captured	Total Counts and Estimated Density/Acre Per Year			Average** Density/acre*
	2014	2016	2017	
Ambrosia dumosa	32 (232.32/acre)	24 (174.24/acre)	23 (166.98/acre)	143.3
Cylindropuntia acanthocarpa	1 (7.26/acre)	1 (7.26/acre)	--	4.8
Cylindropuntia ramosissima	9 (65.34/acre)	9 (65.34/acre)	10 (72.60/acre)	67.7
Krameria grayi	4 (29.04/acre)	3 (21.78/acre)	4 (29.04/acre)	26.6
Larrea tridentata	14 (101.64/acre)	20 (145.2/acre)	19 (137.94/acre)	128.2
Pleuraphis rigida	11 (79.86/acre)	7 (50.82/acre)	9 (65.34/acre)	65.3
Tiquilia palmeri	--***	2 (14.52/acre)	--	4.8

*Density/acre is calculated by first dividing area surveyed by 43560 square feet (1 acre). Area surveyed is the area within 6ft of the side of a transect surveyed for 10 transects. Each transect is 100ft long. 6ft x 100ft = 6000sqft. So, 43560sqft./6000 = 7.26. Each total count is then multiplied by 7.26 to estimate the sites density (# of plants) of each specie per acre.

** Average density/acre is the sum of all estimated density/acre per year and divided by the amount of years monitoring was conducted. In this case, four years of monitoring.

*** Note: The – symbol means that specific plant was not captured/read by the plot that year; however, a non-captured year still goes into the calculating the average density/acre. The fact that it was not captured one year versus another means there is a decreased average that the specific plant will be found.

Interpreting Indicators of Rangeland Health

17 indicator evaluations were not conducted at the 7 key areas since their establishment except for key area 1 and 5 in 2014. The following evaluations were conducted at the AIM plots established in 2021.

Of the seven AIM plots, four plots were evaluated.

Plot ID #2021-001

The Ecological Site this plot falls in is described as a Saline Terrace. There is no ESD for a Saline Terrance. What is mapped by the NRCS web soil survey as a Saline Terrace is also too generic for this site and can be further broken down into a desert pavement ecological site. This site is representative of

much of the ecological makeup of the Bishop Allotment. This site is not naturally viable for livestock grazing. No perennial grasses and little to none low shrub communities available.

Of the 17 indicators, 14 were rated *none to slight*. This plot randomly landed in a desert pavement drainage. The expectations of some soil movement was considered for ratings given. All of the soil indicators were rated *none to slight*. The presence of desert pavement is protecting and stabilizing the soil. Within the drainage, slight presence of pedestaling was found but expected. Hydrological indicators were all found normal for the site. Three indicators related to Biotic Integrity place it at a slight departure due to increased decadence, litter, and poor reproductive signs by the available community. It is important to note that the only presence of plants were found within the drainage as expected for the site, however, what available vegetation was present was disturbed by wild burros. Tracks, trampling, broken branches, and the presence of burros were observed.

Overall ratings:

- Soil and Site Stability – *None to Slight*: Soil indicators show good stability for the site.
- Hydrological Function – *None to Slight*: Hydrological function is as expected.
- Biotic Integrity – *Slight*: Expected community is intact. Slight departure due to Wild Burros.

Plot ID #2021-002

The Ecological Site this plot falls in is a Sandy Wash. The ESD for a Sandy Wash within the Sonoran Basin and Range MLRA is described to exhibit high amounts of grasses. However, the presence of grasses can vary by many factors such as actual precipitation, size of washes, washes versus drainages, etc., It is expected that the sandy washes within the Bishop allotment are going to exhibit low production of grasses, as better defined in Very Gravelly Wash ESD of the Lower Colorado Desert MLRA. This particular location does not appear to be capable of supporting high amounts of grasses.

Of the 17 indicators, all were rated *none to slight*.

Overall ratings:

- Soil and Site Stability – *None to Slight*: slight presence of rills, presence of waterflow patterns, and soil surface movement are all expected and occurring at stable rates. No gullies or pedestaling.
- Hydrological Function – *None to Slight*: Hydrological function is as expected.
- Biotic Integrity – *None to Slight*: Expected community is intact.

Plot ID #2021-004

The Ecological Site this plot falls in is a Sandy Wash. Given this particular wash site it may appear that it could support grasses if the precipitation would allow it.

Of the 17 indicators, 11 were rated *none to slight*. Soil stability and hydrological function is found relatively stable as expected for a wash. This wash is very large and allows for high distribution of water flow which can keep soils stable during flooding events. The Biotic integrity is rated at *moderate*. The

vegetative community is found to be water stressed. There are high signs of mortality, litter, low biomass, and low signs of reproductive capability from perennial plants. Due to the little production capabilities of the shrubs, trees are receiving higher impacts from wild burros. Browsing can be seen on most trees with tree canopies high due to trimming of branches and leaves by wild burros.

Overall ratings:

- Soil and Site Stability – *None to Slight*: Soils are found stable.
- Hydrological Function – *None to Slight*: Hydrological function is as expected.
- Biotic Integrity – *Moderate*: Plant and tree community appear to be at a downward trend.

Plot ID #2021-006

The Ecological Site this plot falls in what is described as Breaks 3-7” p.z. There is no ESD available for a Breaks ecological site. The landform of this site can be described as escarpments or terraces with a convex shape at slopes of 1 to 50%. Soils are classified as well drained. Above this particular Break is desert pavement and below the escarpment is also desert pavement with a narrow wash before the landscape becomes desert pavement and another escarpment. Much like AIM Plot #2021-001, this area is not viable for livestock and is representative of much of the Bishop allotment.

Of the 17 indicators, 16 were rated *none to slight* from expected departure. Indicator #17, reproductive capabilities of perennial plants, was rated *moderate*. Of the available vegetation, reproductive signs were low. Ocotillo plants were not vigorous and also had signs of disturbance, such as use and trampling. A wild burro was seen near the evaluation site. Creosote was the only shrub seen blooming. It is expected that the main reason for a lack of flowers, and annual production is due to the lack of rains received in the winter season.

