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Safford Field Office

Safford, AZ

Land Health Evaluation Report

Zuni Concho Allotment

(No. 06170)

June 30, 2021

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List of Acronyms

ADEQ	Arizona Department of Environmental Quality
ADWR	Arizona Department of Water Resources
AGFD	Arizona Game and Fish Department
AUM	Animal Unit Month
BLM	Bureau of Land Management
CFR	Code of Federal Regulations
ESD	Ecological Site Description
°F	Degrees Fahrenheit
FEIS	Final Environmental Impact Statement
GPS	Global positioning system
HCPC	Historic Climax Plant Communities
HUC	Hydrologic Unit Code
IPaC	Information for Planning and Conservation
LHE	Land Health Evaluation
MLRA	Major Land Resource Area
NAD	North American Datum
NRCS	National Resources Conservation Service
p.z.	Precipitation zone
PRISM	Parameter-elevation Relationships on Independent Slopes Model
RMP	Resource Management Plan
ROD	Record of Decision
TEAMS	[USFS] Talent, Expertise, Agility, Mobility, and Simplicity Enterprise Unit
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
UTM	Universal Transverse Mercator
ZC-1	Zuni Concho Key Area 1
ZC-2	Zuni Concho Key Area 2

1. Introduction

The purpose of this land health evaluation (LHE) report is to evaluate whether the Arizona Standards for Rangeland Health are being achieved on the Zuni Concho Allotment, or if the standards are not being achieved, to determine if livestock are the causal factor for not achieving or making significant progress towards achieving land health standards. This evaluation is not a decision document but a stand-alone report that records the analysis and interpretation of the available inventory and monitoring data.

The Secretary of the Interior approved Bureau of Land Management (BLM) Arizona Standards for Rangeland Health and Guidelines for Grazing Administration (Standards and Guidelines) in April 1997. The Decision Record signed by the Arizona BLM State Director (April 1997) provides for full implementation of the Standards and Guidelines in Arizona BLM land use plans (LUPs). Standards and guidelines are implemented by the BLM through terms and conditions of grazing permits, leases, and other authorizations, grazing-related portions of activity plans (including Allotment Management Plans), and through range improvement-related activities.

Land health standards are measurable and attainable goals for the desired condition of the biological resources and physical components/characteristics of desert ecosystems found within the allotment.

The LHE Report ascertains:

1. If standards are being achieved, not achieved, and if significant progress is being made towards achievement of the land health.
2. Whether livestock grazing is a significant causal factor where it is determined that land health standards are not being achieved.

This report covers an evaluation period of 10 years (2007-2016). This is a standard evaluation period that provides the BLM the ability to collect an adequate amount of information related to grazing use and environmental factors pertaining to the permit renewal process.

1.1 Consultation Coordination and Cooperation

A letter to interested publics informing that the Zuni Concho Allotment was being considered for permit renewal was dated November 11, 2016. Changes were made and the letter was again sent out January 31, 2017. Coordination with the Zuni Concho Allotment permittee has been on-going. Data on special status species was obtained from the US Fish and Wildlife Service (USFWS) and the Arizona Game and Fish Department (AZGFD).

1.2 Definition of Arizona Standards for Rangeland Health and Guidelines for Grazing Administration

Arizona Standards for Rangeland Health are expressions of levels of physical and biological condition or degree of function required for healthy, sustainable rangelands and defines minimum resource conditions that must be achieved and maintained. Determination of rangeland health is based upon conformance with these standards.

Guidelines for grazing administration consider type and level of grazing use. Guidelines for grazing management are types of methods and practices determined to be appropriate to ensure the standards can be met or that significant progress can be made toward meeting the standard. Guidelines are tools that help managers and permittee's achieve standards.

Although the process of developing standards and guidelines applies to grazing administration, present rangeland health is the result of the interaction of many factors in addition to grazing livestock. Other contributing factors may include, but are not limited to, past land uses, land use restrictions, recreation, wildlife, rights-of-way, wild horses and burros, mining, fire, weather, and insects and disease (Arizona Standards and Guidelines, 1997).

The Arizona Standards and Guidelines identify three standards regarding (1) upland sites, (2) riparian-wetland sites, and (3) desired resource conditions based on specific indicators, as discussed in *Section 3 Objectives* of this document.

2. Allotment Profile and General Description

This section describes the location of the LHE as well as the physical description of the site such as acreage of land ownership, climatic data, soils, watersheds, and BLM range improvements.

2.1 Location

The Zuni Concho Allotment No. 06170 is located in Apache County, Arizona. The allotment is geographically split into two separate locations, both locations are managed by the same operator and they utilize the allotment as a whole. Throughout the document the locations will be distinguished by "Zuni Concho North" and "Zuni Concho West" for the purpose of clarity and to more easily identify the key areas and assessments that are presented in this LHE, although the allotment is geographically split Zuni Concho North and Zuni Concho West make up the Zuni Concho Allotment No. 06170 (Figure 1).

Zuni Concho West is located 15 miles west of the town of St. Johns. It is bordered by Arizona State Trust lands and private property. The southern portion of Zuni Concho West is bordered by the Little Ortega Lake BLM grazing allotment. Zuni Concho West lies predominantly north of State Route 61, and Route 180 divides the allotment to east and west. BLM lands are found approximately 6 miles west of Route 180.

Zuni Concho North is located 15 miles to the North of St. Johns. It is bordered on the north by the Zuni Wash Allotment, the west is partially bordered by the Zuni Wash Bridge Allotment and to the south it is bordered by the Carrizo Wash Allotment. The rest of the allotment is bordered by State and private lands unassociated with any BLM grazing lease.

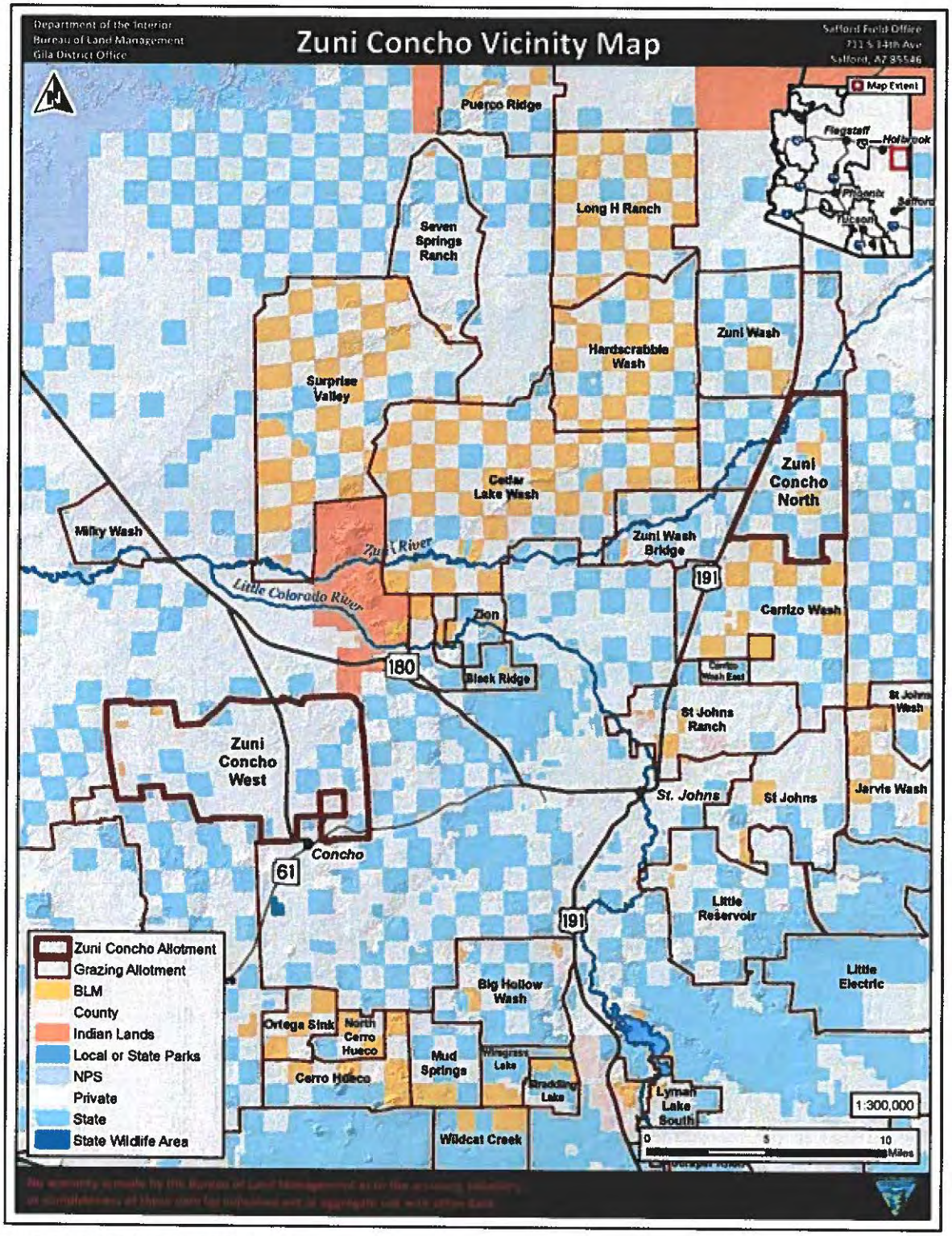

Figure 1 Zuni Concho Vicinity Map
Source: USDI BLM 2020

2.2 Physical Description

This section describes physical characteristics within the Zuni Concho Allotment.

2.2.1 Surface Land Ownership

The Zuni Concho Allotment is predominately comprised of private land intermixed with State Trust lands, and a small amount of Zuni Indian Reservation land. The BLM-administered land portion of the allotment is comprised of a total of 1,538 acres. Table 1 (below) breaks down the land ownership of the Zuni Concho Allotment by the North and West portions of the allotment.

Table *1.* Acreage of landownership for the Zuni Concho Allotment

Zuni Concho North		
Land Classification	**Acres**	**Percent**
Public Acres	1,207	8.3%
State Acres	6,995	48.1%
Private Land Acres	6,361	43.6%
Total Acres	**14,563**	**100%**
Zuni Concho West		
Land Classification	Acres	Percent
BLM- Administered Lands	331	1.04%
State Land	4,880	15.4%
Private Land	26,530	83.5%
Indian Lands	3	0.009%
Total Acres	**31,744**	**100%**

Source: BLM GIS data set

2.2.2 Climate Data

Precipitation

Precipitation data for the Zuni Concho Allotment and vicinity is provided by the Parameter-elevation Regressions on Independent Slopes Model (PRISM) Climate Group out of Oregon State University (Refer to Figure 2 below). Climatic data from this source is not collected from a single station but is modeled using data from many stations and physiographic factors in the area (PRISM 2017). The data presented is representative for both Zuni Concho North and Zuni Concho West.

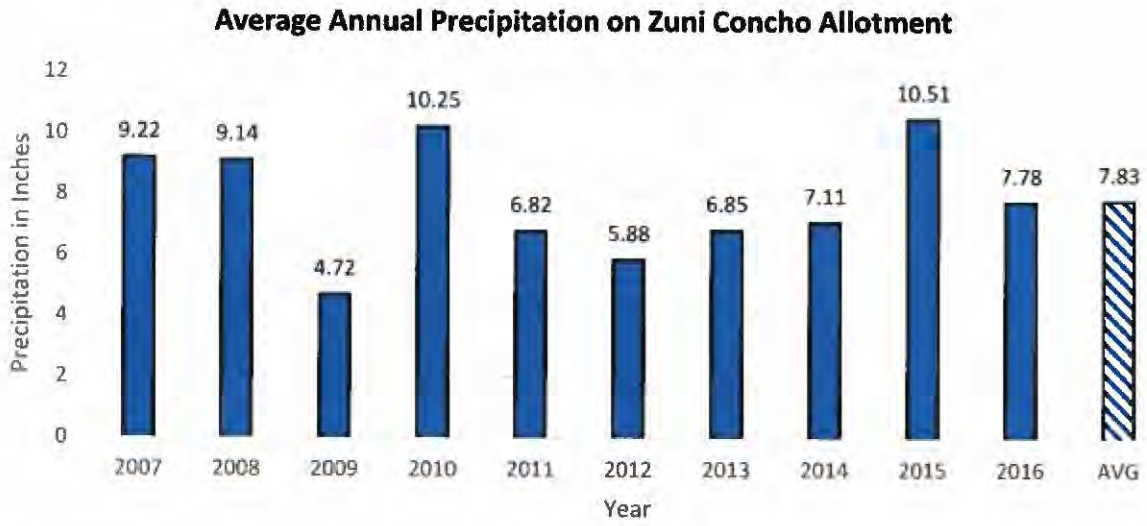

Figure 2 Average Annual Precipitation on Zuni Concho Allotment
Source: PRISM 2017

Temperature

The following table (Table 2) shows the average minimum, average maximum and average temperature per month reported on the Zuni Concho Allotment between 2007 and 2016.

Table 2. Temperature in Degrees Fahrenheit (°F) on the Zuni Concho Allotment

Month	Minimum	Maximum	Average
January	18	48	33
February	22	54	38
March	27	64	46
April	33	70	52
May	41	77	59
June	51	90	71
July	60	91	75
August	58	88	73
September	51	83	67
October	38	73	55
November	27	60	44
December	21	48	34
Annual Average			**54**

Source: PRISM 2017. Average Temp 2007-2016.

2.2.3 Soils

The soil composition on the Zuni Concho Allotment varies, as presented in Figure 3. The soils that occur on BLM-administered land are presented below in Tables 3 and 4 and are separated by the North and West portions of the allotment.

