Upper Centennial Complex Grazing Permit Renewal

FINAL ENVIRONMENTAL ASSESSMENT

DOI-BLM-AZ-P010-2017-0003-EA

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It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

DOI-BLM-AZ-P010-2017-0003-EA

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF MAPS

1.0 INTRODUCTION/PURPOSE AND NEED

1.1 Introduction

The Bureau of Land Management (BLM) is proposing to fully process the term grazing authorizations on the Central Arizona Ranch Company (CARCO, #3014), Forepaugh (#5012), and Cross Mountain (#3021) allotments. A Rangeland Health Evaluation (RHE) was prepared for these three allotments and the Auza Allotment (#5032) in 2016 (Appendix A). The Auza Allotment is being renewed separately under a categorical exclusion (DOI-BLM-AZ-P010-2017-0020-CX).

The Upper Centennial Complex (Complex) (Map 1) is located north and east of the town of Aguila, Arizona. State Route 71 bisects the Forepaugh Allotment. The CARCO Allotment lies to the west of the Forepaugh Allotment. The Cross Mountain Allotment consists of two scattered parcels located north and south of US-60 between Aguila and Wickenburg, Arizona. The allotments analyzed in this document cover approximately 132,000 acres located in Maricopa and Yavapai counties. BLM administered lands account for approximately 47,293 acres. The remainder is Arizona State Trust land (76,901 acres) and privately held lands (7,804 acres).

This Environmental Assessment (EA) has been prepared to analyze and disclose the potential environmental consequences associated with the Proposed Action and alternatives for livestock management on the Complex allotments. The analysis was conducted in accordance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations (CFR) 1500-1508), and direction provided under BLM NEPA Handbook H-1790-1 (2008).

Allotment Profiles

The CARCO Allotment

The current permit holder for the CARCO Allotment is the Forepaugh Cattle Company. This Allotment is run in conjunction with the Forepaugh Allotment in an informal livestock pasture rotation system.

The Forepaugh Allotment

The current lease holder for the Forepaugh Allotment is the Forepaugh Cattle Company. This Allotment is run in conjunction with the CARCO Allotment in an informal livestock pasture rotation system.

The Cross Mountain Allotment

The current permit holder for the Cross Mountain Allotment is R.L. Echeverria. There is no formal rotation system in place on the Allotment. The majority of the Allotment is State Trust land.

Table 1: CARCO Allotment Profile.

Permittee	Forepaugh Cattle Company
Percent/Acres BLM Land	89 percent/37,000 acres
Percent/Acres State Land	4 percent/1,704 acres
Percent/Acres Private Land	7 percent/2,790 acres
Grazing Preference	2,329 AUMs
Season of Use	Yearlong
Number and class of livestock use	211 Cattle

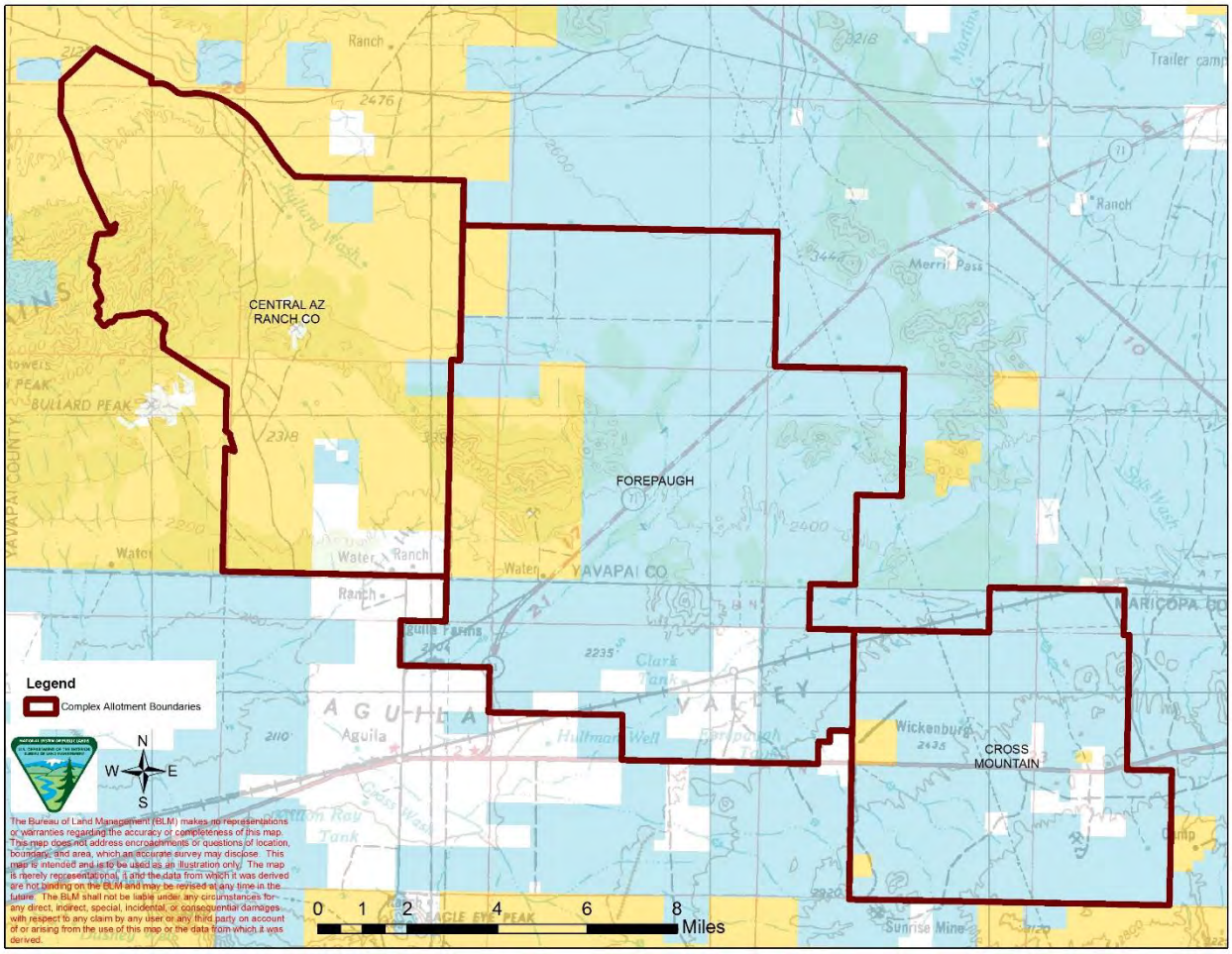
Table 2: Forepaugh Allotment Profile.