Overall ratings:

- Soil and Site Stability – *None to Slight*: Soils are found stable.
- Hydrological Function – *None to Slight*: Hydrological function is as expected.
- Biotic Integrity – *None to Slight*: Though there are signs of stress and disturbance on ocotillo cacti, the rest of the shrub community is found at a slight departure from expectation. There is a mix of cacti and low shrubs present, however, annual production is expected to be naturally low due to the sites low potential to support a dense shrub plant community.

Plot ID #2021-008

The Ecological Site this plot falls in is described as a Saline Terrace. There is no ESD for a Saline Terrace. What is mapped by the NRCS web soil survey as a Saline Terrace is also too generic for this site and can be further broken down. This area can be described as desert pavement with large deposit of sand. Just north of the plot, there are even higher sand deposits, dune like, but not fully formed. Except for plant communities within washes, this site comprises of a shrub community with possibly the next higher amount of plant composition.

Of the 17 indicators, 15 were rated *none to slight*. Soil is sandy to sandy loam and stability is as expected for such erodible soils, but there is soil surface protection by a gravelly layer. Plant

composition is seen normal for the sight, but available plants do show signs of stress and low production.

Overall ratings:

- Soil and Site Stability – *None to Slight*: Soils are found stable.
- Hydrological Function – *None to Slight*: Hydrological function is as expected.
- Biotic Integrity – *None to Slight*: There is a slight departure of annual production and reproductive signs at this sight, but structural groups are at/near potential. There is also low signs of decadence. Some shrubs were blooming but not all.

Addition Data

The following data are summary findings from the 2014 Rangeland Health Assessment and Evaluation that was conducted.

Desert Pavement:

In 2014, two plots for a one time read were read at desert pavement ecological sites, the results are as follows:

17 indicators Evaluation- Of the 17 indicators, both sites were rated *none to slight* from departure.

Density- Site #1 captured 1 forb and 1 shrub. Site #2 captured 14 shrubs and 1 tree to account for 4 species.

Cover- Site #1 total canopy cover was found at 0.52%. Site #2 total canopy cover was found at 0.80%.

Sandy Wash (Identified as gravelly, braided, ephemeral stream ecological site during 2014 Assessment and Evaluation):

In 2014, 17 indicator evaluations were conducted at the established key areas 1 and 5. The evaluation findings are as follows:

Both key areas were rated *none to slight* from departure. All indicators of soil, hydrology, and biotic were found to be as expected for a sandy wash ecological site.

Sandy Upland:

In 2014, two plots were read at a Sandy Upland ecological site. One of the sites was at key area 7 while the other was a one-time read, the results are as follows:

17 indicators Evaluation – of the 17 indicators at site #1 (key area 7), 15 were rated *none to slight* from departure. The perennial grass, big galleta, was observed lacking in population size and some rills were observed. Of the 17 indicators at site #2, 14 were rated *none to slight* from departure. Overall, Soil and

site stability and Hydrological Function were rated *none to slight* while Biotic Integrity was rated *moderate* from departure.

Density – Site #1 (key area 7) captured 58 shrubs and 11 grasses to account for 6 species. Site #2 captured 97 shrubs and 6 grasses to account for 5 species.

Cover – Site #1 (key area 7) total canopy cover was found at 7.5%. Site #2 total canopy cover was found at 11.25%

Breaks:

In 2014, two plots for a one time read were read at Breaks ecological sites, the results are as follows:

17 indicators Evaluation- Of the 17 indicators, both sites were rated *none to slight* from departure.

Density – Site #1 captured 18 shrubs and 43 grasses to account for 3 species. Site #2 captured 42 shrubs, 13 grasses, and 2 trees to account for 7 species.

Cover – Site #1 total canopy cover was found at 3.47%. Site #2 total canopy cover was found at 7.46%

Granitic Hills (Identified as limy hills ecological site during 2014 Assessment and Evaluation):

In 2014, two plots for a one time read were read at Granitic Hills ecological sites, the results are as follows:

17 indicators Evaluation- Of the 17 indicators, both sites were rated *none to slight* from departure.

Density – Site #1 captured 54 shrubs and 56 forbs to account for 9 species. Site #2 captured 78 shrubs, 132 forbs, and 7 trees to account for 11 species.

Cover – Site #1 total canopy cover was found at 3.72%. Site #2 total canopy cover was found at 9.29%

4.2.6 Bishop Evaluation Report

Key Areas 1-6:

Sandy Wash 3-7” p.z. (R040XC318AZ) – This ESD is incomplete and does not provide enough information to make closer comparisons. This ESD describes grasses as being a large portion of the annual production produced. This indicates that sandy wash sites account for a large amount of grasses (density) within its plant community. This may be so in some areas based on various factors; however, washes can be broken down into further wash types. In most areas, grasses cannot be supported or only account for a small portion of the plant community. In the Major Land Resource Area (MLRA) the Bishop Allotment is found in, Sonoran Basin and Range, only the Sandy Wash ecological site is available to describe ephemeral streams/washes. Other MLRAs, like the Lower Colorado Desert found in southeast California provide further breakdowns of ecological sites pertaining to ephemeral streams/washes. To more accurately assess the washes found in the bishop allotment, the ecological site

Very Gravelly Wash (R031XY021CA) of the Lower Colorado Desert MLRA will also be used to make a more accurate evaluation based on the assessment results.

Based on the available state and transition model, provided in the ESD of the Very Gravelly Wash, the historic community state is the current reference state with the absence of non-native species. The reference state provides two reference phases that will shift plant communities based on drought and average precipitation response. Phase one of the reference state is when average precipitation occur. This phase is further broken down into two community components. Community component one is in the most actively flooded region of the drainageway, which is composed of barren sands and gravels. Community component two is adjacent to the active zone in the drainageway and on the side slopes of the drainageway. Brittlebush is generally dominant, and creosote bush, white ratany and desert lavender are common secondary shrubs. Although always relatively small, there is variation in the size and shape of these drainageways, ranging from smaller channels with primarily creosote bush, to larger channels with a higher diversity of shrubs.