Table 3. Soil Composition of BLM-administered land on Zuni Concho West Portion

Soil Map Unit Name	Allotment Acres	Total Composition	BLM Acres	BLM Composition
Claysprings clay, 0 to 8 percent slopes	3,438	10.83%	0	0%
Clovis loamy sand, 0 to 8 percent slopes	8,391	26.43%	155	46.85%
Hubert gravelly loam, 0 to 8 percent slopes	6	0.02%	0	0%
Jocity sandy clay loam	143	0.45%	0	0%
Millett gravelly sandy loam, 8 to 30 percent slopes	1,899	5.98%	45	13.63%
Moenkopie loamy sand, 0 to 8 percent slopes	3,894	12.27%	18	5.33%
Moenkopie very rocky loamy sand, 0 to 30 percent slopes	2,835	8.93%	61	18.31%
Navajo clay	2,480	7.81%	0	0%
Navajo clay, 1 to 3 percent slopes	10	0.03%	0	0%
Navajo clay, 3 to 5 percent slopes	30	0.10%	0	0%
Navajo sandy clay loam, 3 to 5 percent slopes	44	0.14%	0	0%
Rough broken land	4,105	12.93%	2	.47%
Rudd complex, 0 to 8 percent slopes	412	1.30%	0	0%
Sandstone rock land	775	2.44%	1	0.37%
Stony rock land	360	1.13%	0	0%
Tours clay loam	1,215	3.83%	0	0%
Tours loam	1,701	5.36%	50	15.04%
Winona fine sandy loam, 0 to 8 percent slopes	7	0.02%	0	0%

Source: USDI BLM 2020, USDA NRCS 2015

Table 4. Soil Composition of BLM-administered land on Zuni Concho North Portion

Soil Map Unit Name	Allotment Acres	Total Composition	BLM Acres	BLM Composition
Badland	801	5.50%	111	9.23%
Clovis-Palma association, undulating	1,840	12.63%	0	0%
Clovis loamy sand, 0 to 8 percent slopes	743	5.10%	0	0%
Eroded land	1,265	8.69%	39	3.25%
Fruitland sandy loam, 1 to 8 percent slopes	293	2.01%	0	0%
Jocity sandy clay loam	77	0.53%	0	0%
Loamy alluvial land	158	1.09%	16	1.31%
Navajo clay	961	6.60%	29	2.36%
Rough broken land	467	3.21%	131	10.84%
Sandstone rock land	237	1.63%	50	4.15%
Sandy alluvial land	373	2.56%	0	0%
Tours clay loam	7,348	50.46%	831	68.86%

Source: USDI BLM 2020, USDA NRCS 2015

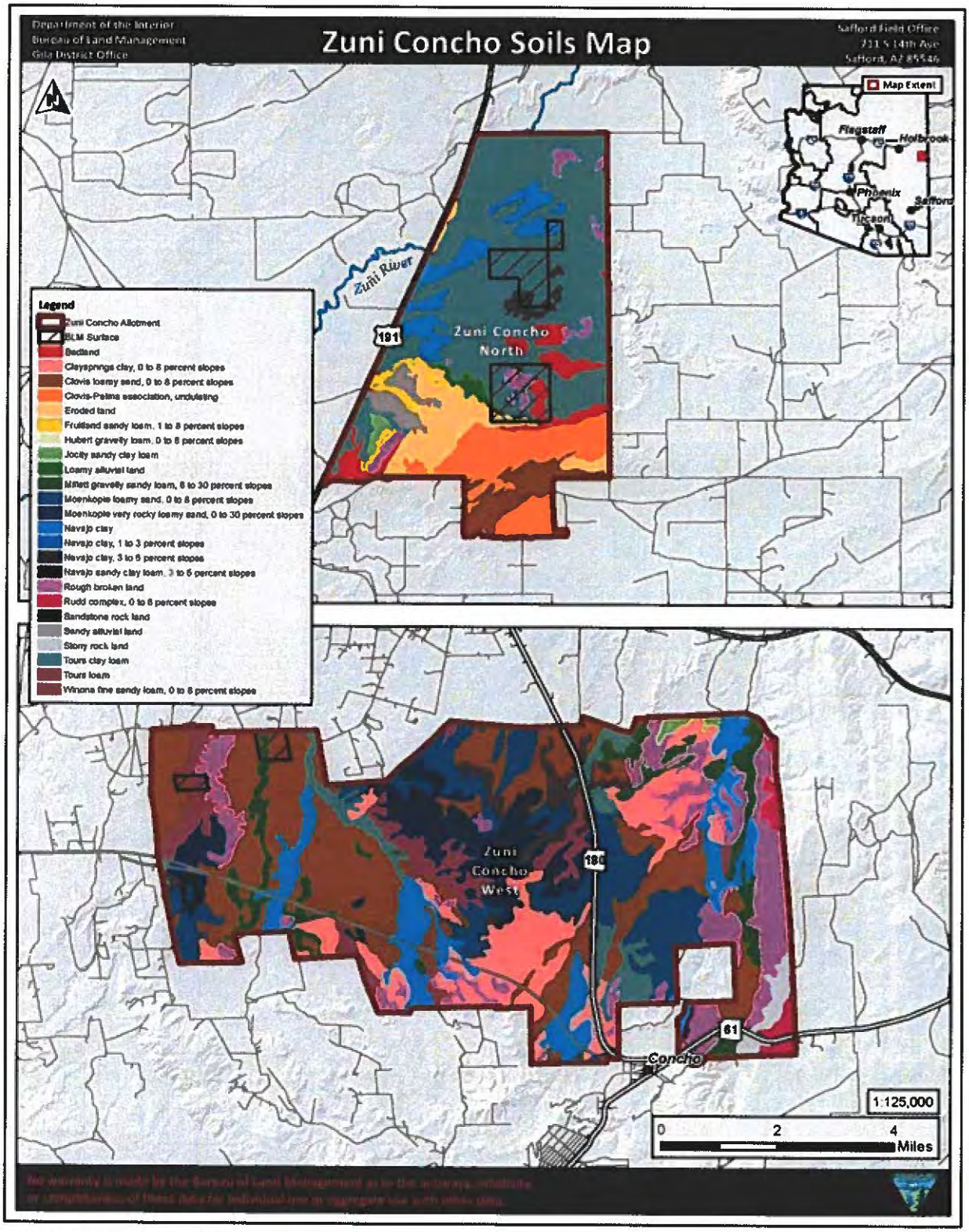

Figure 3 Zuni Concho Soils Map
Source: USDI BLM 2020, USDA NRCS 2015

A total of 13 soils occur on BLM-administered lands within the allotment, seven of these soils are described below as the make up 93 percent of the soil composition on BLM-administered lands within the Zuni Concho Allotment the remaining six soils are not described as they only account for 7 percent of the total soils present on BLM-administered lands.

Millet gravelly sandy loam, 8 to 30 percent slopes (Zuni Concho West Portion)

This soil type occurs on terraces, and hills with slopes ranging from 8 to 30 percent. Elevations range from 5,500 to 7,000 feet. The mean annual precipitation ranges from 10 to 16 inches. The mean annual temperature is 50 to 106 °F, with 130 to 140 days frost free. The soil is well drained and has medium runoff. Parent material consists of gravelly alluvium derived from quartzite and/or sandstone.

Tours Clay Loam (Zuni Concho North Portion)

Tours Clay Loam soils occur on alluvial fans and flood plains with slopes ranging from 0 to 5 percent. Elevations range from 5,400 feet to 7,000 feet. The mean annual precipitation is 8 to 12 inches. The mean annual air temperature is 48 to 54 °F, with 120 to 140 days frost free. The soil is well drained and has low runoff.

Tours Loam (Zuni Concho West Portion)

Tours Loam soils occur on alluvial fans and flood plains with slopes ranging from 0 to 5 percent. Elevations range from 5,400 feet to 7,000 feet. The mean annual precipitation is 8 to 12 inches. The mean annual air temperature is 48 to 54 °F, with 120 to 140 days frost free. The soil is well drained and has low runoff. Parent material consists of alluvium derived from sandstone and shale and/or basalt

Moenkopie very rocky loamy Sand, 0 to 30 percent slopes (Zuni Concho West Portion)

This soil type occurs on hills, and plains with slopes ranging from 0 to 30 percent. Elevations range from 5,400 to 6,500 feet. The mean annual precipitation ranges from 8 to 12 inches. The mean annual temperature is 52 to 55°F, with 130 to 140 days frost free. The soil is well drained and has high runoff. Parent material consists of residuum weathered from sandstone

Clovis Loamy Sand 0 to 8 Percent Slopes (Zuni Concho West Portion)

This soil type occurs on plains with slopes ranging from 0 to 8 percent. Elevations range from 5,400 feet to 7,000 feet. The mean annual precipitation is 12 to 16 inches. The mean annual air temperature is 52 to 55 °F, with 130 to 140 days frost free. The soil is well drained and has low runoff. Parent material consists of Eolian sands and/or gravelly alluvium derived from metamorphic and sedimentary rock.

Badland (Zuni Concho North Portion)

Extensively eroded lands, no soil description associated.

Rough Broken Land (Zuni Concho North & West Portions)

This soil type occurs on terraces and breaks with slopes ranging from 10 to 60 percent. Elevations range from 5,400 to 7,000 feet. The mean annual precipitation ranges from 8 to 16 inches. The mean annual temperature is 48 to 55 °F, with 120 to 140 days frost free. The soil has very high runoff.

2.2.4 Watersheds

Zuni Concho North

All BLM-administered land on the Zuni Concho North portion of the allotment lies within the Lower Zuni Concho watershed (Hydrologic Unit Code (HUC)-10 1502000409). The Zuni Concho is an intermittent stream that flows through private and State Trust land within the northern part of Zuni Concho North, approximately 0.70 miles from the nearest BLM-administered section of the allotment. The Zuni Concho is a tributary to the Little Colorado River, with its confluence approximately 25 miles west of Zuni Concho North. The Little Colorado River is an intermittent stream with some reaches flowing perennially closer to its headwaters and is one of two major tributaries in Arizona to the Colorado River. The Little Colorado River drains in the Little Colorado Basin (HUC-6 150200), which has a drainage area of 26,000 square miles extending into New Mexico.

The allotment lies entirely within the "Little Colorado River Plateau" Arizona Department of Water Resources (ADWR) Groundwater Basin and is not within an ADWR Active Management Area. The groundwater basin consists of the following aquifers: unconsolidated alluvium from streams, volcanic bedrock (Lakeside-Pinetop Aquifer), and consolidated sedimentary aquifers: Bidahochi, C, D, N, Springerville, and White Mountain Aquifers (USDI EPA N.d.).

The majority of surface waters occurring on BLM-administered land within the Zuni Concho North are ephemeral washes and natural depressions, primarily having peak flows from precipitation events. An unnamed, intermittent pond lies on BLM-administered land with an associated stock pond that are fed by an unnamed ephemeral tributary. Pine Springs Wash, an intermittent tributary to Zuni Concho, flows through state and private land approximately 0.25 miles north of the nearest BLM-administered section of the allotment. Flowing Well, an artesian well, and associated unnamed perennial stream are also tributaries to the Zuni Concho with its headwaters on state land approximately 0.75 miles southwest of the nearest BLM-administered section of the allotment. The majority of the allotment is located within a FEMA Zone D floodplain meaning undetermined but possible flood hazard. The ephemeral streams on the northern sections of BLM-administered lands, closest to Zuni Concho, lie in 100-year floodplains, with a one percent chance of flooding in any single year. Water quality is monitored and listed by Arizona Department of Environmental Quality (ADEQ) for EPA 303(d) waterbody impairments under the federal Clean Water Act, and there are no impaired waters on the allotment, nor directly downstream of the allotment.

Zuni Concho West

All of BLM-administered lands on the Zuni Concho West portion of the allotment lie within the Oso Draw watershed (HUC-10 1502000204). Oso Draw is an ephemeral stream, with some upstream reaches having artificial perennial flows, and is a tributary to the Little Colorado River, with its confluence approximately 5.25 miles north of the Zuni Concho West Allotment. The Little Colorado River is an intermittent stream with some reaches flowing perennially closer to its headwaters and is one of two major tributaries in Arizona to the Colorado River. The Little Colorado River drains the Little Colorado Basin (HUC-6 150200), which has a drainage area of 26,000 square miles extending into New Mexico.

The allotment lies entirely within the "Little Colorado River Plateau" ADWR Groundwater Basin and is not within an ADWR Active Management Area. The groundwater basin consists of

the following aquifers: unconsolidated alluvium from streams, volcanic bedrock (Lakeside-Pinetop Aquifer), and consolidated sedimentary aquifers: Bidahochi, C, D, N, Springerville, and White Mountain Aquifers (USDI EPA N.d.).

The majority of surface waters occurring on BLM-administered lands within the Zuni Concho West portion are ephemeral washes and natural depressions, primarily having peak flows from precipitation events. Manuel Seep Draw is an ephemeral stream that flows through the western BLM-administered sections of the allotment and confluences with Oso Draw north of the allotment. The northern BLM-administered section of the allotment has one stock pond that receives flows from precipitation runoff. On private and state land in the central sections of the allotment are several manmade tanks or ponds, these developments are what gives Oso Draw its perennial flows. They include Dad Patterson Tank, Patterson Tank, Fence line Tank, and an unnamed tank associated with Haumont Dam. The majority of the allotment is located within a FEMA Zone D floodplain meaning 'undetermined but possible flood hazard'. The ephemeral streams on the northern sections of BLM-administered lands, closest to Zuni Concho, lie in 100-year floodplains, with a 1 percent chance of flooding in any single year. Water quality is monitored and listed by ADEQ for EPA 303(d) waterbody impairments under the federal Clean Water Act, and there are no impaired waters on the allotment, nor directly downstream of the allotment.

Proper Functioning Condition (PFC) rationale for the unnamed intermittent pond on BLM:

The unnamed, intermittent pond that lies on BLM-administered lands within the Zuni Concho North portion of the allotment, is a developed pond that collects precipitation runoff. Developed waters have direct alterations present that create predominantly artificial conditions and an altered potential. PFC assessments (TR 1737-15; Dickard et al 2015) are designed to rate the functionality of a water source against its own potential, so if conditions are present that significantly alter that potential, the assessment is not reliable for that source. Therefore, PFC was not conducted for this unnamed pond.

2.2.5 Range Improvements

Range improvement projects that have assigned maintenance responsibility on the allotment are listed in Table 5 and Figure 4 (below). Only range improvements on BLM-administered lands are considered for this evaluation.

Table 5. Range Improvements

Range Improvement Name	Project Number	Location	Zuni Concho North or Zuni Concho West
Patterson Fencing	007761	T. 13N, R. 25E Sec 4. NW1/4	Zuni Concho West
Old Mail Station Well	007770	T. 13N, R. 25E Sec 4. SE1/4 NW1/4	Zuni Concho West
Rincon Tank	007771	T. 15N, R. 29E Sec 26. SE1/4 NE1/4	Zuni Concho North
Zuni Dike	007772	T. 15N, R. 29E Sec 14. SE1/4 NE1/4	Zuni Concho North

Source: USDI BLM 2020

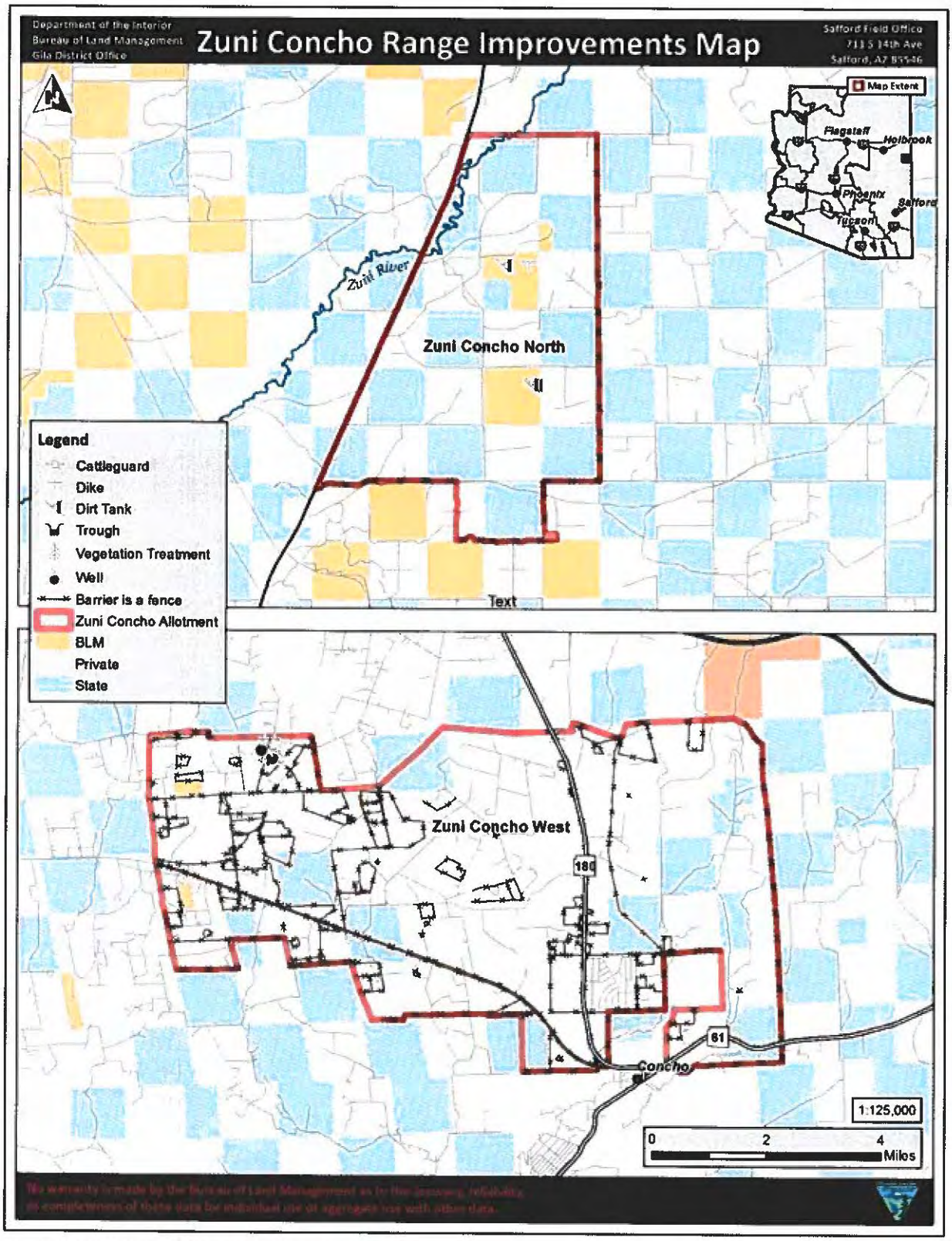

Figure 4 Zuni Concho Range Improvement Map
Source: USDI BLM 2020

2.3 Biological Resources

This section discusses the biological resources within the Zuni Concho Allotment.