Permittee	Forepaugh Cattle Company
Percent/Acres BLM Land	15 percent/9,431 acres
Percent/Acres State Land	80 percent/50,248 acres
Percent/Acres Private Land	5 percent/3,444 acres
Grazing Preference	888 AUMs
Season of Use	Yearlong
Number and class of livestock use	74 Cattle

Table 3: Cross Mountain Allotment Profile.

Permittee	R.L. Echeverria
Percent/Acres BLM Land	3 percent/862 acres
Percent/Acres State Land	91 percent/24,949 acres
Percent/Acres Private Land	6 percent/1,570 acres
Grazing Preference	12 AUMs
Season of Use	Yearlong
Number and class of livestock use	1 Cattle

Map 1: Allotments within the Upper Centennial Complex.



1.2 Purpose and Need

The purpose of this action is to consider livestock grazing opportunities on public lands where consistent with management objectives, including the BLM *Arizona Standards for Rangeland Health and Guidelines for Livestock Grazing Management* (Rangeland Health Standards) (BLM 1997).

The need for this action is established by the Taylor Grazing Act, the Federal Land Policy and Management Act, Fundamentals of Range Health (43 CFR 4180), and the Hassayampa Field Office (FO) Resource Management Plan (RMP) (BLM 2010) to respond to an application for renewal of an expiring livestock grazing lease to graze livestock on public land. In detail, the analysis of the actions is needed because:

- The Bradshaw-Harquahala RMP identifies resource management objectives and management actions that establish guidance for managing a broad spectrum of land uses and allocations for public lands in the Hassayampa FO. The RMP allocated public lands within the Complex as available for domestic livestock grazing. Where consistent with the goals and objectives of the RMP and Land Health Standards, the issuance of grazing

permits or leases to qualified applicants are provided for by the Taylor Grazing Act and the Federal Land Policy and Management Act.

- BLM Arizona adopted the Arizona Rangeland Health Standards (Land Health Standards) and Guidelines for Livestock Grazing Management (Arizona S&Gs) in all Land Use Plans in 1997 (Appendix A). The Land Health Standards and Guidelines for Grazing Administration were also incorporated into the RMP. The Land Health Standards for Rangeland should be achieving or making significant progress toward achieving the standards. Guidelines direct the selection of grazing management practices and, where appropriate, livestock facilities to promote significant progress toward, or the attainment and maintenance of, the standards. The RHE completed for the Complex determined that Standard 1 is met on the CARCO and Forepaugh allotments, Standard 3 is met on the CARCO and Cross Mountain allotments, and Standard 2 does not apply to the Complex.

1.3 Scoping and Issue Identification

Internal scoping was conducted with BLM specialists on February 6 and March 6, 2017. External scoping was conducted via letters sent to individuals and organizations on the Consultation, Coordination, and Cooperation list. Recipients were asked to comment on the RHE and the Proposed Action. The scoping period for the Complex was November 10 through January 1, 2017. Comments were received from Forepaugh Cattle Company on the CARCO and Forepaugh allotments. These comments are summarized in Appendix A.

Issues for Analysis

For the purpose of BLM NEPA analysis, an "issue" is a point of disagreement, debate, or dispute with a Proposed Action based on some anticipated environmental effect. An issue is more than just a position statement, such as disagreement with grazing on public lands. An issue:

- Has a cause and effect relationship with the Proposed Action or alternatives;
- Is within the scope of the analysis;
- Has not been decided by law, regulation, or previous decision; and
- Is amenable to scientific analysis rather than conjecture.

For the purposes of this EA, the BLM analyzed issues if analysis of the issue is necessary to make a reasoned choice between alternatives, or the issue is significant or may have potentially significant effects (BLM 2008). The Interdisciplinary Team (IDT) carefully considered comments by BLM specialists, the permittee, and affected agencies in order to identify issues relevant to issuing a 10-year grazing permit or lease. The issues derived from internal and external scoping on technical recommendations of the RHE (BLM 2016) are as follows:

Issue 1 –Upland vegetation: How would continued livestock grazing affect the health of upland vegetation?

Issue 2 –Wildlife: How would continued livestock grazing affect priority wildlife species and migratory birds?