Big galleta (*Pleuraphis rigida*), has low cover in the more defined drainageways. Annual production varies with precipitation, but whitemargin sandmat (*Chamaesyce albomarginata*) and desert Indianwheat (*Plantago ovata*) are usually present with notable cover.

As further described in this state and transition model, during drought years, flood events are unlikely. The plant community components remain similar to those described in community phase one, but show a decline in overall health, cover and production due to drought. Shorter lived species (such as burrobrush, sweetbush, brittlebush and bladderpod spiderflower) may suffer high mortality while longer lived species with deeper roots (desert lavender, smoketree, blue paloverde, desert ironwood, creosote bush and Schott's dalea) may take longer to respond to drought conditions but may eventually have severe branch die back.

Evaluation:

Standard 1-Upland Health

Based on the indicators, Standard 1 is being met.

Standard 3- Desired Resource Conditions

Based on the indicators and quantitative data, Standard 3 is not being met.

Rationale for Evaluation Finding:

Based on the 2014 and 2021 evaluations (17 indicators) conducted at the Sandy Wash ecological sites, Standard 1 is being met. Soil and hydrological indicators are as expected for a sandy wash/ ephemeral stream setting. Excessive erosion is not apparent. Indicators of soil movement and deposits are normal.

Desired resource conditions are not being met because although the overall integrity of the plant community of all 6 key areas are found intact and the major expected communities are present, perennial

grasses are missing. It is expected with either ESD used for comparison that perennial grasses contributed to the plant community and this was not the case for these areas.

The evaluation conducted at the AIM plot ID# 2021-004 in 2021 found the biotic integrity at a moderate departure due to drought conditions of previous years. This site provides indication of some of the overall settings the Bishop allotment is experiencing and the further stress caused by wild burro disturbance. Future data will give further indication of the state of this particular location. If precipitation becomes available, this site can yet improve.

Key Area 7:

Due to no available ESD of a Sandy Deep ecological site a Sandy Upland ESD will be used as a reference state. Landform, soil texture, precipitation zone, slope, and drainage classification are very similar based on available descriptions.

Sandy Upland 3-7" p.z. (R040XC319AZ) – This range site has a plant community made up of a mixture of perennial and annual grasses, forbs and desert shrubs. Plant species most likely to invade or increase on this site following disturbance are creosote, white bursage, and primrose. Continuous livestock grazing use will decrease perennial grasses, which are replaced by lower forage value shrubs and forbs.

Dominant shrub species include white bursage (*Ambrosia dumosa*), and creosote. Dominant grass for this site is big galleta and bush muhly.

Soil surface texture is a sandy, loamy sand, and loamy fine sand. Drainage class is well drained with a very rapid permeability class.

Evaluation:

Standard 1-Upland Health

Based on the indicators, Standard 1 is not being met.

Standard 3- Desired Resource Conditions

Based on the indicators and quantitative data, Standard 3 is not being met.

Rationale for Evaluation Finding:

Based on the data gathered, the dominant plant species expected for this site was captured. Creosote, white bursage, and big galleta were the predominant species found. However, based on cover and photo points collected over the course of three monitoring years, the plant community does not appear to be at desired conditions. Though the key species, big galleta, was captured, it is not captured as a specie that contributes to the canopy cover. This indicates that the grass population is possibly not at a healthy state and any annual production is low. Photo points also show there is both decadence and mortality at this site. The predominant specie for cover, presence, and vigor appears to only be creosote. This bush is very resilient to drought and would be the last to show stress, while other shrubs are apparent in their

stress. It can be expected that Upland Health is also not meeting as a result of exposed soil and a lack of adequate forage cover. In comparison to previous years, the 2017 photos do show more vigor in the plant community; continuous monitoring will indicate if this site is at an upward trend. More data is required to make a more accurate evaluation of this sites health status, but based on available data, this site is otherwise not meeting Standard 1 and 3.

Summary

Table 4.2.11. Rangeland Health Standards Evaluation Findings for Ecological Sites Monitored

Standard #	Key Area 1-6 Eco Site: Sandy Wash 3-7” p.z.	Key Area 7 Eco Site:
1- Upland Health	Meeting	Not Meeting
2- Riparian/wetland area	Not present within this allotment.	
3- Desired Resource Conditions	Not Meeting	Not Meeting

4.2.7 Evaluation Conclusion

Based on the available data, specialists knowledge and expertise, and available ecological site descriptions, the following table presents a summary finding for the Bishop Rangeland Health Condition Standards.

Table 4.2.12. Bishop Rangeland Health Standards Overall Evaluation

Standards	Bishop
1- Upland Sites	Meeting
2- Riparian-Wetland Sites	N/A
3- Desired Resource Conditions	Not Meeting

Quantitative data was collected in 2 of 8 ecological sites that comprise of the Bishop allotment. One of those sites, Sandy Wash, represents 24% while the other site, Deep Sand, represents 1.7% of the Bishop allotment. The evaluations (17 indicators) conducted in 2014 and 2021 captured other ecological sites to account for an additional 3 ecological sites monitored, which include Saline Terrance or Desert Pavement, and accounts for 61.2% of the Bishop ecological sites. Conclusions of those qualitative evaluations overall place those sites at a none to slight departure. With the available data and results, Standard 1 and 3 for are being met for those area. It is important to note that the Bishop allotment may be meeting standards is some areas, but that does not entirely conclude that all of Bishop is at a desired state. Some of the data suggest there are stress factors and disturbances occurring in Bishop. Bishop is also a naturally barren allotment and provides little forgeable communities except in washes. It would be ideal that if grazing continues, livestock are turned out seasonally when annual forage is more readily available.

5.0 Interdisciplinary Team Members

The BLM Arizona, LHFO and YFO prepared this Rangeland Health Assessment and Evaluation.