2.3.1 Major Land Resource Area

The Zuni Concho Allotment is located in Major Land Resource Area (MLRA) 35—Colorado Plateau. A MLRA is a broad geographic area that is characterized by a particular pattern of soils, climate, water resources, vegetation, and land use. Each MLRA, in which rangeland and forestland occur, is further divided into sub-resource areas and ecological sites, The Colorado River Plateau MLRA is divided into nine sub-resource areas. The Zuni Concho Allotment lies within the Mixed Grass Plains (35-1) sub-resource area, and the Colorado Plateau Shrub-Grasslands (35-2).

2.3.2 Ecological Sites

Ecological sites provide a consistent framework for classifying and describing rangeland soils and vegetation thereby delineating land units that share similar capabilities to respond to management activities or disturbance. The ecological site descriptions (ESDs) are developed by the National Resources Conservation Service (NRCS). The two ESDs that occur on the Zuni Concho Allotment at the key area monitoring points will be carried forward in the LHE and are summarized below (Refer to section **5.2.2 Key Area Objectives** for more information). Detailed NRCS ESD reports for each ESD are stored and can be accessed online at https://edit.jornada.nmsu.edu/. The ESD reference sheets are considered provisional, meaning the ecological site has undergone quality control and quality assurance, it contains a working state and transition model with enough information to identify the ecological site.

Historic climax plant community (HCPC), or reference state, is the potential plant community that can develop on a relatively undisturbed site according to the following factors: soils, topography, and climate. These collective factors form the basis of ecological sites that classify rangeland types. Table 6 and Figure 5 below show the key monitoring areas and the corresponding ecological site.

Table 6. Ecological sites at Key Area Monitoring Points

Ecological Site	ESD ID	Key Monitoring Area	UTM Coordinates
Clay Loam Wash 10-14" p.z.	DX035X01I104	ZC-1 (North)	660922, 3842972
Loamy Upland 10-14" p.z.	DX035X01I113	ZC-2 (West)	617593, 3825073

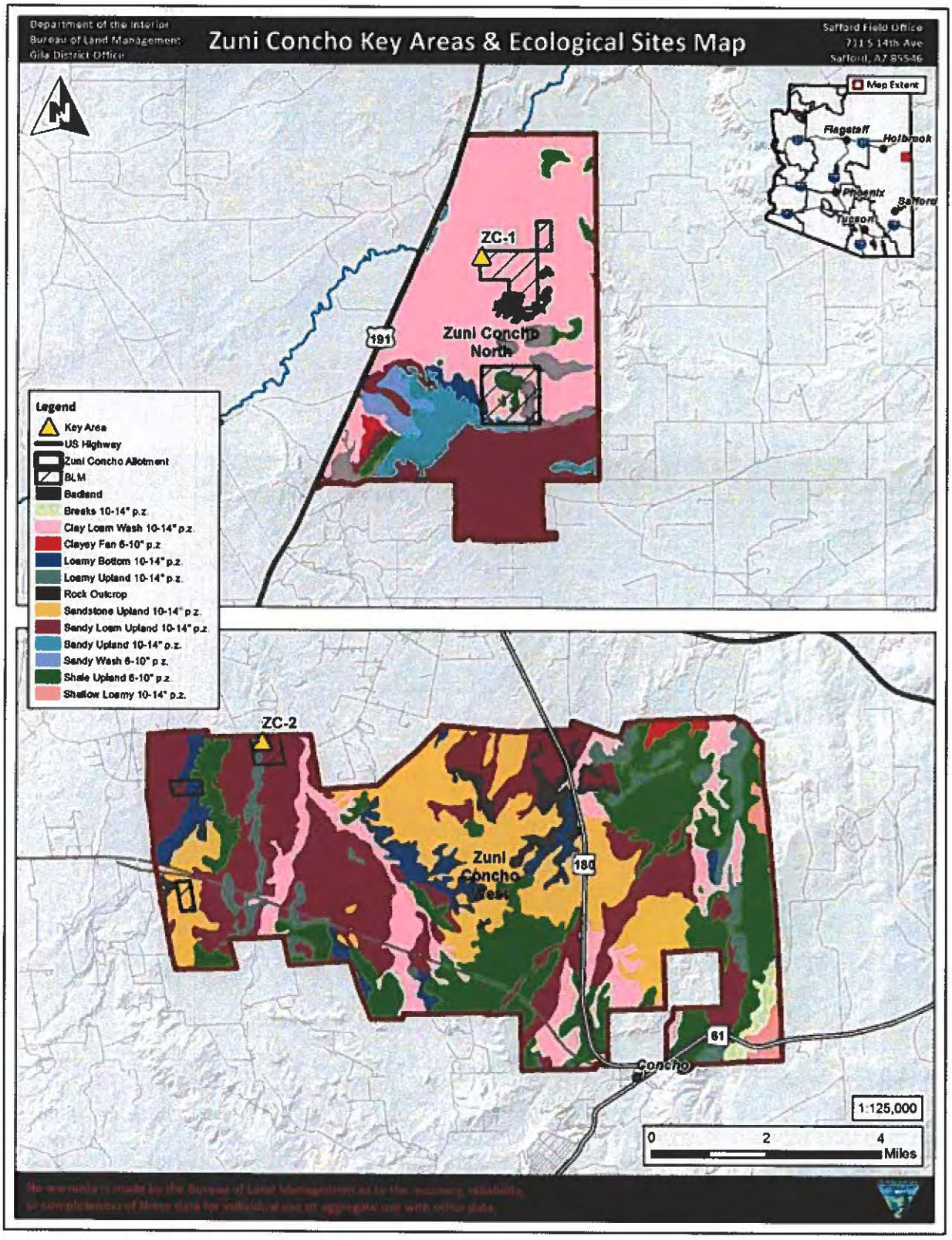

Figure 5 Zuni Concho Key Areas and Ecological Sites Map
Source USDI BLM 2020

Clay Loam Wash 10-14" p.z. (DX035X011104)

This ecological site occurs in Common Resource Area 35.1 – the Colorado Plateau Mixed Grass Plains. Elevations range from 4,800 to 6,300 feet and precipitation averages 10 to 14 inches per year. Vegetation includes Stipa species, Indian ricegrass, galleta, blue grama, fourwing saltbush winterfat and cliffrose. The site is characterized by a sequence of flat to gently dipping sedimentary rocks eroded into plateaus, valleys and deep canyons. Sedimentary rock classes dominate the plateau with volcanic fields occurring for the most part near its margin. Fifty to sixty percent of moisture falls as rain from July through September and is the most effective moisture for plant growth.

Loamy Upland 10-14" p.z. (DX035X01I113)

This ecological site occurs in Common Resource Area 35.1 – the Colorado Plateau Shrub-Grasslands. Elevations range from 4,800 to 6,300 feet and precipitation averages 10 to 14 inches per year. Vegetation includes Stipa species, Indian ricegrass, galleta, blue grama, fourwing saltbush, winterfat and cliffrose. The site is characterized by a sequence of flat to gently dipping sedimentary rocks eroded into plateaus, valleys, and deep canyons. Sedimentary rock classes dominate the plateau with volcanic fields occurring for the most part near its margin. Fifty to sixty percent of moisture falls as rain from July through September and is the most effective moisture for plant growth.

2.3.3. Wildlife Resources

This section discusses the wildlife resources in and around the Zuni Concho Allotment, including Federally listed threatened and endangered (T&E) species, BLM special status species, and species of economic and recreational importance. The analysis focuses on the BLM-administered lands of the Zuni Concho Allotment. Refer to **Appendix A** for a complete list of species.

Threatened and Endangered Species

The grazing program for the BLM Gila District, including grazing activities within the Zuni Concho Allotment, was assessed pursuant to Section 7 of the Endangered Species Act (ESA) to determine whether the program would jeopardize the continued existence of a T&E species and/or their designated or proposed critical habitat. The U.S. Fish and Wildlife Service (USFWS) rendered a Biological Opinion (BO) on the Gila District Livestock Grazing Program #22410-2006-F-0414 (2012). The BO determined that no conservation measures were needed for the Zuni Concho Allotment due to the absence of the consulted listed species and/or designated critical habitat. Additionally, on March 1, 2021 a generated report using the USFWS Information for Planning and Conservation (IPaC) website indicated a total of six Federally listed or proposed species were known or expected to occur within the allotment: gray wolf, yellow-billed cuckoo, northern Mexican gartersnake, Chiricahua leopard frog, Little Colorado Spinedace, and Zuni Bluehead Sucker (USDI USFWS N.d.; **Appendix A**). A report generated on December 14, 2020 from the Arizona Game and Fish Department (AZGFD) Environmental Online Review Tool (AZGFD, N.d.) indicated that an additional three Federally listed species have the potential to occur within five miles of the allotment boundary and/or within the allotment based on modeling: black-footed ferret, jaguar, and Mexican spotted owl.

The IPaC query indicated the gray wolf as being potentially present within the allotment; however, Mexican wolf is the correct common name of *Canis lupus baileyi* and will be referred

to as Mexican wolf in this document. This species requires areas with sufficient prey populations, such as deer and elk, and where human-induced mortality is controlled. Current populations are typically associated with evergreen pine-oak woodlands, pinyon juniper woodlands, and mixed-conifer montane forests. The Mexican Wolf Experimental Population Area encompasses Arizona and New Mexico from Interstate 40 south to Mexico. Based on the most current information, species occurrence in Arizona is primarily on eastern/northeastern portions of the Apache-Sitgreaves National Forest, eastern portions of the San Carlos Apache Reservation, and eastern portions of the Fort Apache Indian Reservation according to the Mexican Wolf Recovery Program Monthly Update from January 2020 (MWIFT 2020). Due to an absence of forested habitat on the BLM-administered portions of the allotment, the Mexican spotted owl and Mexican gray wolf are expected to be absent from the BLM-administered lands of the allotment. Overall, the BLM-administered portions of the allotment lack suitable forested habitat to support Mexican gray wolves but is located within a Mexican wolf experimental population area and may be used by wolves for movement between blocks of suitable habitat.

The allotment lacks the basic components that define jaguar habitat based on the description provided by the USDI USFWS (2013) Federal Register Notice for designating critical habitat. The jaguar is most commonly found in warm, tropical climates that are usually associated with water. Jaguars are rarely found in extensive arid areas and generally avoid open country like grasslands and desertscrub as they prefer closed vegetative structures of nearly every tropical forest type. Due to the Zuni Concho Allotment's biotic communities consisting primarily of the Plains and Great Basin Grassland community, jaguars are expected to be absent from the BLM-administered lands of the allotment.

The black-footed ferret is associated with native grassland communities and relies solely on prairie dog burrows for shelter and suitable dens to raise their young (USDI USFWS 2017). They are highly specialized predators that rely on prairie dogs for survival, which make up more than 90 percent of their diet (USDI USFWS 2017). Gunnison prairie dogs were noted in the AZGFD species report as having the potential to occur in this area based on predicted range models; however, no prairie dogs have been observed on the allotment. Based on the ESDs of this allotment and the results of monitoring data, as described below in Section 6, BLM-administered portions of the allotment contain suitable habitat to support this species if it was present. Due to the lack of their primary prey species and source for burrows, this species is expected to be absent from the allotment.

Although the IPaC and AZGFD species reports did not include the northern Aplomado falcon, the State of Arizona is considered to be part of the 10(j) management area for the nonessential experimental population. The northern Aplomado falcon is one of three subspecies of the Aplomado falcon, and the only subspecies recorded in the United States. Falcons require open habitats that have scattered trees for hunting, roosting, and nesting and an understory of grass and shrubs (USDI USFWS 2005). Habitat types include yucca-covered ridges in coastal prairie, riparian woodland in open grassland, palm and oak savannas, deciduous woodland, yucca-mesquite grasslands, and a variety of other open desert grassland and shrub habitats (USDI USFWS 2005). According to Truett (2002), there have been no verified sightings of Aplomado falcons in Arizona since 1940, and the northern Aplomado falcon is now considered to be extirpated from the State of Arizona. There is a very limited distribution in the U.S. in Texas and New Mexico. The species' historical range extends into southeastern Arizona; however, the species is still considered to be extirpated from Arizona with no recent records of the species. In

Arizona, no documented nesting attempts have occurred since 1940 (AZGFD 2021), or since 2006 when the whole state of Arizona was included in the 10(j) area designation (50 CFR Part 17, 42298-42315). There was a reported observation in 1977 west of Rodeo, New Mexico in Cochise County, Arizona; however, sight records since 1940 are unsubstantiated, and the falcon is considered possibly extirpated in Arizona (per conversation with USFWS 2021; AZGFD 2021). There is no designated or proposed critical habitat for this species. Based on monitoring results, the allotment lacks the riparian-woodland habitat component as well as a productive grassland understory; therefore, the northern Aplomado falcon is expected to be absent from the allotment.

Overall, due to the lack of water sources and riparian habitat, the yellow-billed cuckoo, northern Mexican gartersnake, and Chiricahua leopard frog are expected to be absent from the allotment.

The western yellow-billed cuckoo is a riparian obligate species that utilizes cottonwood gallery forests and may use upland areas for foraging. The allotment does not contain the primary riparian habitat; however, yellow-billed cuckoos may utilize the upland areas temporarily during times of migration. The northern Mexican gartersnake is known to be found in both lotic and lentic habitats including cienegas, stock tanks, and river habitats including pools and backwaters (USDI USFWS 2014). There are no recorded observations of the northern Mexican gartersnake being present within the allotment.