1.4 Land Use Plan Conformance Statement

Rangeland management decisions in the Bradshaw-Harquahala RMP that pertain to the Proposed Action include:

Rangeland Management (GM)

Desired Future Conditions:

GM-1 "Rangeland conditions conform to the Land Health Standards described in Arizona Standards for Rangeland Health and Guidelines for Grazing Administration, which describe the desired conditions needed to encourage proper functioning of ecological processes. These standards are described in greater detail in the above section on Land Health Standards."

GM-2 "Watersheds are in properly functioning condition, including their upland, riparian, and aquatic components. Soil and plant conditions support infiltration, storage, and release of water that are in balance with climate and landform."

GM-3 "Ecological processes are maintained to support healthy biotic populations and communities."

Land Use Allocation

GM-4 "Administer 93 grazing authorizations within the grazing allotment boundaries shown on Map 13."

GM-5 "Public lands without a grazing permit or lease authorization will remain unauthorized for livestock grazing."

Management Actions

GM-6 "Build livestock control fences and alternative water sources where needed to meet natural resource objectives. Fence construction and maintenance will follow guidance provided in BLM's Handbook on Fencing No. 1741-1."

GM-8 "Inventory and/or monitoring studies are used to determine if adjustments to permitted use levels, terms and conditions, and management practices are necessary in order to meet and/or make significant progress towards meeting the Arizona Standards for Rangeland Health and other management objectives."

GM-9 "Implement grazing management changes as needed to produce riparian areas that are in or making progress toward proper functioning condition."

GM-11 "Range improvements needed for proper management of the grazing program will be determined and completed, including repair and/or installation of fences, cattle guards, water developments, and vehicle routes needed to access improvement areas."

GM-12 "Vehicular access to repair range improvements by the grazing permittee or lessee is considered administrative access. Use of vehicle routes closed to public use, but limited to administrative uses, will be allowed to maintain or repair range improvements. Off-route

vehicle use will require prior authorization unless the needed access is to resolve an immediate risk to human health, safety, or property."

GM-13 "One-time travel off designated routes to access or retrieve sick or injured livestock would be authorized as an administrative use for transporting the animal to obtain medical help."

GM-14 "Management practices to achieve Desired Plant Communities (DPCs) will consider protecting and conserving known cultural resources, including historical sites, prehistoric sites, and plants of significance to Native American people."

GM-15 "Apply management actions outlined in the Arizona Standards for Rangeland Health and Guidelines for Grazing Administration (Arizona Standards for Rangeland Health) to recognize and correct potential erosion problems that could degrade other resources, with prioritized emphasis on sites that might directly affect species that have been listed as threatened, endangered, or candidate by the United States Fish and Wildlife Service (USFWS)."

Guidelines for Standard One

GM-17 "Management activities will maintain or promote ground cover that will provide for infiltration, permeability, soil moisture storage, and soil stability appropriate for the ecological sites. The ground cover should maintain soil organisms, plants, and animals to support the hydrologic and nutrient cycles and energy flow. Ground cover and signs of erosion are surrogate measures for hydrologic and nutrient cycles, and energy flow."

Guidelines for Standard Two

GM-19 "Management practices maintain or promote sufficient vegetation to maintain, improve, or restore riparian-wetland functions of energy dissipation, sediment capture, groundwater recharge, and stream bank stability, thus promoting stream channel morphology (e.g. gradient, width/depth ratio, channel roughness, and sinuosity), and functions suitable to climate and landform."

Guidelines for Standard Three

GM-27 "DPC objectives will be quantified for each allotment through the rangeland monitoring and evaluation process. Ecological site descriptions available through the Natural Resources Conservation Service and other data will be used as a guide for addressing site capabilities and potentials for change over time. These DPC objectives are vegetation values that BLM is managing over the long term. Once established, DPC objectives will be updated and monitored by the use of indicators for Land Health Standard Three."

Travel Management (TM)

Motorized and Mechanized Travel and Public Access (TM)

TM-8 “All motorized and mechanized travel is limited to existing roads and trails, according to the BLM inventory of routes, until final route designations are made. Where inventories are not complete, use is limited to existing routes. Inventoried routes may be updated with new information from BLM, citizens, or partners. Livestock and game trails are not considered existing routes or trails.”

TM-9 “Cross-country travel is prohibited away from existing, inventoried routes. This prohibition will continue after routes are formally designated. The following exceptions apply in both cases:

- Public health, safety, and law enforcement emergencies;
- Administrative uses; or
- BLM-authorized tasks approved by the authorized officer.”

TM-13 “Motorized vehicles may not be used off designated routes to retrieve game. The cross-country use of wheeled game carriers is permitted, except in wilderness areas. Permittees, including livestock operators, may not use motorized vehicles off designated routes without express permission from the Authorized Officer.”

1.5 Relationships to Statutes, Regulations, Manuals and Other Plans

The Taylor Grazing Act and the Federal Land Policy and Management Act (FLPMA) recognize grazing as a valid use of the public lands and require BLM to manage livestock grazing in the context of multiple use and sustained yield. Additionally, livestock grazing on public lands is managed according to grazing regulations found in the Code of Federal Regulations (at 43 CFR Part 4100).

The Taylor Grazing Act of 1934 provides for two types of authorized use: (1) A grazing permit, which is a document authorizing use of the public lands within an established grazing district, and are administered in accordance with Section 3 of the Taylor Grazing Act; and (2) a grazing lease, which is a document authorizing use of the public lands outside an established grazing district, and are administered in accordance with Section 15 of the Taylor Grazing Act. The CARCO and Cross Mountain grazing allotments are Section 3 permits. The Forepaugh allotment is a Section 15 grazing lease.