Table 5.1 Interdisciplinary Team Members

Resource Specialist/Name	Title
Eric Duarte	Rangeland Management Specialist
Harry F. Mauney	Wildlife Biologist
Jessica Han	Archaeologist
Aron King	YFO Field Manager, Background in Archaeology
Adam B. Cochran	LHFO Assistant Field Manager, Background in Rangeland Management
Tanner Brown	District GIS Specialist

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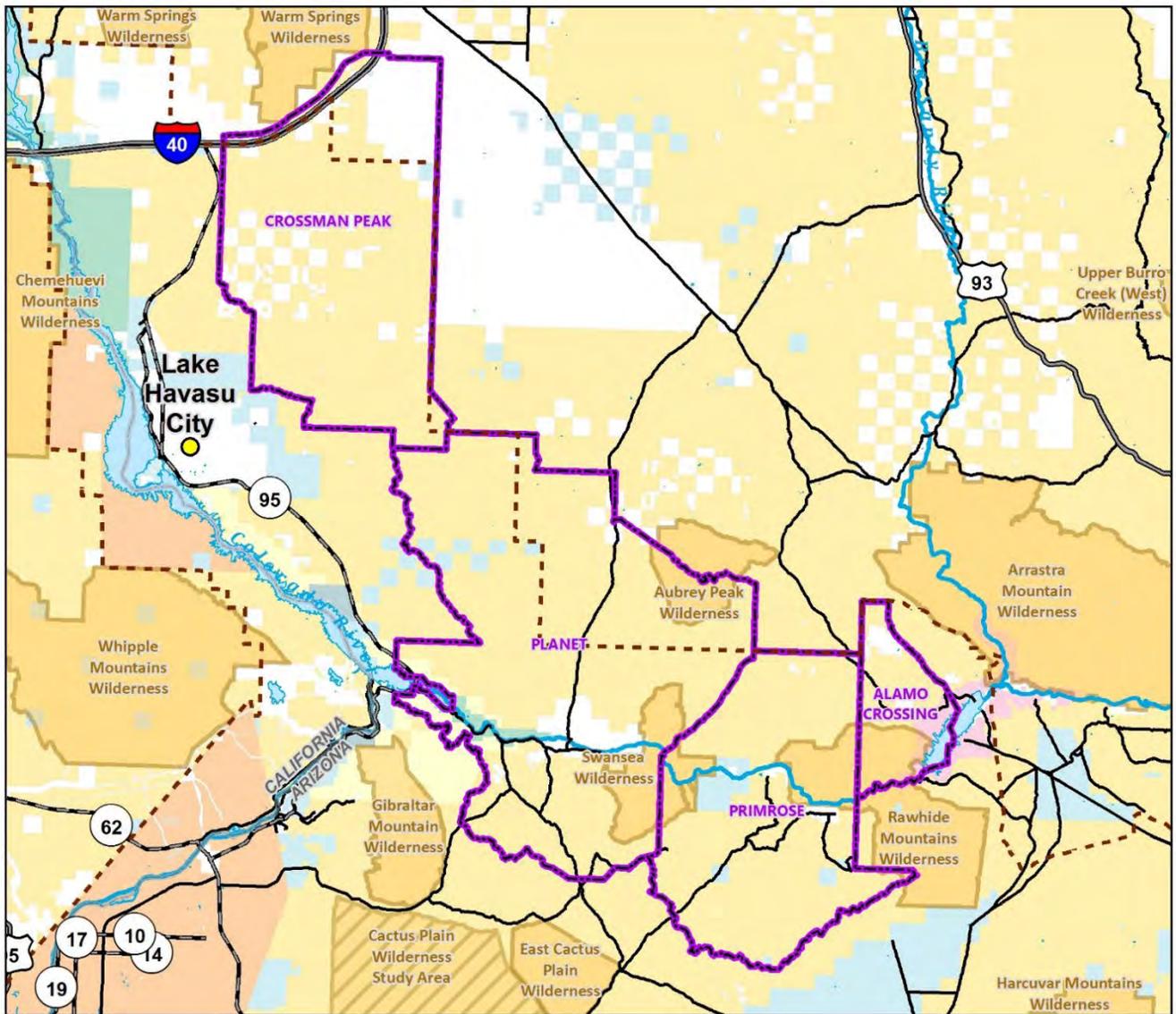
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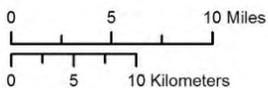
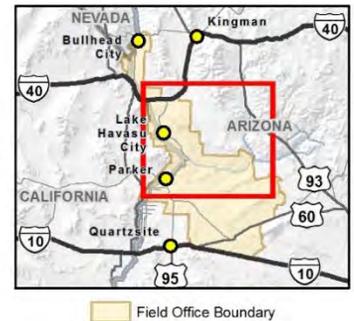
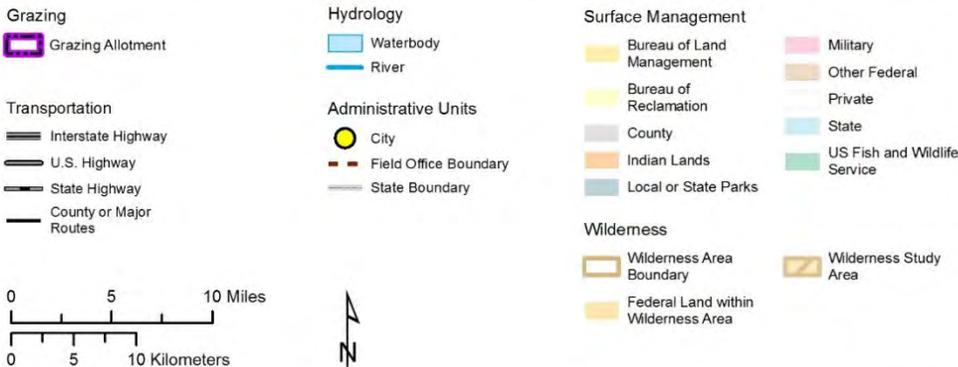
Appendix 1