The Chiricahua leopard frog has various habitat requirements for each stage of its life history. Some of the most important habitat features include permanent or nearly permanent water that is free or relatively free from non-native predators (SESAT 2008). They also require shallow water with emergent and perimeter vegetation that provide areas for egg deposition, tadpole and adult thermoregulation sites, and foraging sites (SESAT 2008). Deeper water, root masses, and undercut banks provide refuge from predators and potential hibernacula during the winter (SESAT 2008). It is also important that the water is relatively clean and not overly polluted by livestock excrement or chemical pollutants (SESAT 2008).

The Zuni Bluehead Sucker, Little Colorado Spinedace, and the Apache trout are not expected to be present within the BLM-administered portions of the allotment due to the absence of perennial riparian areas.

BLM Special Status Species

The BLM sensitive species that have suitable habitat present and/or are known to exist or have the potential to exist within this allotment are the bald eagle (wintering only), ferruginous hawk, golden eagle, western burrowing owl, pinyon jay, Arizona myotis, banner-tailed kangaroo rat, Gunnison prairie dog, spotted bat, pale Townsend's big-eared bat, and the Northern leopard frog. A total of six USFWS Birds of Conservation Concern (USDI USFWS 2008), not already addressed as BLM sensitive species or T&E species, have the potential to occur within the allotment and are included in **Appendix A**. The Birds of Conservation Concern 2008 list considers bird species that are nongame species, gamebirds without a hunting season, subsistence-hunted nongame birds in Alaska, and Endangered Species Act candidates, proposed, and recently delisted species (USDI USFWS 2008). Data derived from the Arizona Game and Fish Department Environmental Online Review Tool (AZGFD, N.d.) was used for the migratory bird analysis.

The allotment offers an array of habitats for migratory birds, providing valuable food and cover. Migratory species of concern that have the highest potential to occur on the allotment include several raptor species (i.e., hawks, eagles, owls, falcons) and a variety of passerine species. Bird species utilize the grassland, open shrub, and rocky outcrop habitat for hunting prey. No surveys have been conducted specifically within this allotment for this assessment to determine presence, but these species have the potential of occurring if habitat is available.

The Gunnison prairie dog and banner-tailed kangaroo rat utilize grasslands and open shrub habitat for burrowing and foraging. Both species were noted in the AZGFD species report as having the potential to occur in this area based on predicted range models; however, no prairie dogs have been observed on the allotment. Bat species may occur on the allotment if roosting habitat is available. Generally, the composition, structure, and distribution of habitat for all classifications of sensitive species, are intact and would be suitable for use if the species were present.

Species of Economic and Recreational Importance

Game species predicted to occur within, or within five miles of, the Zuni Concho Allotment include the America pronghorn, mountain lion, mule deer, scaled quail, and the mourning dove (AZGFD N.d.). Mountain lions can be found in deserts, mountains, deciduous forests, lowlands, canyons, prairies and more, and could use the allotment to migrate between more suitable patches of habitat, such as rocky outcrops or areas with dense vegetation. Grasslands with dispersed shrub thickets, cacti and palo verde offer forage and cover habitat for pronghorn, mule deer, scaled quail, and the mourning dove.

2.4 Special Management Areas

There are no special management areas within the Zuni Concho Allotment

2.5 Recreation Areas

There are no developed recreation sites within the allotment. There is vehicular access to public lands within the allotment. Dispersed recreation primarily involves small and big game hunting, target shooting, and off-highway vehicle operation.

2.6 Cultural Resources

Guidelines 3-7 in the Arizona Standards and Guidelines provides that, "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".

A Class I cultural resources review was completed on May 3, 2021 by Safford Field Office Archaeologist George Maloof. This review was to note the presence of any archeological sites, properties of traditional religious and cultural importance (i.e., traditional cultural properties), and sacred sites. No known cultural resources were observed.

3. Grazing Management

This section discusses the grazing history, permitted use, and terms and conditions on the current lease for Zuni Concho Allotment.

3.1 Grazing History

The BLM grazing lease for the Zuni Concho Allotment authorizes six cattle year-round at 100 percent Public Lands (PL) for a total of 72 Animal Unit Month (AUM). No changes have been made to the permitted AUM use on the allotment during the evaluation period. The carrying capacity for the whole allotment is not set by the BLM; instead, the lessee is billed for the available forage utilized on public lands only.

3.2 Grazing System

Grazing management on the Zuni Concho Allotment consists of grazing on private land, State Trust land, and BLM-administered land. As a Section 15 lease, permitted use is for BLM-administered land only and is authorized under Section 15 of the Taylor Grazing Act. The BLM grazing lease allows for year-round use on all BLM-administered land within the allotment.

3.3 Mandatory Terms and Conditions for Permitted Use

Grazing use on the Zuni Concho Allotment is in accordance with the terms and conditions of the grazing lease. A summary of the current permitted use for the allotment is provided in Table 7.

Table 7. Current Permitted use on Zuni Concho Allotment

Allotment Name/ Number	Livestock Number/Kind	Grazing Period Begin End	Percent Public Land	Active Use (AUM)
Zuni Concho (No. 06170)	6 Cattle	3/1 2/28 Yearlong	100	72

Other Terms and Conditions:

1. In order to improve livestock distribution on the public lands, all salt blocks and /or mineral supplements will not be placed within a ¼ mile of any riparian area, wetland meadow, or watering facility (either permanent or temporary) unless stipulated through a written agreement or decision in accordance with 43 CFR 4130.3-2(c).

2. If in connection with operations under this authorization, any human remains, funerary objects, sacred objects of cultural patrimony as defined in the Native American Graves Protection and Repatriation Act (P/L/ 101-601; 104 Stat. 3048; 25 U.S.C. 3001) are discovered, the permittee/lessee shall stop operations in the immediate area of the discovery, protect the remains and objects, and immediately notify the Authorized Officer of the discovery. The permittee/lessee shall continue to protect the immediate area of the discovery until notified by the Program Manager that operations may resume.

4. Rangeland Inventory and Monitoring Methodology

4.1 Monitoring Protocol

Monitoring occurred on the Zuni Concho North and West portions of the Allotment at key areas ZC-1 and ZC-2. Quantitative measurements for cover and species composition were collected along each transect and were analyzed in conjunction with qualitative indicators of quality, hydrologic function, and biological health. This was completed to assess the existing conditions within the ecological sites Clay Loam Wash 10-14" p.z. (DX035X01I104) and Loamy Upland 10-14" p.z. (DX035X01I113). The existing conditions were compared to site specific reference conditions established by the NRCS, which are considered to be representative of relatively undisturbed sites within a given soil-plant community type. This comparison between existing and reference conditions determines the level of departure from the potential natural community. The location of the key areas occurred on BLM-administered land and is approximately one mile from water, which is expected to adequately represent livestock utilization for the majority of the allotment due to the distance cattle travel from water. This distance from water is appropriate for indicating vegetation changes that would be tied to livestock management. The key areas are a representative sample of the majority of the grazing allotment based on the vegetation composition, soils, vegetative production, and overall grazing management on BLM-administered land for the allotment.

The key areas were recorded using a global positioning system (GPS) using a projection of North American Datum (NAD) 83. Inventory and monitoring data are provided in **Appendix B**.

4.1.1 Line Point Intercept

The method used to obtain transect data pertaining to species composition and soil cover is line point intercept (LPI), This method consists of a horizontal, linear measurement of plant intercepts along the course of a line (tape) 50 meters in length. The LPI method is rapid and accurate for measuring occurrence of grass or grass-like plants, forbs, shrubs, and trees in which vegetation composition is extrapolated. It also quantifies soil cover, including vegetation, litter, rocks, and biotic crusts. These measurements are indicators of wind and water erosion, water infiltration, and the ability of the site to resist and recover from degradation. A summary of the LPI measurements is incorporated into the discussions for Standards 1 and 3.

4.1.2 Indicators of Rangeland Health

The five steps for Interpreting Indicators of Rangeland Health (IIRH) are protocols for evaluating the three rangeland health attributes (Soil and Site Stability, Hydrologic Function, and Biotic Integrity), as outlined in Technical Reference 1734-6 (Pellant et al. 2005). They are:

Step 1. Identify the Key Area; Determine the Soil and Ecological Site

Step 2. Obtain or Develop the Reference Sheet and the Corresponding Evaluation Matrix

Step 3. Collect Supplementary Information

Step 4. Rate the 17 Indicators on the Evaluation Sheet

Step 5. Determine the Functional Status of the Three Rangeland Health Attributes:

1. Soil and site stability (S) – The capacity of an area to limit redistribution and loss of soil resources (including nutrients and organic matter) by wind and water.
2. Hydrologic function (H) – The capacity of an area to capture, store, and safely release water from rainfall, run-on and snowmelt (when relevant), to resist a reduction in this capacity, and to recover this capacity when a reduction does occur.
3. Biotic integrity (B) – The capacity of the biotic community to support ecological processes within the normal range of variability expected for the site, to resist a loss in the capacity to support these processes, and to recover this capacity when losses do occur. The biotic community include plants, animals, and microorganisms occurring both above and below ground.

The IIRH provides information on the functioning of ecological processes (water cycle, energy flow, and nutrient cycle) relative to the reference state for the ecological site or other functionally similar unit for that land area. This assessment provides information that is not available with other methods of evaluation. It gives an indication of the status of the three rangeland attributes chosen to represent the health of the "key area" (i.e., the area where the evaluation of the rangeland health attributes occurs). The following are the 17 indicators that are evaluated during an IIRH assessment and the attribute(s) they measure:

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

17. Reproductive Capability of Perennial Plants: B

Attribute ratings reflect the degree of departure from expected levels for each indicator per the reference sheet. The degree of departure may be categorized (rated) as:

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

5. Objectives

This section is an overview of the Safford Field Office management objectives that are associated with the Zuni Concho Allotment per the Phoenix Resource Management Plan (RMP) (USDI BLM 1989), as amended by the decision record for Arizona Standards and Guidelines. The Phoenix RMP incorporates by reference the decisions from the Eastern Arizona Grazing Final Environmental Impact Statement (FEIS) Record of Decision (ROD; 1987).

5.1 Land Use Plan Management Objectives

- Grazing Management (GM)-02: The grazing program in the area is managed under the provisions of the Taylor Grazing Act of 1934, The Federal Land Policy and Management act of 1976 (FLPMA), and the Public Rangelands Improvement Act of 1978. [Phoenix] RMP page 14-15.
- GM-03: Management of rangeland resources is guided the Range Program Summary Record of decision (RPS/ROD) which selected the Preferred Alternative analyzed in the 1987 Arizona Grazing FEIS. [Phoenix] RMP page 15.
- Wildlife/Fisheries (WF)-03: Wildlife and plants which are federally listed or proposed for listing as either threatened or endangered are protected under provisions of the Endangered Species Act of 1973, as amended. [Phoenix] RMP page 15.
- WF-04: It is the BLM policy to avoid jeopardizing the continued existence of any listed or proposed species and to actively promote species recovery. [Phoenix] RMP page 15.
- WF-05: It is BLM policy to manage federal candidate species and their habitat to prevent the need for listing as threatened or endangered. [Phoenix] RMP page 15.

Further, the Phoenix RMP provides the following grazing management objectives: 1) to restore and improve rangeland condition and productivity, 2) to provide for use and development of rangeland, 3) to maintain and improve habitat and viable wildlife populations, 4) to control future management actions and 5) to promote sustained yield and multiple use.

5.2 Allotment-Specific Objectives

The Zuni Concho Allotment is subject to the following objectives as established in the Arizona Standards for Rangeland Health.

5.2.1 Land Health Standards

The following land health standards are established by the Arizona Standards for Rangeland Health

Standard 1 - Upland Sites

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

Standard 2 - Riparian-Wetland Site

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

Standard 3 - Desired Resource Conditions

Objective: Productive and diverse upland and riparian and riparian-wetland communities of native species exist and are maintained

5.2.2 Key Area Objectives

In grazing administration, a key area is defined as a relatively small portion of a range selected because of its location, use, or grazing value as a monitoring point for grazing use. Key areas are indicator areas that can reflect what is happening on a larger area as a result of on-the-ground management actions. A key area should be a representative sample of a large stratum, such as a pasture, grazing allotment, wildlife habitat area, herd management area and watershed area. Objectives should be developed so that they are specific to the key area. Monitoring studies can then be designed to determine if these objectives are being met (USDI BLM/USDA USFS, 1996).

5.2.2.1 Zuni Concho North

The key area ZC-1 falls within the Clay Loam Wash 10-14" p.z. as shown in Figure 5. The Desired Plant Community (DPC) objectives were established using the Clay Loam Wash 10-14" p.z. ESD. Refer to Table 8 and **Figure 5** for the location of key area ZC-1.

Addressed in this LHE report are the results from the key area monitoring conducted by the U.S Forest Service (USFS) TEAMS in 2016. Refer to **Appendix B** for key area monitoring results.

The key area objective for the Zuni Concho North portion of the allotment is to meet the land health standards as established in the Arizona Standards for Rangeland Health. Specific objectives are defined below to guide the determination of whether the land health standards are being met.

Table 8. Location of the Zuni Concho North Key Area

Ecological Site	ESD ID	Key Monitoring Area	UTM Coordinates
Clay Loam Wash 10-14" p.z.	DX035X011104	ZC-1 (North)	660922, 3842972

Standard 1 – Upland Sites

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

Signs of accelerated erosion that are rated None to Slight or Slight to Moderate are appropriate for this ecological site as indicated by ground cover (litter, rock, vegetative (canopy) cover, etc.) and signs of erosion. This objective applies to the key area and the corresponding ecological site. A departure of Moderate or greater would not be achieving the standard. A departure of none to Slight or Slight to Moderate is considered achieving the standard.

Standard 2 – Riparian-Wetland Site

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

Standard 2 is **not applicable** because no riparian-wetland habitats exist on BLM-administered lands within the Zuni Concho North portion of the allotment.

Standard 3 – Desired Resource Conditions

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

The DPC objectives are criteria established to evaluate a site's capability of achieving desired resource conditions with consideration for all multiple uses. The DPC objectives are typically specific to the ecological sites within the allotment and also address desired habitat characteristics for the wildlife species likely to be present. There have been no DPC objectives established for this allotment in the past. Therefore, the DPC objectives were established using the ESD reference sheet for Clay Loam Wash 10-14" p.z. (DX035X01I104), see **Appendix D** for DPC objectives methodology. Desired resource conditions are based upon the following DPC objectives: plant community composition, bare ground, and litter.