Title 43 CFR 4100.0-8 states, in part, “The authorized officer shall manage livestock grazing on public lands under the principle of multiple use and sustained yield, and in accordance with applicable land use plans.” Title 43 CFR 4130.2(a) states, in part, “Grazing permits or leases shall be issued to qualified applicants to authorize use on the public lands and other lands under the administration of the Bureau of Land Management that are designated as available for livestock grazing through land use plans.”

The Proposed Action is consistent with the Fundamentals of Rangeland Health (43 CFR 4180.1) and Rangeland Health Standards, which were developed through a collaborative process involving the Arizona Resource Advisory Council and the BLM State Standards and Guidelines team. The Secretary of the Interior approved the Standards and Guidelines in April 1997. These standards and guidelines address watersheds, ecological condition, water quality, and habitat for special status species. These resources are addressed later in this document.

The Biological Opinion for the Bradshaw-Harquahala RMP provides USFWS review of the continued implementation of the RMP (FWS 2006). The opinion provides terms and conditions and/or conservation measures for individual threatened or endangered species found within the boundaries of the Bradshaw-Harquahala management area.

Additionally, the following pertinent laws and/or agency regulations also apply:

- 43 CFR 4100 Grazing Administration -Exclusive of Alaska
- Taylor Grazing Act of 1934
- Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 et seq.)
- Public Rangelands Improvement Act of 1978
- 43 CFR 4100 Grazing Administration -Exclusive of Alaska
- Arizona Water Quality Standards, Revised Statute Title 49, Chapter II
- Clean Water Act of 1972, as amended
- Clean Air Act of 1970, as amended
- Endangered Species Act of 1973, as amended
- Section 106 of the National Historic Preservation Act of 1966, as amended
- National Environmental Policy Act of 1969
- Migratory Bird Treaty Act of 1917, and Executive Order 13186 *–Responsibilities of Federal Agencies to Protect Migratory Birds*

1.6 Decision to be Made

The Hassayampa Field Manager is the Authorized Officer responsible for the decisions regarding management of public lands within the Complex allotments. This analysis would help to inform the decision to renew, renew with modifications, or not renew the leases and permits. If renewed, management actions, mitigation measures, and/or monitoring requirements would be prescribed for the Complex allotments to ensure management objectives and Rangeland Health Standards continue to be achieved or make progress towards achievement.

2.0 PROPOSED ACTION AND ALTERNATIVES

This chapter describes the alternatives to be analyzed in detail in Chapter 3.0. The IDT developed three alternatives: 1). Proposed Action; 2). No Action; and 3). No Grazing, based on the analysis and technical recommendations presented in the RHE (Appendix A), and to respond to issues identified during scoping. The alternatives are designed to meet the purpose and need for action, conform to existing land use plans, and satisfy the legal and regulatory requirements for rangeland management.

Actions Common to All Action Alternatives

The following actions apply to each of the action alternatives below.

Arizona Standards for Rangeland Health

All the alternatives were designed to meet the following objectives, as described in the Rangeland Health Standards:

1. Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate, and landform (ecological site).
2. Riparian and wetland areas are in properly functioning condition.
3. Productive and diverse upland and riparian-wetland plant communities of native species exist and are maintained.

Stipulations

No new road construction would be permitted in conjunction with the alternatives. Routine maintenance would be performed on existing range improvements as needed.

2.1 Proposed Action

The Proposed Action is to renew the CARCO, Forepaugh, and Cross Mountain grazing authorizations for a period of 10-years with the following terms and conditions (Table 4). These terms and conditions are the same as the current grazing authorization, with the addition of Other Terms and Conditions, as described below.

Table 4 Proposed Mandatory Terms and Conditions.

Allotment	Livestock Number	Grazing Period	Percent Public Land	Animal Unit Months
CARCO	211 Cattle	3/1-2/28	92	2,329
Forepaugh	74 Cattle	3/1-2/28	100	888
Cross Mountain	1 Cattle	3/1-2/28	100	12

Other Terms and Conditions

Standard terms and conditions are found on Grazing Permit/Lease Form 4130-2a. In addition to the mandatory terms and conditions, other terms and conditions would be added to the grazing authorizations under the Proposed Action:

1. Supplemental feeding is limited to salt, mineral, and/or protein in block, granular, or liquid form.
2. The permittee/lessee must properly complete, sign and date an Actual Grazing Use Report Form (BLM Form 4230-5) annually. The completed form(s) must be submitted to the