Grazing Allotments: Crossman Peak, Planet, Primrose, Alamo Crossing

Colorado River District - Lake Havasu Field Office

Map Location within the Lake Havasu Field Office

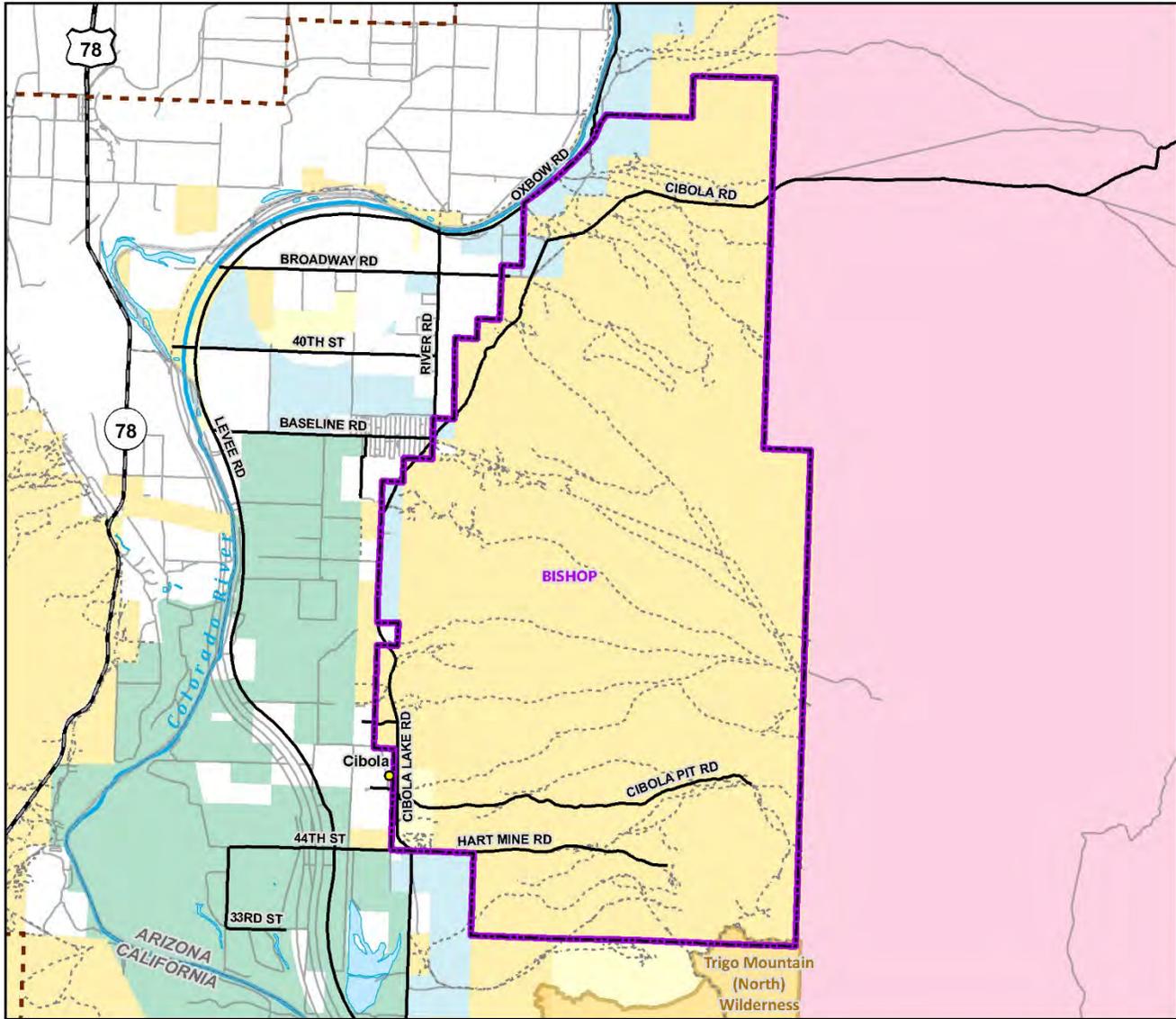


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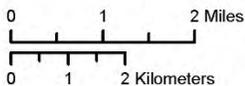


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Grazing Allotments: Bishop

Colorado River District - Yuma Field Office



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Map Produced by BLM Yuma Field Office Staff
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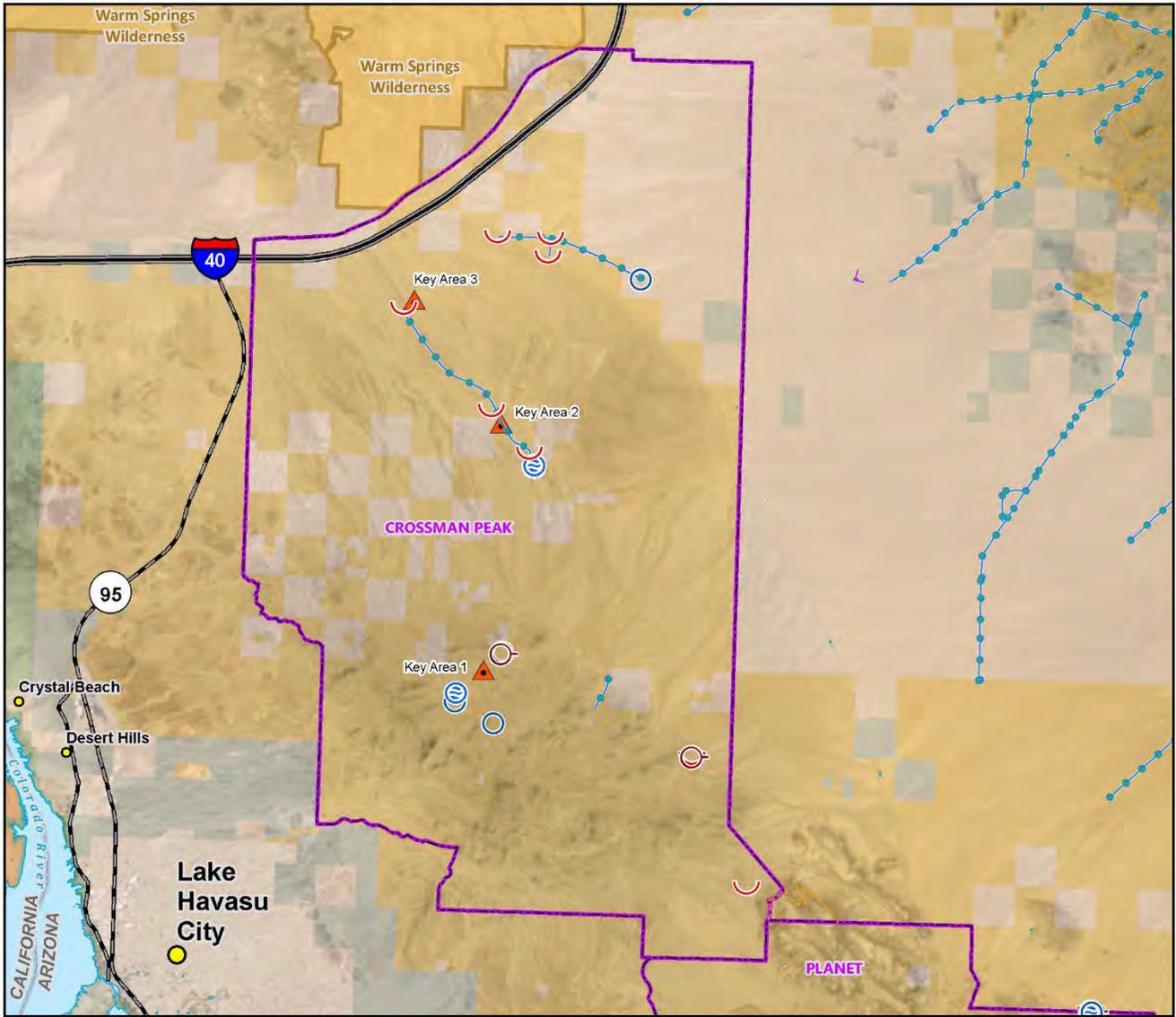
Map Location within the Yuma Field Office