The ESD reference sheet for Clay Loam Wash 10-14" p.z. (DX035X01I104) defines the reference state as follows: "The reference state is characterized as a native mid and short grassland dominated by alkali sacaton and western wheatgrass". The full ESD report is available at https://edit.jornada.nmsu.edu/catalogs/esd/035X/DX035X01I104

Canopy and Basal Cover

This site's reference sheet indicates a desired range of canopy cover and basal cover as follows:

- 40 percent average canopy cover
- 12 to 35 percent basal cover

Plant Community Composition

This site's reference sheet indicates aa desired range of plant community composition as follows:

- 69 to 83 percent composition of grasses
- 6 to 12 percent composition of forbs
- 11 to 19 percent composition of shrubs

Bare Ground

The site's reference sheet indicates a desired range of bare ground as follows:

- 20 to 40 percent bare ground

Litter Cover

This site's reference sheet indicates a desired range of litter cover as:

- 15 to 35 percent litter cover

In summary, The Zuni Concho North portion of the allotment DPC objectives for key area ZC-1, based on the Clay Loam Wash 10-14" p.z. (DX035X01I104) ecological site, are presented as the following evaluation area DPC objectives:

- Maintain an average of 40 percent canopy cover and 12 to 35 percent basal cover.
- Maintain an average of plant composition of 69 to 83 percent grasses, 6 to 12 percent forbs, and 11 to 19 percent shrubs.
- Maintain average bare ground between 20 to 40 percent.
- Maintain an average litter cover of 15 to 35 percent.

Maintaining the DPC objective for plant community composition for grasses, forbs, and shrubs will provide important nesting and escape cover for bird, as well as adequate forage for wildlife and livestock on the Zuni Concho North portion of the allotment while continuing to achieve land health standards.

As a Section 15 lease, there are limitations to the degree in which BLM can control or influence plant community changes across the broader allotment. The DPC objective established above are realistic in terms of what is possible to achieve within the BLM-administered portions of the allotments.

5.2.2.2 Zuni Concho West

The key area ZC-2 falls within the Loamy Upland 10-14" p.z. The DPC objectives were established using the Loamy Upland 10-14" p.z. ESD. Refer to Table 9 and **Figure 5** for the location of key area ZC-2.

Addressed in this LHE report are the results from the key area monitoring conducted by the USFS TEAMS in 2016 refer to **Appendix B**.

The key area objective for the Zuni Concho West portion of the allotment is to meet the land health standards as established in the Arizona Standards for Rangeland Health. Specific objectives are defined below to guide the determination of whether the land health standards are being met.

Table 9. Location of Zuni Concho West Allotment Key Area.

Ecological Site	ESD ID	Key Monitoring Area	UTM Coordinates
Loamy Upland 10-14" p.z.	DX035X01I113	ZC-2 (West)	617593, 3825073

Standard 1 – Upland Sites

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

Signs of accelerated erosion that are rated None to Slight or Slight to Moderate are appropriate for this ecological site as indicated by ground cover (litter, rock, vegetative (canopy) cover, etc.) and signs of erosion. This objective applies to the key area and the corresponding ecological site. A departure of moderate or greater would not be achieving the standard. A departure of None to Slight or Slight to Moderate is considered achieving the standard.

Standard 2 – Riparian-Wetland Site

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

Standard 2 is **not applicable** because no riparian-wetland habitats exist on BLM-administered lands within the Zuni Concho West portion of the allotment.

Standard 3 – Desired Resource Conditions

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

The DPC objectives are criteria established to evaluate a site's capability of achieving desired resource conditions. The DPC objectives are typically specific to the ecological sites within the allotment. Therefore, the DPC objectives were established using the ESD reference sheet for Loamy Upland 10-14" p.z. (DX035X01I113), see **Appendix E** for DPC objectives methodology. Desired resource conditions are based upon the following DPC objectives: plant community composition, bare ground, and litter.

The ESD reference sheet for Loamy Upland 10-14" p.z. (DX035X01I113) defines the reference state as follows:

"The reference state is composed primarily of warm season mid-grasses and short grasses with a mix of cool season grasses and half shrubs. Natural climatic variation result in changes in the amount of both individual plants and warm season versus cool season plants, particularly in grasses".

The full ESD report is available at
https://edit.jornada.nmsu.edu/catalogs/esd/035X/DX035X01I113

Canopy and Basal Cover

The sites' reference sheet indicates a desired average of canopy cover as follows:

- 30 to 40 percent canopy cover
- 10 to 20 percent basal cover

Plant Community Composition

The site's reference sheet indicates a desired range of plant community composition as follows:

- 74 to 83 percent grasses
- 11 to 15 percent shrubs
- 2 to 4 percent forbs
- 2 to 3 percent succulents
- 2 to 4 percent trees

Bare Ground

The site's reference sheet indicates a desired range of bare ground as follows:

- 30 to 50 percent

Litter Cover

The site's reference sheet indicates a desired range of litter cover as follows:

- 20 to 40 percent

Summary

In summary, the Zuni Concho West portion of the allotment DPC objectives for key area ZC-2, based on the Loamy Upland 10-14" p.z. (DX035X01I113) ecological site, are presented as the following evaluation area DPC objectives:

- Maintain an average of 30 to 40 percent canopy cover and 10 to 20 percent basal cover.
- Maintain an average plant composition 74 to 83 percent grasses, 11 to 15 percent shrubs, and 2 to 4 percent for forbs, 2 to 3 percent succulents, and 2 to 4 percent trees.
- Maintain an average bare ground of 30 to 50 percent.
- Maintain an average litter cover of 20 to 40 percent.

Maintaining the DPC objectives for plant community composition of grasses, shrubs, forbs, succulents, and trees will provide important nesting and escape cover for birds, as well as adequate forage for wildlife and livestock on the Zuni Concho Allotment while continuing to achieve land health standards.

As a Section 15 lease, there are limitations to the degree in which the BLM can control or influence plant community changes across the broader allotment. The DPC objectives established above are realistic in terms of what is possible to achieve within the BLM-administered portions of the allotments.

6. Land Health Standards and Determination

The following information is the evaluation and summary of the Land Health Evaluation (LHE) conducted on the Zuni Concho Allotment in 2016.

6.1 Actual Use

Full permitted AUMs have been implemented on the Zuni Concho Allotment during the evaluation period (2007-2016) totaling 6 cattle or 72 AUMs each year.

Livestock grazing for the Zuni Concho Allotment is permitted as a Section 15 grazing lease. Allowable AUMs are calculated on BLM-administered land only. Lease holders are billed for their maximum use available on public lands unless non-use is requested and approved. Non-use by the lessee was not requested during the evaluation period.

6.2 Land Health Evaluation

The IIRH assessment of the three rangeland health attributes was completed at key area ZC-1 and ZC-2 on the Zuni Concho Allotment. Ratings of Moderate or more are considered to indicate resource concerns for soil erosion, water quantity, and plant productivity. It is important to remember that these ratings are made relative to the potential for the site. For example, a site with highly erodible soils and low potential for stabilizing vegetation may be rated as having a

Slight departure from reference conditions even though the actual amount of soil movement is significant, while a site with a high potential for stability rated Moderate may have a relatively little soil movement. Monitoring data recorded for the LHE is provided in **Appendix B**. A summary of the IIRH conducted at key area ZC-1 and ZC-2 is presented in Table 11 below.

Table 10 Summary of IIRH at both Key Areas.

Key Area	Ecological Site	Range Health Attributes – Degree of Departure		
		Soil and Site Stability	Hydrologic Function	Biotic Integrity
ZC-1	Clay Loam Wash 10-14" p.z. (DX035X01I104)	None to Slight	None to Slight	None to Slight
ZC-2	Loamy Upland 10-14" p.z. (DX035X01I113)	None to Slight	None to Slight	None to Slight

ZC-1 Clay Loam Wash 10-14" p.z. DX035X01I104

For the indicators of rangeland health, the ecological site reference sheet condition indicates:

1. **Number and extent of rills:** Very few expected due to the high plant cover potential of this site. Rills may occur due to finer textures, slow permeability, medium runoff, moderate to high shrink/swell (cracking) characteristics of many soils and rare to occasional flooding. The number and length of rill will be limited by the low slopes on the site.
2. **Presence of water flow patterns:** Water flow patterns (and occasional ponding) may be common due to the slow permeability of the soils. Water flow patterns should be short and shallow.
3. **Number and height of erosional pedestals or terracettes:** Few expected, pedestals should be very short and along water flow patterns. Terracettes should also be very short and stop at obstructions.
4. **Bare ground from Ecological Site Description or other studies:** Bare ground is expected to be less than 20-40 percent.
5. **Number of gullies and erosion associated with gullies:** Very few expected. Due to occasional flooding and extra run-on moisture a few gullies can form in areas where water flow is concentrated from adjacent uplands. There should be no active erosion and there will be vegetation stabilizing the gully.
6. **Extent of wind scoured, blowouts and/or depositional areas:** None expected.
7. **Amount of litter movement:** None expected. During or after severe droughts, a few minor areas of deposition or hummock clay deposits may be present.
8. **Soil Surface (top few mm) resistance to erosion:** Soil surface textures range from sandy clay loam to clay but are mostly silty clay loam and sandy clay loam. The expected sol stability average ranges between 3-4. When well vegetated and not subjected to severe flood events, these soils have a low to moderate resistance to water erosion and a moderate resistance to wind erosion.

9. **Soil surface structure and SOM content:** Soil surface structure is usually massive or granular (moderate, fine to medium). It may occasionally be platy (weak to moderate, medium to thick) or subangular blocky (weak, fine). Surface horizon thickness is generally 2 to 8 inches. Some soils may have been altered by past farming practices and have altered soil structure and thickness. Color is variable depending upon parent material.

10. **Effects of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** The site is characterized by a relatively even distribution of vegetation dominated by grasses with some shrubs. This plant community structure is highly effective at capturing and storing precipitation.

11. **Presence and thickness of compaction layer:** None. Due to the sites position on the landscape, it accumulates finer particles such as silts and clays. The associated soil structure is platy or subangular blocky in the soil subsurface. These should not be considered compaction layers.

12. **Functional/Structural Groups:**

Dominant: Warm season bunchgrasses>>

Subdominant: Warm season colonizing grasses > Cool season colonizing grasses

Other: Large shrubs > Forbs > Cool season bunchgrasses = half shrubs > Cacti

13. **Amount of plant mortality and decadence:** All plant functional groups are adapted to survival in all but the most severe droughts. Severe winter droughts affect shrubs the most. Severe summer droughts affect grasses the most.

14. **Average percent litter cover (%) and depth (in):** Litter cover is mostly fines with depths usually less than ½ inch. Litter depths will be the greatest under canopies. Of the total litter amount, it would be expected that 80-90 percent would be herbaceous litter and 10-20 percent would be woody litter. Litter amounts increase the first few years of drought, then decrease in later years.

15. **Expected annual production:** Average annual production on this site is expected to be 1600 to 2400 pounds per acre in a year of average annual precipitation.

16. **Potential invasive species:** Ring muhly, tumble grass, burrograss, snakeweed and rubber rabbitbrush are all native to the site, but they have the potential to increase and dominate the site after unmanaged grazing or surface disturbance. Russian thistle, filaree and cheatgrass are non-native annuals that can invade with or without disturbance.

17. **Perennial plant reproductive capability:** All plants native to this site are adapted and are capable of producing seeds, stolons, and rhizomes in all but the most severe droughts.

ZC-2 Loamy Upland 10-14" p.z. DX035X01I113

For the indicators of rangeland health, the ecological site reference sheet condition indicates:

1. **Number and extent of rills:** No rills expected. A few minor rills may form on slopes greater than 5 percent due to moderate permeability and moderate runoff.

2. **Presence of water flow patterns:** Water flow patterns are infrequent, short (1 to 2 meters), and poorly developed with less than 10 percent coverage they may become more common on steeper slopes due to slow to moderate permeability and medium runoff characteristics.
3. **Number and height of erosional pedestals and terracettes:** Pedestals less than 1 inch may be common and often associated with waterflow patterns. Terracettes are infrequent, but they should be short. Both may be more developed and common during a drought, due to moderate wind erosion hazards of the soils. Moderate wind erosion hazard occurs on the soils with a coarse-loamy surface texture. Pedestals and terracettes may be more common, especially on steeper slopes, but they should be short.
4. **Bare ground from Ecological Site Description or other studies:** Bare ground ranges from 30 to 50 percent. Drought may cause an increase in bare ground.
5. **Number of gullies and erosion associated with gullies:** None.
6. **Extent of wind scoured, blowouts and/or depositional areas:** No blowouts are present on this site. Some small mounding may around long-lived perennial plant base common, especially during droughts due to low to moderate wind erosion hazard of the soil.
7. **Amount of litter movement:** Most herbaceous and fine woody litter will be transported by wind and in short water flow pathways, while a small percentage stays in place. Coarse woody litter and duff will accumulate under shrub and tree canopies.
8. **Soil Surface (top few mm) resistance to erosion:** Soil aggregate stability should average 4-5 (range 3 to 6) under plant canopies and 2-3 (range 1 to 3) in the interspaces. There is usually less than 5 percent cover of rock fragments on the surface. When well vegetated, soils have a moderate resistance to water erosion and moderate to high resistance to wind erosion.
9. **Soil surface structure and SOM content:** Soil structure is mostly granular (weak to moderate, very fine) with some platy (weak, thin and medium) and sub angular blocky (weak, fine to medium). Surface thickness typically ranges from 2-8 inches but is mostly 2-4 inches. Color is typically reddish brown to brown but can vary depending on parent material.
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and run off:** This site is characterized by a relatively even distribution of mostly grasses with some shrubs and a few forbs. This type of plant community is moderately effective at capturing and storing precipitation thus reducing runoff. Cover averages 30-40 percent (25 to 30 percent grasses, 5 to 10 percent shrubs, 2 to 5 percent forbs). Basal plant cover averages 10-20 percent (15 percent grasses, 2 percent shrubs, 1 percent forbs) Both cover values decrease during a prolonged drought.
11. **Presence and thickness of compaction layer:** The occurrence of compaction layers should be rare to none. Soils with sandy clay loam and clay loam textures, can be easily compacted when wet, if there are no rock fragments in surface horizons. Some surface horizons are naturally platy.
12. **Functional/Structural Groups:**

    Dominant: > 40 percent: None

Sub-dominant: 11-40 percent: warm season bunchgrasses > warm season colonizing grasses > shrubs > cool season bunchgrasses >

Other: Minor (3-10 percent): forbs = cacti = trees (trace)

13. **Amount of plant mortality and decadence:** In a normal year up to 10 percent of grasses and shrubs die off. During and after drought years there can be from 10 to 15 percent die off of shrubs and grasses. Severe winter droughts affect shrubs, trees and cool season grasses the most. Severe summer droughts affect the warm season grasses the most.
14. **Average percent litter cover (%) and depth (in):** Average percent litter cover ranges from 20-40 percent and depth 1/8 inch. Within plant interspaces litter ranges from 5 to 20 percent cover, while under shrub and tree canopies litter can range up to 50 percent cover with depths from 1/8 to 1/4 inch thick.
15. **Expected annual-production:** Total production ranges from; 300-375 pounds per acre (dry weight) in drought years; 572-725 pounds per acre in average years; 725-800 pounds per acre in wet years.
16. **Potential invasive species:** Mormon tea, broom snakeweed, Greene's rabbitbrush, prickly pear, Whipple cholla cactus, and false buffalo grass are all native to the site but have the ability to increase and dominate the area after unmanaged grazing. Oneseed juniper is native to the site but has the ability to increase and dominate the site after unmanaged grazing and/or fire exclusion. Russian thistle is an exotic forb that has the ability to increase and dominate the site after heavy grazing and/or ground disturbance.
17. **Perennial plant reproductive capability:** All plants native to this site are adapted to the climate and are producing seeds, stolons and rhizomes in all but the most severe droughts.