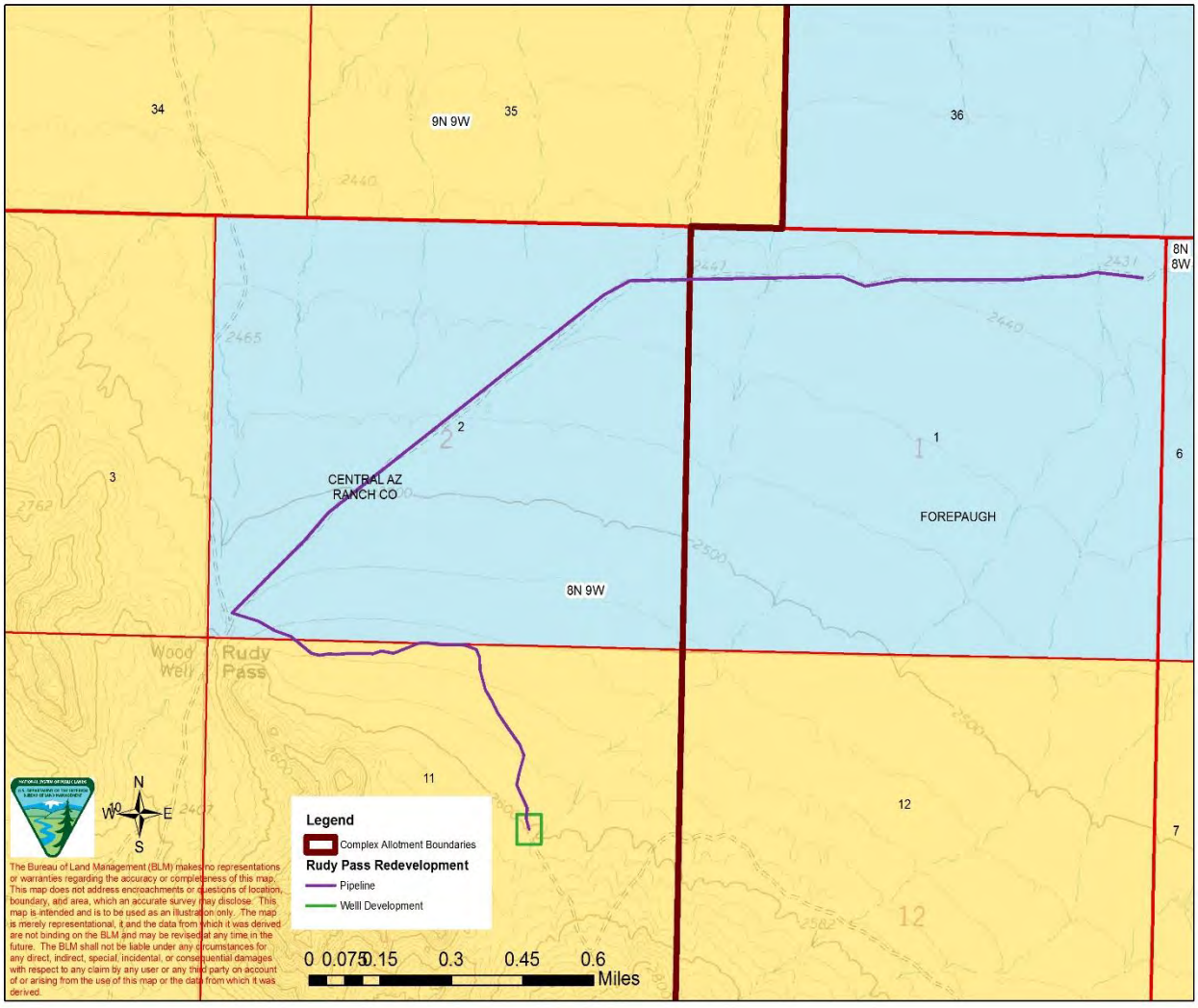
BLM, Hassayampa Field Office (HFO) within 15 days from the last day of authorized annual grazing use (43 CFR 4130.3-2 (d)); and

3. 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; 25 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.

Range Improvements

To facilitate orderly management of the range, a new water source is proposed on the CARCO Allotment. A well, 10,000 gallon capacity storage tank, and underground pipeline for approximately 4,200 feet on public land are proposed to be located in T8N, R9W, Section 11 in the southwest quarter of the northeast quarter (Map 2). The well and storage tank is to be located on a prior disturbed area at the confluence of several roads. An abandoned well associated with prior mining activity is located south of the proposed new well location. The pipeline would be buried down the centerline of the road heading northwest toward Rudy Pass. At Rudy Pass, this pipeline would continue across State Trust lands to the northeast, decreasing in elevation to the floodplain of Bullard Wash. Drinkers would be located at existing stock tanks to serve as supplemental water sources and at Rudy Pass to provide water at an abandoned well location. Drinkers would not be located at the proposed well due to its proximity to the Allotment boundary fence.

Map 2: Proposed Rudy Pass Water Development.



Due to gullying occurring on the floodplains north of Bullard Wash due to prior flooding, soil stabilization would be implemented. Gullies would be blocked using gabions to catch sediment and reduce headcutting and soil loss. Gabions or boulders would also be installed along the south bank of Bullard Wash. Bank sloughing in some areas along the wash are impacting vehicle routes across the wash as well as range improvements located on the adjacent floodplain.

2.2 No Action Alternative

A No Action Alternative is developed for two reasons. First, the No Action Alternative represents a viable and feasible choice in the range of management alternatives. Second, because a No Action Alternative represents the continuation of current management actions, it provides a benchmark of existing impacts continued into the future against which to compare the impacts of the other proposed management alternatives.

The No Action Alternative would renew the CARCO, Forepaugh, and Cross Mountain grazing authorizations for a period of 10-years with the same terms and conditions as shown in Tables 1 through 3.

2.3 No Grazing Alternative

This alternative was developed to address unresolved conflicts concerning alternative uses of available resources, in this case, alternative uses of forage (40 CFR 1501.2(c)). Under the No Grazing Alternative, the BLM would not authorize grazing in the CARCO, Forepaugh, or Cross Mountain allotments for a 10-year term and all Animal Unit Months (AUMs) for active preference would not be available for livestock grazing on public lands (i.e. livestock grazing would be deferred for the 10-year permit period). No new range improvement projects would be constructed and no maintenance would occur on existing projects.

2.4 Alternatives Considered but Eliminated From Detailed Analysis

Reduced Grazing Alternative

The IDT reviewed a "reduced grazing" alternative. The purpose of the alternative was to consider whether reducing the livestock stocking rate on the allotments presented a viable means of meeting the purpose and need for this action.