Field Office Boundary

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Appendix 2



Range Water Resources - Crossman Peak

Colorado River District - Lake Havasu Field Office

Range Improvements - Water Resources

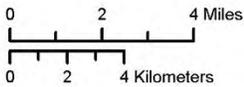
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- Supplemental Storage Tank
- Trough
- Corrals and Loading Chutes Not Portable
- Pipeline
- Dikes and Diversions
- Unknown

Land Health Evaluations

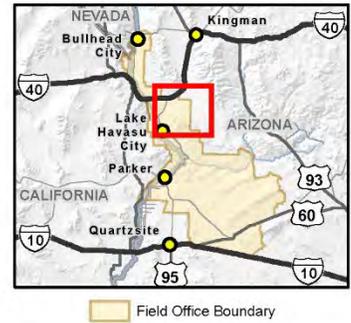
- Monitoring Plots
- Grazing Allotment
- Transportation**
- Interstate Highway
- State Highway
- Hydrology**
- River
- Waterbody

Surface Management Agency

- Bureau of Land Management
- Bureau of Reclamation
- Local or State Parks
- Private
- State
- US Fish and Wildlife Service
- Administrative Units**
- City
- Town or Place of Interest
- State Boundary



Map Location within the Lake Havasu Field Office

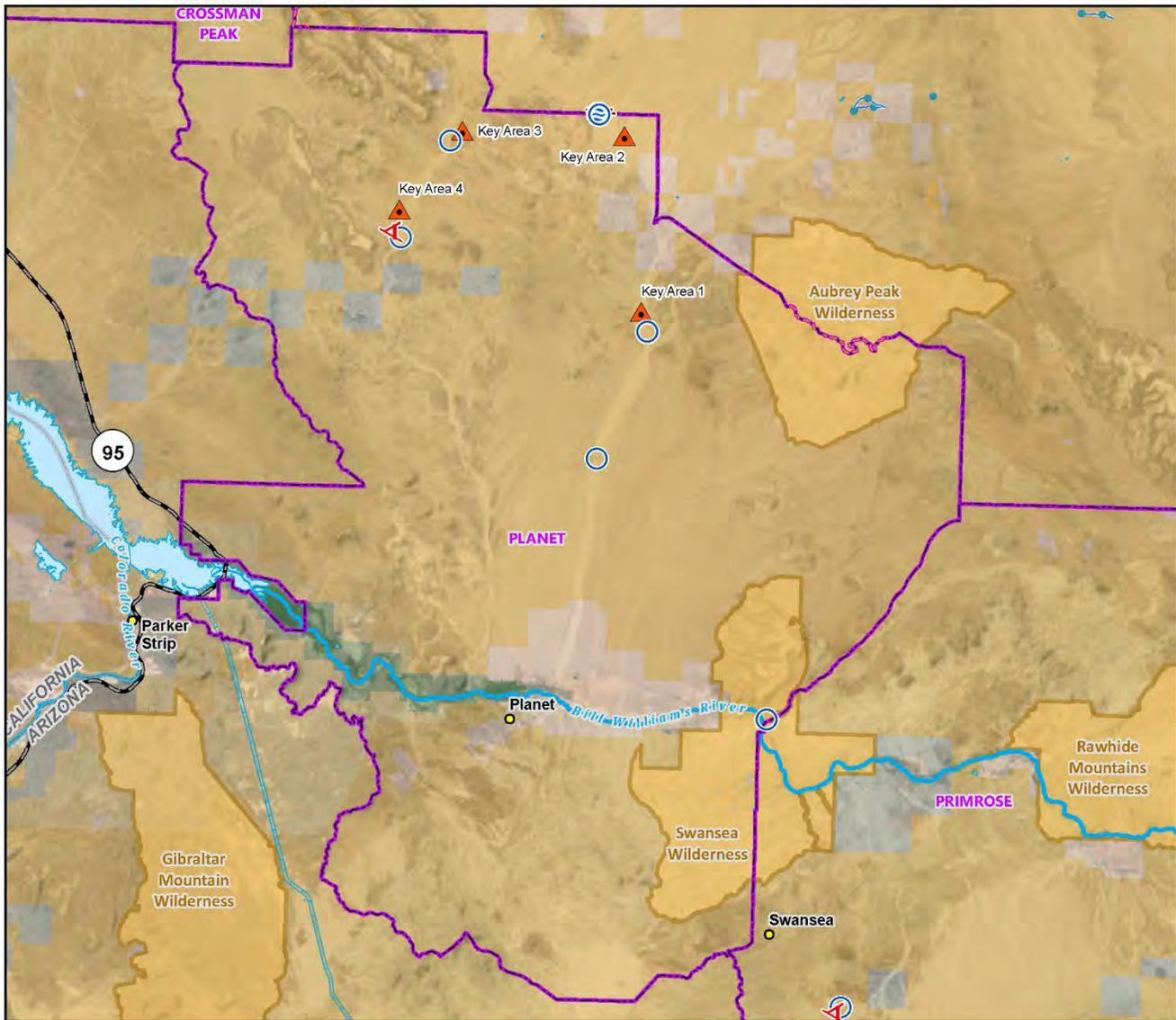