6.2.1 Zuni Concho North ZC-1 IIRH Assessment

Figure 6 Zuni Concho North at Key Area ZC-1

Rangeland Health Attribute 1: Soil and Site Stability

There were no rills or gullies observed, these indicators were rated None to Slight. Water flow patterns were not observed at the site and were rated None to Slight. Pedestals and terracettes were not observed and soil was stable at the plant base, this indicator were rated None to Slight. Bare ground was measured at 33 percent the reference sheet had a range of 20 to 40 percent bare ground and was therefore rated None to Slight. There was no evidence of wind-scouring observed and this was rated None to Slight. All litter size classes remained at the base of plants with little to no movement observed and was rated None to Slight. Soil surface resistance to erosion was rated None to Slight, appropriate litter cover and vegetative cover was observed protecting the soils from erosion. Soil Surface loss or degradation was rated None to Slight, soils remained intact and soil surface loss or degradation was not observed. No compaction layers were observed, and this indicator was rated None to Slight.

Ten indicators for soil and site stability were rated None to Slight, therefore the overall rating for the soil and site stability departure rating was rated None to Slight.

Rangeland Health Attribute 2: Hydrologic Function

There were no rills or gullies observed, these indicators were rated None to Slight. Water flow patterns were not observed at the site and were rated None to Slight. Pedestals and terracettes were not observed and soils were stable at the plant base, this indicator were rated None to Slight. Bare ground was measured at 33 percent the reference sheet had a range of 20 to 40 percent bare ground and was therefore rated None to Slight. Soil surface resistance to erosion was rated None to Slight, appropriate litter cover and vegetative cover was observed protecting the soils from erosion. Soil Surface loss or degradation was rated None to Slight, soils remained intact and soil surface loss or degradation was not observed. Plant community composition was within ESD parameters, LPI data showed that grasses accounted for most of the composition at 79 percent followed by shrubs at 12 percent and fit the expected plant community as outlined in the ESD, therefore infiltration has not been negatively impacted and was rated None to Slight. No compaction layers were observed, and this indicator was rated None to Slight. Litter amount was measured at 49 percent which is exceeding the acceptable range of 15 to 35 percent. Increased litter amount can be attributed to the site experiencing repeated, past years of below average moisture; therefore, litter amount was rated None to Slight.

Ten indicators for hydrologic function were rated none to slight. Therefore, the overall rating for the hydrologic function attribute was rated None to Slight.

Rangeland Health Attribute 3: Biotic Integrity

Soil Surface resistance to erosion was rated None to Slight, as appropriate litter cover and vegetative cover were observed protecting the soils from erosion. Soil Surface loss or degradation was rated None to Slight, as soils remained intact and soil surface loss or degradation was not observed. No compaction layers were observed, this indicator was rated None to Slight. Functional structure groups were within ESD parameters and was rated None to Slight, the data provided in the LPI indicated that the functional structure groups in descending order were grasses, shrubs, and lastly forbs, this coincides with what the ESD provided, and the functional structure groups are as expected resulting in a None to Slight departure. Plant mortality and decadence was rated None to Slight based on an even distribution of age classes amongst the vegetation, indicating the site was not experiencing unexpected or excessive plant die off. Litter amount was measured at 49 percent, which is exceeding the acceptable range of 15 to 35 percent; therefore, litter amount was rated None to Slight as this site has experienced repeated years of less than adequate moisture and all of the other land health indicators point to the site properly functioning. Annual production was ocularly estimated to be within the ESD parameters and was rated None to Slight. There were no invasive plants observed at the site and this indicator was rated None to Slight. The reproductive capability of perennial plants was rated None to Slight due to even distribution of age classes observed at the site indicating that plant species are capable of reproducing.

Nine indicators for biotic integrity were rated none to slight; therefore, the overall rating for the Biotic Integrity attribute is None to Slight.

6.2.2 Zuni Concho West ZC-2 IIRH Assessment

Figure 7 Zuni Concho West at Key Area ZC-2

Rangeland Health Attribute 1: Soil and Site Stability

There were no rills or gullies observed, these indicators were rated None to Slight. Water flow patterns were not observed at the site and was rated None to Slight. Pedestals and terracettes were not observed and soils were stable at the plant base, these indicators were rated None to Slight. Bare ground was measured at 4 percent, this was significantly lower than what was described in the ESD sheet, bare ground was impacted by the amount of gravel at the location accounting for 27 percent ground cover and there was also a higher presence of juniper on site which resulted in higher amounts of litter cover. It was determined that the soil and site stability would not be negatively impacted and was rated None to Slight. There was no evidence of wind-scouring observed and this was rated None to Slight. All litter size classes remained at the base of the plants with little to no movement observed and this was rated None to Slight. Soil surface resistance to erosion was rated None to Slight, the site was well vegetated with a gravel component protecting the soils from erosion. Soil surface loss or degradation was rated None to Slight, soils remained intact and soil surface loss or degradation was not observed. No compaction layers were observed, and this indicator was rated None to Slight.

Ten indicators for soil and site stability were rated none to slight; therefore, the overall rating for the soil and site stability departure rating was rated None to Slight.

Rangeland Health Attribute 2: Hydrologic Function

There were no rills or gullies observed, these indicators were rated None to Slight. Water flow patterns were not observed at the site and was rated None to Slight. Pedestals and terracettes were not observed and soils were stable at the plant base, these indicators were rated None to Slight. Bare ground was measured at 4 percent, this was significantly lower than what was described in the ESD sheet, bare ground was impacted by the amount of gravel at the location accounting for 27 percent ground cover and there was also a higher presence of juniper on site which resulted in higher amounts of litter cover reducing bare ground. Soil surface resistance to erosion was rated None to Slight, the site was well vegetated with a gravel component protecting the soils from erosion. Soil surface loss or degradation was rated None to Slight, soils remained intact and soil surface loss or degradation was not observed. The ESD describes the site as having a relatively even distribution of mostly grasses some shrubs and a few forbs, the LPI data indicated that this statement mostly held true with the most variation being in the presence of juniper (trees) and the lack of shrubs present. It was determined that in its current state infiltration would not be negatively impacted as the site would be capable of retaining appropriate levels of moisture (refer to **Appendix C**. Table 14.). No compaction layers were observed, and this indicator was rated None to Slight. Litter amount was measured at 59 percent which is exceeding the acceptable range of 20 to 40 percent, increased litter amount can be attributed to the site experiencing repeated, past years of below average moisture; therefore, litter amount was rated None to Slight.

Ten indicators for hydrologic function were rated none to slight; therefore, the overall rating for the Hydrologic Function attribute was rated None to Slight.

Rangeland Health Attribute 3: Biotic Integrity

Soil surface resistance to erosion was rated None to Slight, the site was well vegetated with a gravel component, protecting the soils from erosion. Soil surface loss or degradation was rated None to Slight, soils remained intact and soil surface loss or degradation was not observed. No compaction layers were observed, this indicator was rated None to Slight. Functional structure groups were within ESD parameters and was rated None to Slight. LPI indicated that the functional structure groups in descending order were grasses, shrubs, and lastly forbs, this coincides with what the ESD provided and the functional structure groups are as expected resulting in a None to Slight departure Plant mortality and decadence was rated None to Slight, there was an even distribution of age classes amongst the vegetations, indicating the site was not experiencing unexpected or excessive plant die off. Litter amount was measured at 59 percent which is exceeding the acceptable range of 20 to 40 percent, litter amount was rated None to Slight. Annual production was ocularly estimated to be within the ESD parameters and was rated None to Slight. There were no invasive plants observed at the site and this indicator was rated None to Slight. Reproductive capability of perennial plants was rated None to Slight, even distribution of age classes was observed at the site indicating that plant species are capable of reproducing.

Nine indicators for biotic integrity were rated none to slight; therefore, the overall rating for the Biotic Integrity attribute is None to Slight.

7. Determinations of Land Health Standards

7.1 Zuni Concho Allotment

7.1.1 Standard 1: Upland Sites

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

Determination:

☒ Meeting the Standard
☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
☐ Not Meeting the Standard; Not making Significant Progress Toward Standard

Rationale:

Overall, the soils throughout the Zuni Concho Allotment are productive, stable, and in a sustainable condition. The key area monitoring data shows that canopy cover, litter, and bare ground are adequate to ensure soil stabilization and appropriate permeability rates within the ecological site.

ZC-1: Bare ground was measured at 33 percent and was within the desired range of 20 to 40 percent. Canopy cover was measured at 46 percent and litter cover was measured at 49 percent, both exceeding the desired range as described in the ESD. These indicators show that the soils are well protected and are in a sustainable condition appropriate for the ecological site. No rills or gullies were observed and terracettes were rated None to Slight.

ZC-2: Bare ground was measured at 4 percent this was much lower than the expected 30 to 50 percent as described in the ESD. The site had a strong gravel component that accounted for 27 percent of the ground cover, this reflects why there was such a low percentage of bare ground calculated from the LPI data. Canopy cover (73 percent) and litter cover (59 percent) were exceeding the range of acceptability, these indicators show that the soils are well protected and are in a sustainable condition appropriate for the ecological site. No rills or gullies were observed and terracettes were rate none to slight.

7.1.2 Standard 2: Riparian-Wetland Sites

Objective: Riparian-wetland areas are in proper functioning condition

Determination:

☐ Meeting the Standard
☐ Not Meeting the Standard; Making Significant Progress Toward Standard
☐ Not Meeting the Standard; Not making Significant Progress Toward Standard

☒ Standard Does Not Apply

Rationale:
There are no riparian-wetland sites on BLM managed land within the Zuni Concho Allotment; therefore, Standard 2 does not apply.

7.1.3 Standard 3: Desired Resource Conditions

Objective: Productive and upland and riparian-wetland communities of native species exist and are maintained.

Determination:

☒ Meeting the Standard
☐ Not Meeting the Standard; Making Significant Progress Toward the Standard
☐ Not Meeting the Standard; Not making Significant Progress Toward Standard

Rationale:
Based on the monitoring data and this land health evaluation, current livestock grazing is not preventing the Zuni Concho Allotment from providing a productive and diverse upland native plant community that provides for all multiple uses. Due to the absence of riparian-wetland habitat there are no riparian-wetland plant communities considered in this evaluation of Standard 3.

The RHAs indicated that the soil and site stability, hydrologic function, and biotic integrity attributes were within or were close to acceptable ranges to meet the criteria for Standard 1, as described in Sections **6.2** and **7.1**. The allotment was also found to be providing adequate grass, shrub and forb composition and density to provide sufficient forage and shelter for wildlife species, as described in Section **2.3.3.** Therefore, the ID Team determined that the Zuni Concho Allotment is currently meeting Standard 3.

The following DPC objectives were established to ensure current conditions on the allotment are maintained or improved. The DPC objectives provide a diverse plant community that will allow for natural ecological functions and provide habitat features, such as increased sources for shelter, cover and foraging, for the wildlife species described above in Section 2.3.3. These DPC objectives will ensure rangeland health State water quality standards are also being met.

Clay Loam Wash 10-14" p.z. (Key Area ZC-1)

The DPC objectives for canopy cover and basal cover are established as follows: maintain an average canopy cover of 40 percent and basal cover of 12 to 35 percent

> ZC-1: Canopy cover was measured at 46 percent, and basal cover at 6 percent per data derived from the LPI, see **Appendix B.** Canopy cover was slightly above the average for the ecological site and is meeting the objective. Basal cover was slightly below the DPC objective, however both canopy cover and basal cover contribute to resistance of erosion, with canopy cover being adequate for the site and basal cover only being slightly less than the desired resource condition it was determined that the objectives are being met.

The DPC objectives for plant community composition are established as follows: maintain an average plant composition of 69 to 83 percent grasses, 11 to 19 percent shrubs, and 6 to 12 percent forbs.

> ZC-1: Plant community composition was derived from the LPI data, see **Appendix B.** The dominant vegetation type is grasses at 79 percent composition. Forbs were at 8 percent composition and shrubs were at 12 percent composition. The data from the LPI indicates that the dominant functional groups are as expected from the ESD reference sheet. All vegetation groups met the DPC objectives. The LPI data shows alkali sacaton as the dominate species making up 65 percent of the composition this is also consistent with the ESD reference sheet. It was determined that overall DPC objectives at key area ZC-1 are being achieved.

The DPC objective for bare ground is established as follows: maintain bare ground at an average of 20 to 40 percent. The following data was collected for the LHE:

> ZC-1: Bare ground was measured at 33 percent; this falls within the range as provided from the ESD reference sheet. The site had an appropriate level of vegetative cover and soils will not be negatively impacted by maintaining this percentage of bare ground. The DPC objective for bare ground at key area ZC-1 is being achieved.

The DPC objective for litter cover is established as follows: Maintain an average litter cover of 15 to 35 percent. Data collected for the LHE indicates:

> ZC-1: Litter was measured at 49 percent; litter cover was higher than expected, Increased litter amount can be attributed to the site experiencing repeated, past years of below average moisture, therefore litter amount was rated None to Slight. The DPC objective for litter cover at key area ZC-1 is being achieved.

Based on the monitoring data and evaluation, current livestock grazing is allowing the Zuni Concho Allotment to maintain and achieve DPC objectives identified in *Section 4.2.2.1 ZC-1 Key Area Objectives,* that allow for continued land health and wildlife habitat. The IIRH assessment indicates that soil/site stability, hydrologic function, and biotic integrity are meeting the standards for this site. Monitoring data from the allotment's key area ZC-1 indicates that the site is achieving the objectives for canopy cover, plant community composition, bare ground, and litter cover. The vegetation composition and density were deemed sufficient to provide forage and shelter for both livestock and wildlife species.

Loamy Upland 10-14" p.z. (Key Area ZC-2)

The DPC objectives for canopy cover and basal cover are established as follows: maintain an average canopy cover of 30 to 40 percent and basal cover of 10 to 20 percent.

Canopy cover was measured at 73 percent and basal cover at 4 percent per data derived from the LPI, see **Appendix B.** Canopy cover was much higher than what was expected as described in the ESD data sheet, and it was determined that this was predominately influenced by the increase

in juniper that accounted for 18 percent of the total canopy cover. Basal cover was below the expected range at 4 percent, the amount of canopy cover and basal cover observed was determined to be adequate for the site as the soils are being protected and are not exhibiting higher than normal rates of erosion. The vegetation at the location was diverse and did not show negative impacts from the amount of canopy/basal cover observed. DPC objectives for canopy cover and basal cover on the key area ZC2 are being achieved.

The DPC objectives for plant community composition are established as follows: maintain an average of 74 to 83 percent grasses, 11 to 15 percent shrubs, 2 to 4 percent forbs, 2 to 3 percent succulents, and 2 to 4 percent trees. The following data was collected for the LHE:

> ZC-2: Plant community composition was derived from the LPI data, see **Appendix B**. The dominant vegetation type is grasses at 63 percent composition, shrubs were at 8 percent composition, forbs were at 11 percent composition, trees were at 18 percent composition, and no data was collected for succulents along the LPI. The data collected from the LPI shows a slight variation in all plant communities, based on the information provided in the ESD reference sheet and state and transition model. The key area is reflective of ESD Community Phase 2.1: a juniper overstory with grass understory. Juniper accounted for 18 percent of the vegetation composition, which exceeds the 2 to 4 percent composition as derived from the ESD sheet. According to the ESD, Community Phase 2.1 can be influenced through a lack of grazing management and/or fire intervals, for this particular location it is believed that both historic grazing management and fire intervals (lack of) are contributing to the variance in plant community composition. The ESD sheet also states that natural climatic variation, such as recent droughts, influences the amount and ratio of plant composition within an ecological site. These variables can, and do, influence transitions into different plant community phases. With the variation in composition of all plant communities it was determined that standards were not being met at key area ZC-2 for plant community compositions.