Rather than select an arbitrary number or percentage of reduction, the BLM typically uses a "desired stocking rate analysis" to estimate livestock carrying capacity on the allotments. A stocking rate analysis provides a non-arbitrary method to identify alternative possible stocking rates on an allotment. This analysis identifies stocking rates based on a desired utilization percent of key forage species.

A desired stocking rate analysis for the CARCO and Forepaugh allotments, based on actual use and utilization data, indicate that current livestock stocking rates are below the potential stocking rate of the allotments. While some years of utilization data show use levels above the utilization threshold of 40 percent for perennial grass species (Holechek 1988) and 30 percent for browse species (Heffelfinger 2006), overall utilization rates on the allotments are within utilization limits.

A desired stocking rate analysis was not completed for the Cross Mountain Allotment. This allotment is primarily Arizona State Trust land, with a BLM stocking rate of 12 AUMs. No livestock stocking rate reduction could be accomplished on these lands without cancellation of the grazing preference. As public lands on this Allotment are unfenced from State Trust lands, livestock would still be present on public lands regardless of the BLM grazing lease status.

3.0 AFFECTED ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

This chapter identifies and describes the current condition and trend of elements or resources in the human environment which may be affected by the Proposed Action or No Action Alternative. The Affected Environment is the same for all alternatives (Map 1).

This chapter describes the potential direct, indirect, and residual effects to resources that may result from the Proposed Action or No Action Alternative, as well as identifies the potential monitoring needs associated with the specific resources.

3.1 Types of Effects

This chapter describes the potential direct, indirect, and residual effects to resources that may result from the Proposed Action or Alternatives, as well as identifies the potential monitoring needs associated with the specific resources. In this document, the word "adverse" is used in characterizing minor (non-significant) detrimental effects to a resource, and "negligible" is used in characterizing minor (non-significant) detrimental effects to a resource that are generally undetectable. "Beneficial" effects would have a positive effect on the resource. In this document, the terms "effect" and "impact" are used synonymously. Assessment of effects can be for short-term (generally considered during Project implementation) or the long-term. Effects fall into two categories, direct (caused by the action, same time and place) and indirect (caused by the action, but later in time or further in distance).

3.2 General Setting

The Complex is located north and east of the town of Aguila, Arizona. Access to the CARCO Allotment is from Aguila to the south, State Route 71 to the east, and Alamo Road to the north. Primary access to the Forepaugh Allotment is from State Route 71 to the west, and US 60 to the south (Map 1). Access to the Cross Mountain Allotment is limited and primarily from US 60, which bisects the allotment.

The Complex comprises approximately 132,000 acres of mixed ownership land located primarily in Yavapai County, with isolated parcels located in Maricopa County. Approximately 47,293 acres of the Complex are BLM-administered lands. Specific acreages are given in Section 1.0. Legal descriptions of the leased lands are given in Table 5, below.

Table 5. Legal Descriptions of Permitted and Leased Public Lands.

Allotment	Township	Range	Sections
CARCO	8 North	9 West	Section 3-6, 8-11, 14,15,17,19,20,22,23,29,30 and Portions of 7, 18
	8 North	10 West	Portion of Sections 1 and 2
	9 North	9 West	Sections 14, 15, 17-23, 26-28, 30,31,33-35 and Portions of 1,2,6,7,8, 29, 32
	9 North	10 West	Sections 3, 10-15,23-27, 36 and Portions of 4,9,16,22,34,35
	10 North	10 West	Portions of Sections 33,34,35
Forepaugh	8 North	8 West	Sections 5,7,8,17,18,20,29,30 and Portions of Section 19
	8 North	9 West	Sections 12,13,24,25
	9 North	8 West	Section 24,25
Cross Mountain	7 North	6 West	Portions of Sections 17 and 18
	7 North	7 West	Section 16, and Portions of Section 33

The terrain of the Complex varies from alluvial plains to moderately steep and steep mountain grades. Elevations on the CARCO Allotment range from 3,530 feet in the hills south of Bullard Wash, to 2,170 feet on the Centennial wash floodplain. Elevations on the Forepaugh Allotment range from 3,160 feet at Forepaugh Peak, to 2,200-2,500 feet across most of the allotment. Elevations on the Cross Mountain Allotment fall between 2,300-2,600 feet north of US-60, and up to 2,950 feet on Outlaw Hill in the pasture south of US-60.

Climate within the Complex is typical of the 7-10 inch precipitation zone of the Sonoran Desert. Rainfall is bimodal, comprising winter rains and summer monsoons. Limited rainfall is expected during the spring and later fall months. Temperatures in the summer months are hot, with mild winters and few days of frost (Appendix A).

Supplemental Authorities

Appendix 1 of BLM's NEPA Handbook (H-1790-1) identifies supplemental authorities that are subject to requirements specified by statute or executive order and must be considered in all BLM environmental documents (BLM 2008). Table 1 lists the Supplemental Authorities and their status in the Project Area. Supplemental authorities that may be affected by the Proposed Action or No Action Alternative are further described in this EA.

Table 6. Supplemental Authorities*.