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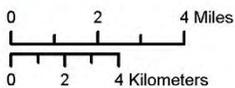


Range Water Resources - Planet

Colorado River District - Lake Havasu Field Office

Range Improvements - Water Resources

- Well
- Unfenced Detention Reservoir
- Supplemental Storage Tank
- Trough
- Corrals and Loading Chutes Not Portable
- Pipeline
- Unknown



Land Health Evaluations

- Monitoring Plots
- Grazing Allotment

Transportation

- State Highway

Hydrology

- River
- Waterbody
- Central Arizona Project

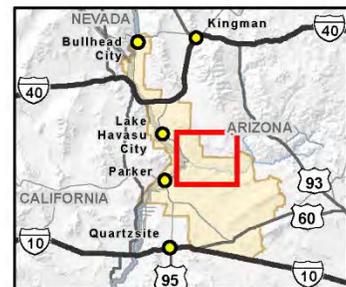
Surface Management Agency

- Bureau of Land Management
- Bureau of Reclamation
- Local or State Parks
- Private
- State
- US Fish and Wildlife Service

Administrative Units

- Town or Place of Interest
- State Boundary

Map Location within the Lake Havasu Field Office

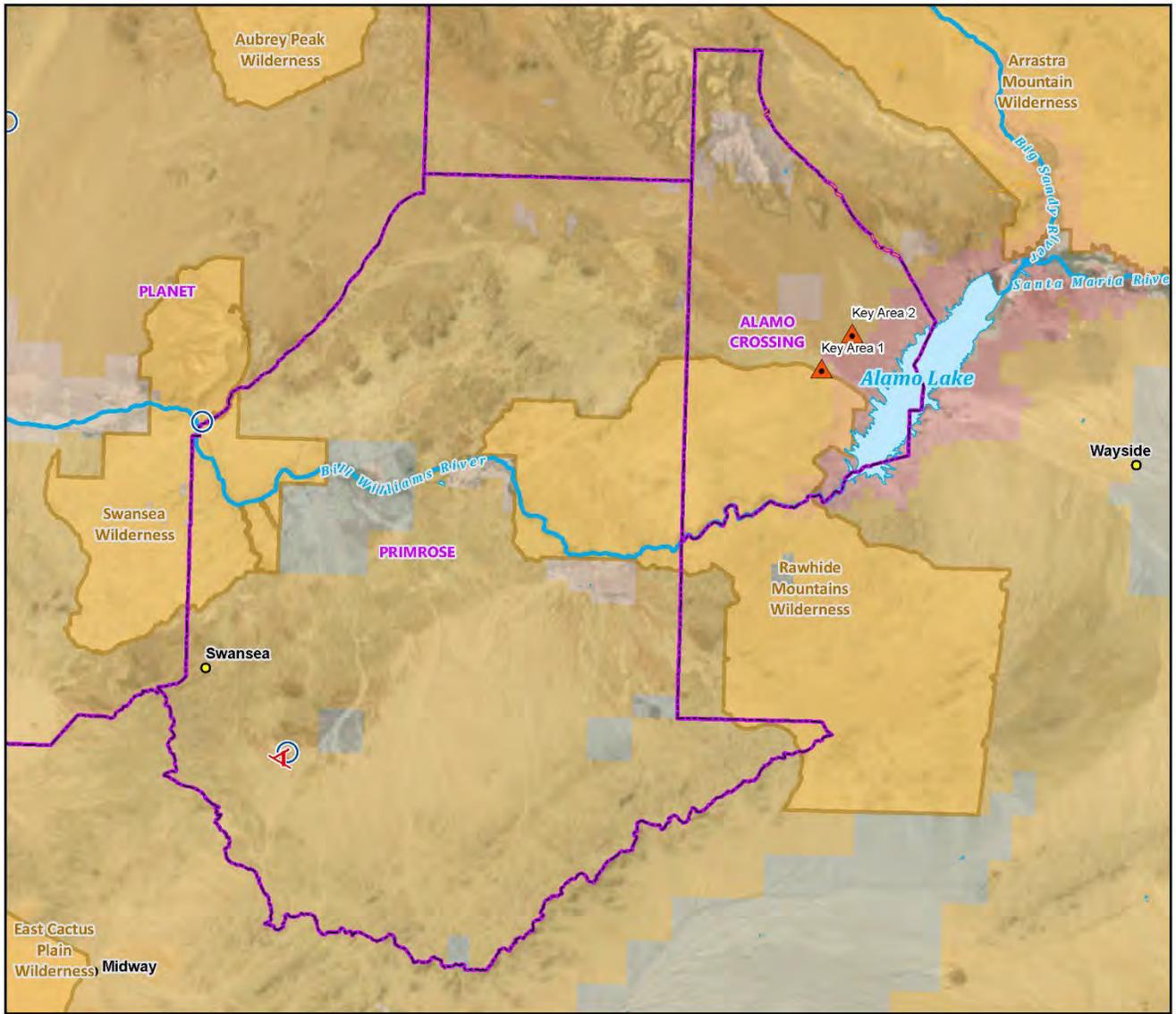


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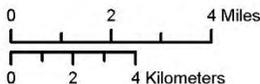
Range Water Resources - Primrose and Alamo Crossing