The DPC objective for bare ground was established as follows: Maintain bare ground at 30 to 50 percent. Data collected for the LHE indicates:

> ZC-2: Bare ground was measured at 4 percent; bare ground correlates strongly with soils, increased levels of bare ground causes increased levels of erosion as the soils are exposed and do not benefit from the protection provided by having more ground cover and less bare ground. The percentage of bare ground exceeds the objective for the site as the soils are well protected and less likely to be exposed to disturbances. The site had 27 percent cover of rock fragments or gravel which reduced the percentage of exposed soils, providing sufficient soil protection, and allowing for adequate infiltration. The DPC objective for bare ground on key area ZC-2 is being achieved.

The DPC objective for litter cover was established as follows: maintain litter cover at 20 to 40 percent. Data collected for the LHE indicates:

> ZC-2: Litter cover was measured at 59 percent; the amount of litter cover was well above the average. Increased litter amount can be attributed to the site experiencing repeated, past years of below average moisture; therefore, litter amount was rated None to Slight. The DPC objective for litter cover at key area ZC-1 is being achieved.

Based on the monitoring data and this evaluation, current livestock grazing is allowing the Zuni Concho Allotment to maintain and achieve the DPC objectives as identified in Section 4.2.2 Key Area Objectives for continued land health and wildlife habitat. The IIRH assessment indicates that soil/site stability, hydrologic function, and biotic integrity are meeting the standard for this site. Data from the key area ZC-2 indicates that the site is achieving the objectives for canopy cover, bare ground, and litter cover. Plant community composition was determined to not be meeting the standards, this was largely due to the juniper encroachment that has occurred in the area. There was variance in all vegetation groupings (grasses, shrubs, forbs, succulents, and trees), but it was determined by the ID Team that the site is still functioning within its capabilities.

8. Recommended Management Actions

Based on the determination in *Section 7 Determinations of Land Health Standards,* the following management actions are recommended:

1. Continue current grazing management on the Zuni Concho Allotment in accordance with the terms and conditions of the term lease, as follows:

Allotment Name/ Number	Livestock Number/Kind	Grazing Period Begin End	% Public Land	Active Use (AUM)
Zuni Concho (No. 06170)	6 Cattle	3/1 - 2/28 Yearlong	100	72

2. Continue with these Other Terms and Conditions:
   - In order to improve livestock distribution on the public lands, all salt blocks and/or mineral supplements shall not be placed within a ¼ mile of any riparian area, wet meadow or watering facility (either permanent or temporary) unless stipulated through a written agreement or decision in accordance with 43 CFR 4130.3-2(C).

3. The following Other Terms and Conditions should be added to the BLM lease:
   - The lessee shall submit, upon request, a report of the actual grazing use made on this allotment for the previous grazing period, March 1 to February 28. Failure to submit such a report by March 15 of the current year may result in suspension or cancellation of the grazing lease.
   - Lessee shall provide reasonable administrative access across private and leased lands to the BLM for the orderly management and protection of the public lands.

4. The following Other Terms and Conditions should be deleted as it is a duplicate of the Standard Terms and Conditions associated with this BLM lease:
   - If in connection with allotment operations under this authorization, any human remains, funerary objects, sacred objects or objects of cultural patrimony as defined in the Native

American Graves Protection and Repatriation Act (P.L. 101-601; 104 Stat. 3048; U.S.C. 3001) are discovered, the Permittee shall stop operations in the immediate area of the discovery, protect the remains and objects, and immediately notify the Authorized Officer of the discovery. The Permittee shall continue to protect the immediate area of the discovery until notified by the Authorized Officer that operations may resume.

9. List of Preparers

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USFS TEAMS Participants:
Doug Middlebrook, Wildlife Biologist
Troy Grooms, Rangeland Management Specialist

10. Authorized Officer Concurrence

I have reviewed the determinations presented in *Section 7 Determinations of Land Health Standards* and the grazing and other management actions identified in *Section 8 Recommended Management Actions*.

☒ I concur with the conclusions and recommendations as written.

___ I do not concur.

___ I concur, but with the following modifications.

acting for

Scott C. Cooke

6/30/2021

Date

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Appendix A: Federally Listed, BLM Special Status, and General Wildlife Species

Threatened & Endangered Species			
Species	**Status**	**Critical Habitat**	**Comments**
Black-footed ferret *Mustela nigripes*	Endangered	No Designation	The black-footed ferret relies solely on native grasslands and the presence of prairie dogs for their prey source and for providing burrows to use for shelter and nesting. The BLM-administered portions of the Zuni Concho Allotment provide suitable grassland habitat to support this species; however, no prairie dogs are known to occur within the allotment. Due to the absence of the key prey source this species is expected to be absent from the allotment.
Western yellow-billed cuckoo (distinct population segment) *Coccyzus americanus*	Threatened	Designated	Yellow-billed cuckoos primarily occur in cottonwood-willow gallery forests of riparian zones of Arizona. Cuckoos may utilize upland areas of the allotment, comprised of pinyon-juniper, for 2-3 weeks prior to migration to and from suitable breeding habitat (Hughes, 2015). The Zuni Concho Allotment is not within the designated critical habitat and lacks suitable riparian plant communities to support this species.
Northern Aplomado falcon *Falco femoralis septentrionalis*	Experimental Population, Non-Essential 10(j)	No Designation	No record of the species occurring within the allotment boundary. Habitat consists of open grassland with scattered trees, low ground cover, and elevations from 3,500 to 9,000 feet. Very limited distribution in the U.S. in Texas and New Mexico. The species' historical range extends into southeastern Arizona; however, the species is still considered to be extirpated from Arizona with no recent records of the species. In Arizona, no documented nesting attempts have occurred since 1940 (AZGFD 2021), or since 2006 when the whole state of Arizona was included in the 10(j) area designation (50 CFR Part 17, 42298-42315). There is no designated or proposed critical habitat for this species. Reported observation in 1977 west of Rodeo, New Mexico in Cochise County, Arizona. Sight records since 1940 are unsubstantiated, and the falcon is considered possibly extirpated in Arizona (per conversation with USFWS; AZGFD 2021).

Little Colorado spinedace *Lepidomeda vittata*	Threatened	Designated	No suitable aquatic habitat exists on the BLM-administered portions of the Zuni Concho Allotment to support this species. This species was consulted on in the 2012 BO (USDI USFWS 2012) and conservation measures were provided for the allotments containing critical habitat for this species, which does not include the Zuni Concho Allotment.
Mexican wolf *Canis lupus baileyi*	Endangered, experimental	No Designation	No wolves occur within the action area. If individual wolves disperse from the experimental population into the action area, humans working near individuals could disturb the wolves, but they would only move to other areas. Livestock grazing would be managed to improve or maintain the productivity of the area and would not affect the native prey base of the wolf. The USFWS issued a letter of concurrence (USDI USFWS 2012) for the determination of "may affect, not likely to adversely affect" regarding the Gila District Grazing Program's actions. Conservation measures will continue to be followed and implemented.
Northern Mexican gartersnake *Thamnophis eques megalops*	Threatened	Designated	Allotment is not within the designated critical habitat. Allotment lacks suitable riparian plant communities to support this species.
Zuni bluehead sucker *Catastomus discobolus yarrowi*	Endangered	Designated	No suitable aquatic habitat exists on the Zuni Concho Allotment to support this species.

[1]Source: AZGFD Report, retrieved December 14, 2020 (AZGFD N.d.)
[2]Source: USFWS Report, retrieved March 1, 2021 (USDI USFWS N.d.)

BLM Sensitive Species	
Species	**Justification**
Amphibians	
Northern leopard frog *Lithobates pipiens*	No suitable aquatic habitat exists on the Zuni Concho Allotment. Low potential of occurrence.
Birds	
Bald eagle (wintering) *Haliaeetus leucocephalus*	Wintering bald eagles occur along the Little Colorado River and may use the allotment as foraging habitat. There are no known impacts of livestock on bald eagles.
Ferruginous hawk *Buteo regalis*	Ferruginous hawk nest in grasslands, shrublands and forest lands. Suitable nesting habitat occurs on the Zuni Concho Allotment. There are no known impacts of livestock on ferruginous hawks.
Golden eagle *Aquila chrysaetos*	There is no suitable nesting habitat for golden eagles on the Zuni Concho Allotment. Golden eagles may fly and hunt over the areas of the allotment. There are no known impacts of livestock on golden eagles.

BLM Sensitive Species	
Species	**Justification**
Pinyon jay *Gymnorhinus cyanocephalus*	Pinyon jay occurs in pinyon-juniper woodland. This habitat is available on the allotment in limited amounts; therefore, this species may be impacted by livestock browsing seedling trees or low-hanging branches. This species is known to travel vast distances in response to localized abundance or shortages of forage.
Western burrowing owl *Athene cunicularia hypugaea*	Can be found in open, treeless areas with low, sparse vegetation, usually on gently sloping terrain. Often associated with grasslands, deserts, and steppe environments as well as golf courses, pastures, agricultural field, airport medians, and road embankments. They are often associated with burrowing mammals such as prairie dogs and ground squirrels. This allotment provides suitable wintering habitat but lacks the presence of burrowing animals.
Fish	
There are no BLM sensitive fish known to occur in the Zuni Concho Allotment.	
Invertebrates	
There are no BLM sensitive invertebrates known to occur on the Zuni Concho Allotment.	
Mammals	
Arizona myotis *Myotis occultus*	Arizona myotis occurs in ponderosa pine and oak-pine woodlands near water. Little of this habitat exists on this allotment. The species will not be impacted.
Banner-tailed kangaroo bat *Dipodomys spectabilis*	This species lives in open desert scrub, creosote bush flats, open grasslands and sandy places. It favors a sparse covering of grasses, interspersed with a few mesquite trees and cacti. The allotment provides potentially suitable habitat for this species; therefore, this species may be impacted if present on the allotment; however, the Zuni Concho Allotment is not within or in near proximity to the species' range.
Gunnison's prairie dog *Cynomys gunnisonii*	Gunnison's prairie dog is not known to be present on the allotment, however suitable habitat does exist and may be colonized if the species becomes more abundant in the surrounding area.
Pale Townsend's big-eared bat *Corynorhinus townsendii*	This species occurs in pine forests and arid desert scrub, always near caves or other roosting sites. Little of this habitat occurs on the allotment. This species will not be impacted.
Spotted bat *Euderma maculatum*	Spotted bats inhabit desert scrub and open forests and are always associated with a water source such as a spring, river, creek or lake. Little of this habitat occurs on the allotment. This species will not be impacted.
Reptiles	
There are no BLM sensitive reptiles known to occur in the Zuni Concho Allotment.	
Plants	
There are no BLM sensitive plants known to occur in the Zuni Concho Allotment.	

Sources: AZGFD Report, retrieved December 14, 2020 (AZGFD N.d.); USFWS Birds of Conservation Concern 2008 (USDI USFWS 2008).

Migratory Birds, Birds of Conservation Concern [1, 2]	
Species	**Comments**
Bald eagle *Haliaeetus leucocephalus*	Addressed as BLM Sensitive Species in table above.
Bendire's thrasher *Toxostoma bendirei*	Found in desert habitats including arid grasslands, shrublands, and agricultural habitats. Prefers more open areas with shorter vegetation. The allotment provides adequate habitat to support this species if present. Low-to-moderate potential for this species to occur.
Chestnut-collared longspur *Calcarious ornatus*	Found in shortgrass prairies, rangelands, and desert grasslands. Eastern Arizona contains wintering habitat for this species. The allotment provides a minimal amount of potentially suitable wintering habitat to support this species. Low potential for this species to occur.
Ferruginous hawk *Buteo regalis*	Addressed as BLM Sensitive Species in table above.
Golden eagle *Aquila chrysaetos*	Addressed as BLM Sensitive Species in table above.
Gray vireo *Vireo vicinior*	Found in pinyon-pine/juniper, mesquite scrub, oak scrub, and chaparral habitats. They prefer hot, arid habitats that usually have dense brush from near the ground to six feet high. There is a low potential for this species to occur on the allotment.
Juniper titmouse *Baeolophus ridgwayi*	Found mainly in dry, open pinyon-pine/juniper woodlands of the Great Basin and Upper Sonoran Zone. The species occurs with sagebrush, Joshua tree, and other understory shrub species. Older pinyon-pine/juniper trees are needed for nesting cavities. This allotment provides a minimal amount of low-quality pinyon-pine/juniper habitat to support this species. Low potential for this species to occur.
Peregrine falcon *Falco peregrinus*	Found near cliffs for nesting and in any open habitat that is near large open bodies of water. This allotment could be used for foraging but would not support breeding or wintering individuals. Low potential for this species to occur.
Pinyon jay *Gymnorhinus cyanocephalus*	Addressed as BLM Sensitive Species in table above.
Prairie falcon *Falco mexicanus*	Found near bluffs and cliffs for nesting, including in alpine habitat. Breeding habitats include grasslands, shrub steppe desert, areas of mixed shrubs and grasslands, or alpine tundra that supports their prey base. Foraging sometimes occurs in agricultural fields. The allotment lacks the majority of their required habitat for nesting and breeding but may be used for opportunistic foraging. Low potential for this species to occur.
Western burrowing owl *Athene cunicularia*	Addressed as BLM Sensitive Species in table above.

[1]The migratory birds species listed are species of particular conservation concern (e.g., Birds of Conservation Concern) that may occur on or near the allotment. It is not a list of every bird species that may be found in this location, nor a guarantee that all of the bird species on this list will be found on or near this location. This list was compiled from data provided by AZGFD (N.d.) and USFWS (2008).

[2] Habitat information and determinations compiled from species profiles found on USFWS website (https://ecos.fws.gov) and the All About Birds website (https://www.allaboutbirds.org/news/).

Migratory Birds, Birds of Conservation Concern [1, 2]	
Western yellow-billed cuckoo *Coccyzus americanus*	Addressed as Federally Listed Species in table above.

Source: AZGFD Report, retrieved December 14, 2020 (AZGFD N.d.)

Species of Economic and Recreational Importance	
Common Name	**Scientific Name**
America pronghorn	*Antilocapra americana*
Mule deer	*Odocoileus hemionus*
Mountain Lion	*Puma concolor*
Mourning dove	*Zenaida macroura*
Scaled quail	*Callipepla squamata*

Source: AZGFD Report, retrieved December 14, 2020 (AZGFD N.d.)