Resource	Present Yes/No	May be Affected Yes/No/ Not Applicable (N/A)	Rationale
Air Quality	Y	N	The allotments are located within an air quality basin that is in attainment for all pollutants. Under the Proposed Action, during construction of the water pipeline there would negligible particulates (fugitive dust) and emissions from vehicles and equipment. Under the Proposed Action, livestock grazing in the allotments would continue. Livestock operations, by use of motorized vehicles and equipment, contributes negligible particulates (fugitive dust) and emissions. Livestock would continue to contribute negligible amounts of methane.
Areas of Critical Environmental Concern	N	N/A	Resource Not Present.
Cultural Resources	Y	N	Under the Proposed Action, the continuation of livestock grazing would have no adverse effect to historic properties in the allotments. The BLM has completed a Class III cultural resources inventory for the proposed waterline and water storage tank and determined no historic properties would be affected.
Environmental Justice	N	N/A	Resource Not Present.
Farm Lands (prime or unique)	N	N/A	Resource Not Present.
Floodplains	N	N/A	Resource Not Present.
Noxious and Invasive Weeds	Y	N	Although noxious and invasive weeds are present in the allotments, none of the Proposed Action would significantly increase the potential spread of existing weed populations.
Migratory Birds	Y	Y	Carried Forward for Analysis. See Section 3.2.3.
Native American Religious Concerns	N	N/A	Resource Not Present.
Threatened or Endangered Species	N	N/A	Resource Not Present.
Wastes, Hazardous or Solid	N	N/A	Resource Not Present.
Water Quality (Surface/Ground)	N	N/A	Resource Not Present.
Wetlands/Riparian Zones	N	N/A	Resource Not Present.
Wild and Scenic Rivers	N	N/A	Resource Not Present.
Wilderness/WSA	N	N/A	Resource Not Present.

**See H-1790-1 (January 2008) Appendix 1 Supplemental Authorities to be Considered.*

Supplemental Authorities determined to be Not Present or Present/Not Affected need not be carried forward or discussed further in the document. Supplemental Authorities determined to be Present/May Be Affected may be carried forward in the document.

Resources or Uses Other Than Supplemental Authorities

BLM specialists have evaluated the potential impact of the Proposed Action or No Action Alternative on these resources and documented their findings Table 2. Resources or uses that may be affected by the Proposed Action or No Action Alternative are further described in this EA (BLM 2008).

Table 7. Resources or Uses Other Than Supplemental Authorities.

Resource or Issue**	Present Yes/No	May be Affected Yes/No/ Not Applicable (N/A)	Rationale
BLM Sensitive Species (animals)	Y	Y	Carried Forward for Analysis. See Section 3.2.3.
BLM Sensitive Species (plants)	N	N/A	Resource Not Present.
Fire Management	Y	N	Under the Proposed Action, the continuation of livestock grazing in the allotments would have no impact on fire suppression activities.
Forest Resources	N	N/A	Resource Not Present.
General Wildlife	Y	Y	Carried Forward for Analysis. See Section 3.2.3.
Lands and Realty	Y	N	Although existing right-of-ways occur in the allotments, under the Proposed Action, the continuation of livestock grazing would have no impact on existing or consideration of future authorizations.
Lands with Wilderness Characteristics	N	N/A	Resource Not Present.
Minerals	N	N/A	Resource Not Present.
Paleontological	N	N/A	Resource Not Present.
Recreation	Y	N	Although dispersed recreation occurs throughout the allotments, under the Proposed Action the continuation of livestock grazing would have no effect on these activities.
Socioeconomics	Y	N	Under the No Grazing Alternative, the removal of permitted livestock grazing from the allotments would have an adverse impact to the grazing leasee, and the negligible contribution to economic input in the county the allotments are located in.
Soils	Y	Y	Carried Forward for Analysis. See Section 3.2.5.
Travel Management	Y	N	Although routes exist in the allotments for public access, under the Proposed Action the continuation of livestock grazing would have no impact to travel through the allotments.
Vegetation	Y	Y	Carried Forward for Analysis. See Section 3.2.2.

Visual Resource Management	Y	N	Although portions of the allotments are designated as either VRM Class II, III or IV, under the Proposed Action the continuation of livestock grazing would not alter the visual character of the allotments. Under the Proposed Action, the construction of the underground waterline would have a short-term and negligible visual impact until native vegetation recovers.
Wild Horses and Burros	N	N/A	Resource Not Present.

***Resources or uses determined to be Not Present or Present/Not Affected need not be carried forward or discussed further in the document. Resources or uses determined to be Present/May Be Affected may be carried forward in the document.*

Resources Considered for Analysis

The following resources are or may be present in the Project Area and may be affected by the Proposed Action or No Action Alternative.

3.2.1 Vegetation Resources

This section discloses the impacts of livestock grazing on upland vegetation within the Complex allotments. This section also responds to the following issues identified in Chapter 1:

Issue 1 – Upland vegetation: How would continued livestock grazing affect the health of upland vegetation?

The BLM develops RHEs to determine whether standards are being achieved on a grazing allotment and to determine if livestock grazing is a causal factor for not achieving, or failing to make significant progress toward achieving, land health standards. Land Health Standard 3 is specific to upland vegetation and is evaluated based on vegetation monitoring within the Complex allotments.

Upland vegetation monitoring of the Complex allotments shows a vegetation community structure typical of the 7-10 inch precipitation zone of the Sonoran Desert.

Floodplains and flats within the southern areas of the Complex show a large shrub and tree dominant aspect, with grasses and perennial forbs generally limited to areas with increased moisture retention, such as swales or soils with an increased clay content. The dominant plant species on these lower elevation areas include mesquite (*Prosopis* sp.), creosote (*Larrea tridentata*), whitethorn and catclaw acacia (*Acacia* sp.), and palo verde (*Parkinsonia* sp.). Grasses and forbs, while limited on the lower elevations, are typically big galleta or Tobosagrass (*Pleuraphis* sp.) and globemallow (S*phaeralcea* sp.).