Colorado River District - Lake Havasu Field Office

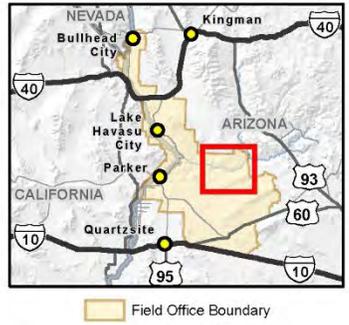
- | | | |
|--|---|---|
| Range Improvements - Water Resources
○ Well
Unfenced Detention Reservoir
--- Unknown | Land Health Evaluations
Monitoring Plots
Grazing Allotment

Administrative Units
● Town or Place of Interest | Surface Management Agency
Bureau of Land Management
Military
Private
State |
|--|---|---|

- Hydrology**
- River
 - Waterbody



Map Location within the Lake Havasu Field Office

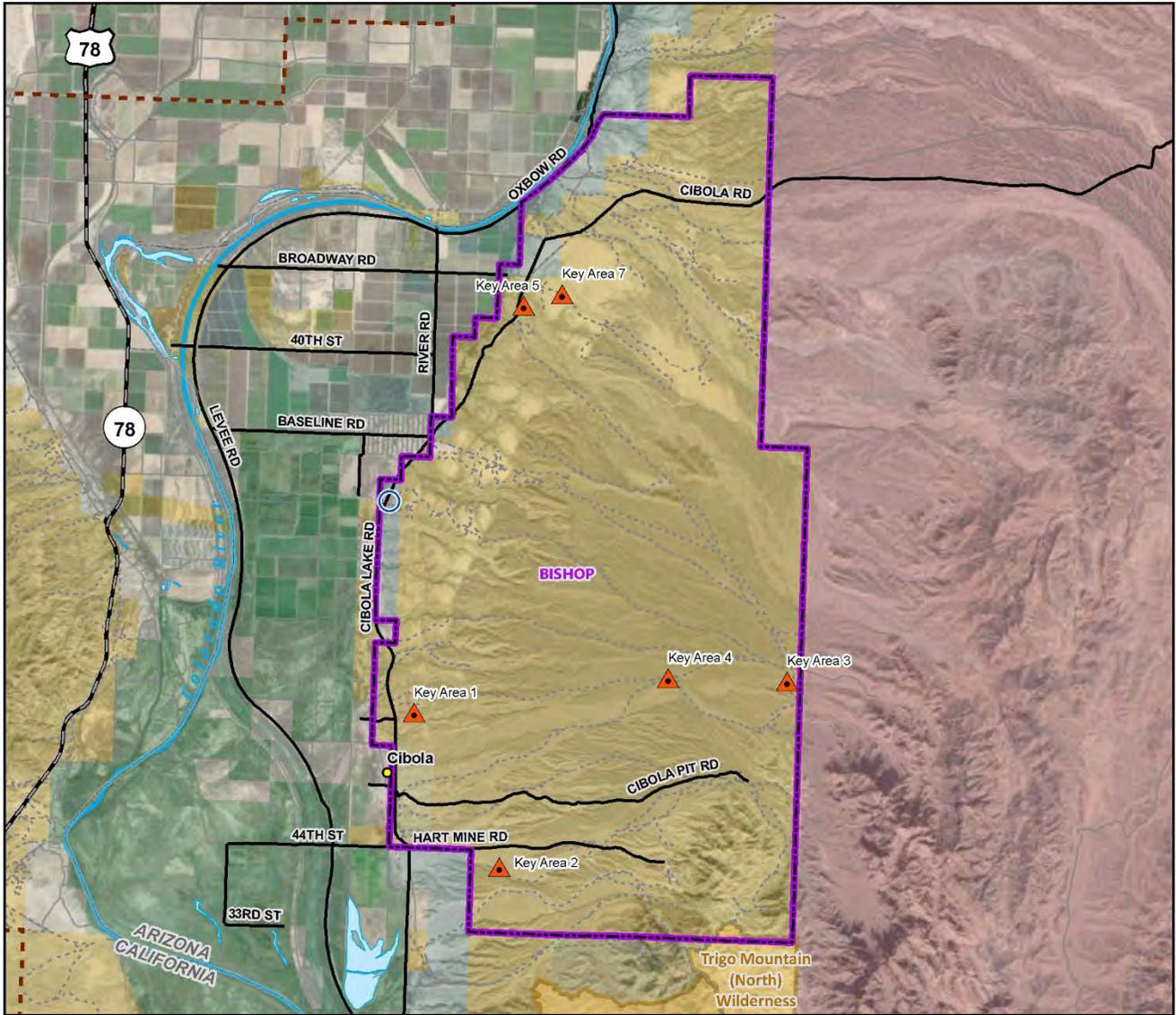


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 Date: 9/14/2021
 Map Scale: 1:220,000
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 AZ Reference System: U.S. PLSS GSR
 CA Reference System: U.S. PLSS SBM



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Range Water Resources - Bishop

Colorado River District - Yuma Field Office

Land Health Evaluations

- Monitoring Plots
- Grazing Allotment

Transportation

- U.S. Highway
- State Highway
- County or Major Routes
- Minor Routes
- Route Not Assessed

Hydrology

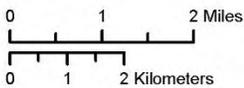
- Waterbody
- River

Administrative Units

- Town or Place of Interest
- Field Office Boundary
- State Boundary

Surface Management

- Bureau of Land Management
- Bureau of Reclamation
- Military
- Private
- State
- US Fish and Wildlife Service



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Map Produced by BLM Yuma Field Office Staff
 File: BLM_YFO_2021LHE_Bishop
 Date: 9/16/2021
 Map Scale: 1:120,000
 Coordinate System: NAD 1983 UTM Zone 12N
 AZ Reference System: U.S. PLSS GSR
 CA Reference System: U.S. PLSS SBM



Map Location within the Yuma Field Office



Field Office Boundary

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