Appendix B: USFS TEAMS Monitoring Data 2016

Table 11. Summary of ZC-1 Line Point Intercept Data

Key Area Information	Species	Line point intercept cover at ZC-1	
		Canopy	Basal
Zuni Concho North Ecological Site ID: DX035X01I104 Key Area: ZC-1 UTM 660922 E, 3842972 N	Alkali Sacaton (*Sporobolus airoides*)	32%	5%
	Fourwing Saltbush (*Atriplex canescens*)	6%	0%
	James' Galleta (*Pleuraphis jamesii*)	7%	1%
	Desert Globemallow (*Sphaeraclcea ambigua*)	3%	0%
	Annual Forb	1%	0%

Cover/Litter/Bare Ground	
Bare Ground	33%
Basal Cover	6%
Canopy Cover	46%
Litter	49%

Table 12 Summary of ZC-2 Line Point Intercept Data

Key Area Information	Species	Line point intercept cover at ZC-2	
		Canopy	Basal
Zuni Concho West Ecological Site ID: DX035X01I113 Key Area: ZC-2 UTM 617593 E, 3825073 N	Blue Grama (*Bouteloua gracilis*)	15%	1%
	Ring Muhly (*Muhlenbergia torreyi*)	11%	2%
	James' Galleta (*Pleuraphis jamesii*)	19%	1%
	Desert Globemallow (*Sphaeraclcea ambigua*)	6%	0%
	Wooly Plantain (*Plantago patagonica*)	2%	0%
	Astragalus spp.	3%	0%
	Threeawn (*Aristida*)	3%	0%
	Oneseed Juniper (*Juniperus monosperma*)	14%	0%
	Broom Snakeweed (*Gutierrezia sarothrae*)	3%	0%
	Needle And Thread (*Hesperostipa comata*)	1%	0%
	Low Woollygrass (*Dasyochloa pulchella*)	1%	0%

Cover/Litter/Bare Ground	
Bare Ground	4%
Basal Cover	4%
Canopy Cover	73%
Litter	59%
Surface Fragments > ¼ & <= 3"	27%

Appendix C: DPC Compared to Species Composition from LPI Data.

Table 13 Key Area ZC-1 Plant Community Composition Compared to DPC Objectives

DPC Objectives for Plant Community Composition	Species Composition ZC-1
Grasses 69-83% Composition	Alkali Sacaton – 66% James' Galleta – 14%
	Total – 79%
Forbs 6-12% Composition	Desert Globemallow – 6% Annual Forb – 2%
	Total – 8%
Shrubs 11-19% Composition	Fourwing Saltbush – 12%
	Total – 12%

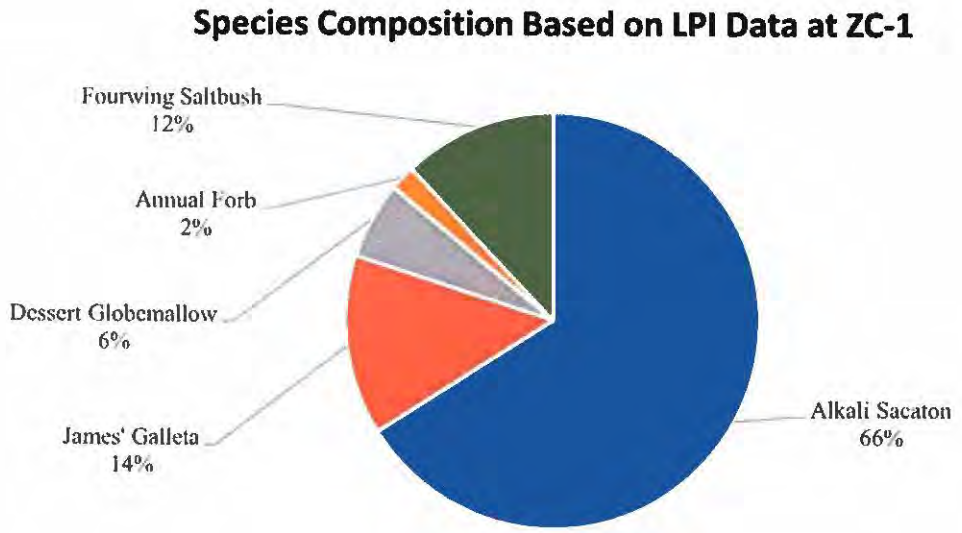

Figure 8 Species Composition Based on LPI Data at ZC-1

Table 14 Key Area ZC-2 Plant Community Species Composition Compared to DPC Objectives

DPC Objectives for Plant Community Composition	Species Composition ZC-2
Grasses 74-84% Composition	Blue Gramma – 19% Ring Muhly- 14% James' Galleta – 24% Needle and Thread – 1% Threeawn – 4% Low Woolygrass – 1 %
	Total – 63%
Forbs 2-4% Composition	Wooly Plantain – 3% Dessert Globemallow – 8%
	Total – 11%
Shrubs 11-15% Composition	Broom Snakeweed – 4% Astragalus spp. - 4%
	Total – 8%
Succulents 2-3% Composition	Na
	Total – 0%
Trees 2-4 % Composition	Oneseed Juniper – 18%
	Total – 18%

Species Composition Based on LPI Data at ZC-2

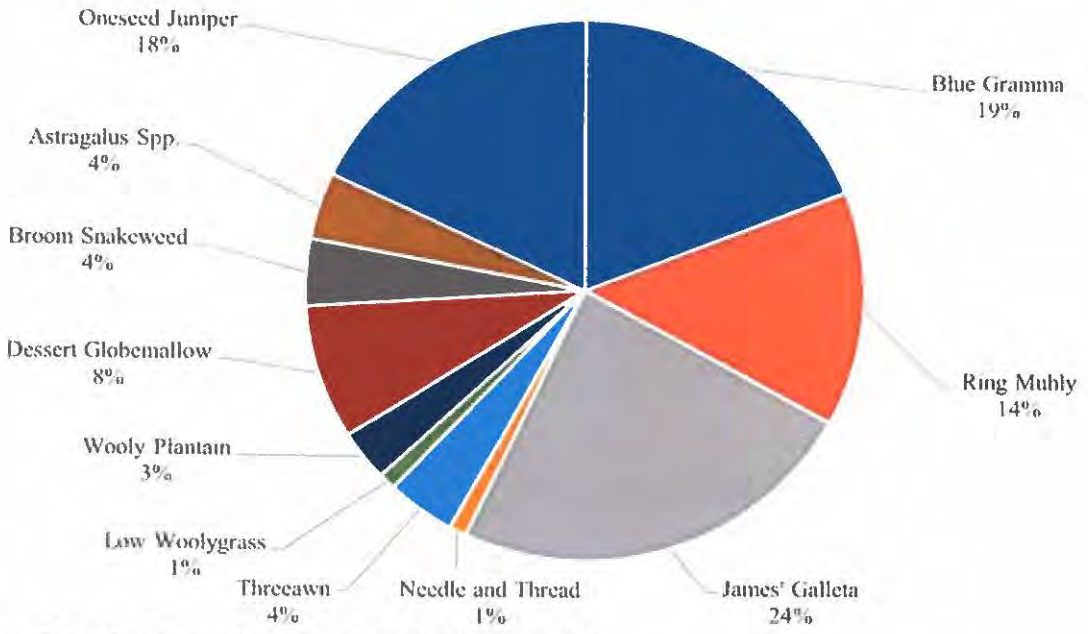

Figure 9 Species Composition Based on LPI Data at ZC-2

Appendix D: DPC Objectives and Methodology for Key Area ZC-1

The information below presents the process and sources for establishing Desired Plant Community Objectives for Key Area ZC-1, Clay Loam Wash 10-14" p.z. DX035X01I104 https://edit.jornada.nmsu.edu/catalogs/esd/035X/DX035X01I104,.

Bare ground/Litter Cover

Both bare ground and litter cover objectives were established from Table 6 of the ESD in the "State" portion of the ESD under "Community 1.1, Alkali sacaton-western wheatgrass/Fourwing saltgrass (HCPC)", pictured below, in Figure xx. The range for both bare ground and litter cover were provided in this table as can be seen in the highlighted sections in the figure of ESD Table 6. The DPC objectives for bare ground was a desired range of 20 to 40 percent. While the DPC objective for litter was a desired range of 15 to 35 percent.

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	0%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	15-35%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	20-40%

Figure 10 Cover Percent for Key Area ZC-1
Source: ESD Reference Sheet

Basal Cover

Basal cover was established from Table 7 of the ESD in the "State" portion of the ESD under "Community 1.1, Alkali sacaton-western wheatgrass/Fourwing saltgrass (HCPC)". This table is pictured below, Figure 11 shows Table 7. Soil surface cover. This was used to establish the range for basal cover, the table provided a range of basal cover for each soil surface category. The low

and the high for each category was added up to establish a range for this objective. The DPC objective for basal cover was to maintain 12 to 35 percent basal cover.

Table 7. Soil surface cover

Tree basal cover	0%
[redacted]	
Shrub/vine/liana basal cover	1-5%
Grass/grasslike basal cover	10-25%
Forb basal cover	1-5%
Non-vascular plants	0%
Biological crusts	0%
Litter	0%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Figure 11 Soil Surface Cover for Key Area ZC-1
Source: ESD Reference Sheet

Canopy Cover

Canopy Cover was established from Table 8 of the ESD in the "State" portion of the ESD under "Community 1.1, Alkali sacaton-western wheatgrass/Fourwing saltgrass (HCPC)". This table is pictured below; Figure 12 shows Table 8. Canopy structure (% cover). This was used to establish canopy cover. The tables provided a range for the percent cover, and the lows and highs were used to establish a range. The DPC objective for canopy cover is to maintain on average 0 to 40 percent canopy cover.

Table 8. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	–	0-2%	0-5%	0-2%
>0.5 <= 1	–	0-2%	0-15%	0-2%
>1 <= 2	–	0-2%	0-7%	0-1%
>2 <= 4.5	–	0-1%	0-1%	–
>4.5 <= 13	–	–	–	–
>13 <= 40	–	–	–	–
>40 <= 80	–	–	–	–
>80 <= 120	–	–	–	–
>120	–	–	–	–

Figure 12 Canopy Cover (% cover)
Source: ESD Reference Sheet

Maintain an average of 40 percent canopy cover and 12 to 35 percent basal cover.

- Maintain an average of plant composition of 69 to 83 percent grasses, 6 to 12 percent forbs, and 11 to 19 percent shrubs.
- Maintain average bare ground between 20 to 40 percent
- Maintain an average litter cover of 15 to 35 percent.

Desired Plant Community Composition:

The Table below presents the process used for establishing Desired Plant Community Composition for the Clay Loam Wash 10-14" p.z. ecological site. The species composition was established using the annual production range by plant type as provided in Table 9 of the ESD reference sheet. Table 9 provides a low and high annual production range for each vegetation type. Under each vegetation type the low and high annual production values were added up. These sums were then divided by the total low and high annual production values for all vegetations types, this resulted in a percent composition for that vegetation type providing an appropriate range for the desired plant community composition.

Table 15 Desired Plant Community Composition Methodology for Key Area ZC-1

Desired Plant Community Composition Methodology For Key Area ZC-1 ESD = Ecological Site Description for Clay Loam Wash 10-14" p.z. (DX035X01I104)		
Total Annual Production for All Vegetation *(* Note this is the sum of all values as provided in Table 9 of the ESD Reference Sheet)* **1,235 (low) – 4,275 (high) lbs. per acre**		
Vegetation Type	**Low Production Values**	**High Production Values**
Grasses	1,035/1,235 * 100 = 83%	2,980/4,275 * 100 = 69%
Shrubs	130/1,235 * 100 = 11%	800/4,275 * 100= 19%
Forbs	70/1,235 * 100 = 6%	495/4,275 * 100 = 12%

Desired Plant Community Composition Objectives for Clay Loam Upland 10-14" p.z. (DX035X01I104)

Methodology: The DPC objectives were established using the percentages calculated above and are summarized below.

Vegetation Type	**Range of Acceptable Composition**
Grasses	69-83%
Shrubs	11-19%
Forbs	6-12%

Appendix E: DPC Objectives and Methodology for Key Area ZC-2

The information below presents the process and sources for establishing Desired Plant Community Objectives for Key Area ZC-2, Loamy Upland 10-14" p.z. DX035X01I113 https://edit.jornada.nmsu.edu/catalogs/esd/035X/DX035X01I113

Bare ground/Litter Cover

The DPC objectives for bare ground and litter cover were provided from the indicators section of the Loamy Upland ESD. Bare ground was presented in indicator four and litter cover was presented in indicator fourteen, pictured below in Figure 13. The DPC objective for bare ground was to maintain an average of 30 to 50 percent, while the objective for litter was to maintain an average litter cover of 20 to 40 percent.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground ranges from 30-50%. Drought may cause an increase in bare ground.

14. **Average percent litter cover (%) and depth (in):** Average percent litter cover ranges from 20-40% and depth 1/8"inch. Within plant interspaces litter ranges from 5 to 20% cover ,while under shrub and tree canopies litter can range up to 50% cover with depths from 1/8 to 1/4 inch thick.

Figure 13 Objectives for Bare Ground and Litter Cover
Source: ESD Reference Sheet

Canopy Cover/Basal Cover

- The DPC objectives for canopy and basal cover were obtained from the indicators section of the Loamy Upland ESD. Indicator ten provided ranges for both canopy and basal cover, pictured below in Figure 14. The DPC objective is to maintain an average of 30 to 40 percent canopy cover and 10 to 20 percent basal cover.
-

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial**

distribution on infiltration and runoff: This site is characterized by a relatively even distribution of mostly grasses with some shrubs and a few forbs. This type of plant community is moderately effective at capturing and storing precipitation thus reducing runoff. Cover averages 30-40% (25 to 30% grasses, 5-10% shrubs, 2-5% forbs). Basal plant cover averages 10-20% (15% grasses, 2% shrubs, 1% forbs). Both cover values decrease during a prolonged drought.

Figure 14 Canopy and Basal Cover for Key Area ZC-2
Source: ESD Reference Sheet

Maintain an average plant composition 74 to 83 percent grasses, 11 to 15 percent shrubs, and 2 to 4 percent for forbs, 2 to 3 percent succulents, and 2 to 4 percent trees.

Desired Plant Community Composition:

The Table below presents the process used for establishing Desired Plant Community Composition for the Loamy Upland 10-14" p.z. ecological site. The species composition was established using the annual production range by plant type as provided in Table 8 of the ESD reference sheet. Table 8 provides a low and high annual production values for all vegetation type. Under each vegetation type the low and high annual production values were added up. These sums were then divided by the total low and high annual production values for all vegetation types, this resulted in a percent composition for that vegetation type providing an appropriate range for the desired plant community composition.

Table 16 **Desired Plant Community Composition Methodology for Key Area ZC-2**

Desired Plant Community Composition Methodology For Key Area ZC-2 ESD = Ecological Site Description for Loamy Upland 10-14" p.z. (DX035X01I113)		
Total Annual Production for All Vegetation *(*Note this is the sum of all values as provided in Table 8 of the ESD Reference Sheet)* **413 (low) – 895 (high) lbs. per acre**		
Vegetation Type	**Low Production Values**	**High Production Values**
Grasses	345/413 * 100 = 83%	660/895 * 100 = 74%
Shrubs	44/413 * 100 = 11%	135/895 * 100= 15%
Forbs	7/413 * 100 = 2%	35/895 * 100 = 4%
Succulents	9/413 * 100 = 2%	30/895 * 100 = 3%
Trees	8/413 * 100 = 2%	35/895 * 100 = 4%

Desired Plant Community Composition Objectives for Loamy Upland 10-14" p.z. (DX035X01I113) Methodology: The DPC objectives were established using the percentages calculated above and are summarized below.	
Vegetation Type	**Range of Acceptable Composition**
Grasses	74-83%
Shrubs	11-15%

Forbs	2-4%
Succulents	2-3%
Trees	2-4%