On the CARCO and Forepaugh allotments north of Bullard Wash, the vegetation aspect is shrubby with intermingled areas of perennial grasses. Prolonged drought and flooding along Bullard Wash in the 1990s have caused grass populations in these areas to decrease, as shown at CARCO Key Areas 1 and 2. The dominant large shrub and tree species include Joshua tree (*Yucca brevifolia*), creosote, whitethorn and catclaw acacia, palo verde and mesquite. Grasses and forbs are generally big galleta, Tobosagrass, and globemallow.

The mountainous areas for the CARCO Allotment have a generally shrubby aspect to their south facing hillslopes, with dominant shrub and tree species being palo verde, white bursage (*Ambrosia dumosa*), brittlebush (*Encelia* sp.), and at lower elevations on toe slopes, creosote, such as shown

at CARCO Key Area 4. North facing slopes have a greater potential to produce grass species, and have an intermingled shrub-grass-tree aspect with some cacti present. Dominant shrub and tree species include palo verde, white bursage, and twinberry (*Menodora* sp.). Grass and forb species include gig galleta and Tobosagrass, bush muhly (*Muhlenbergia porteri*), fluffgrass (*Dasyochloa pulchella*), slim tridens (*Tridens muticus*), and bluedicks (*Dichelostemma capitatum*), as shown at CARCO Key Area 3.

Key Areas were established in 1982 on the CARCO Allotment (Key Areas 1-3), in 2013 on the Forepaugh Allotment, and 2016 on the Cross Mountain and CARCO allotments (Key Area 4) to determine whether indicators of ecological processes conform to the Land Health Standards. A Key Area is an indicator area that represents a larger ecological site. Key Areas reflect the current grazing management over similar areas in the unit and serve as representative samples of range condition, trend, use and production. A total of six Key Areas have been established on the Complex.

Monitoring of the Key Areas on the Complex allotments shows a generally stable shrub and tree community. Grass and forb composition has been generally declining on the non-mountainous areas of the Complex since the mid to late 1980s. Mountainous areas of the allotments show similarly stable shrub and tree compositions to the lower elevation areas. *Pleuraphis* species have declined in frequency in these areas as well, however, bush muhly, fluffgrass, and slim tridens are increasing in frequency, indicating grass colonization of the vegetation community (Appendix A).

Desired Plant Community (DPC) objectives were established for each Key Area on the Complex. These objectives are based on the potential vegetation community on each ecological site, as limited by factors such as rainfall regime, drought effects, and the potential for the ecological site to produce forage for wildlife. DPC objectives are the measurement of attainment for Standard 3 for each Key Area.

The RHE (Appendix A) determined that Standard 3 was achieved on the CARCO and Cross Mountain allotments. Twenty-two DPC objectives were evaluated between six key areas. Eighteen DPC objectives were achieved at these Key Areas, with unachieved DPC objectives being grass composition at CARCO Key Area 1, and vegetative foliar cover requirements at Key Area 2. Standard 3 was not achieved on the Forepaugh Allotment, due to wildlife forage requirements and foliar cover objectives.

Current and historic utilization measurements on the Complex allotments indicate that livestock grazing are unlikely to be a causal factor for the non-achievement of Standard 3. Utilization measurements at CARCO Key Area 1 show a utilization level of 26 to 27 percent on perennial grass species, below utilization levels estimated to impair *Pleuraphis* production (Holecheck, 1988). Utilization levels at CARCO Key Area 2 show a utilization level of 15-35 percent on perennial grass species, which is unlikely to cause a sufficient foliar canopy reduction, given the overall plant community, to cause the non-achievement of that DPC objective. Similarly, utilization levels at Forepaugh Key Area 1, ranging from 6 to 39 percent on perennial grasses, and 15 to 37 percent on palatable browse, is unlikely to cause the non-achievement of the palatable browse species composition and foliar cover DPC objectives at this Key Area.

3.2.2 Environmental Consequences for Vegetation Resources

Proposed Action

The Proposed Action was designed to address the areas of potential concern noted in the RHE, specifically the findings that the perennial grass component was not achieved at CARCO Key Area 1, foliar cover requirements at CARCO Key Area 2, and foliar cover and wildlife browse requirements at Forepaugh Key Area 1.

Under the Proposed Action, upland vegetation is expected to maintain its current visual aspect, with improvements to grass species composition on lower elevation plains and browse species composition throughout the CARCO and Forepaugh allotments. No effect to upland vegetation is expected on the Cross Mountain Allotment as no changes in grazing management are proposed.

Construction of gabions along the gullies leading into Bullard Wash, as well as north of Bullard Wash in incised channels, would decrease water surface flow rates during non-peak runoff events. This would increase water retention and infiltration on those soils, providing increased opportunity for native grass recruitment (Nichols 2016). Due to the fact that perennial grass species are already present in the areas of concern, a sufficient seed bank is present to allow for recruitment. This effect is expected to be gradual over the life of the grazing lease.

Installation of a new well and pipeline would allow for greater flexibility in livestock herd rotation and allow for better livestock distribution in the mountainous areas of the CARCO and Forepaugh allotments. With more uniform livestock distribution on these allotments, grazing pressure on areas not meeting DPC objectives would be reduced, allowing for vegetative regrowth and recruitment. The inclusion of supplemental livestock drinkers at the existing dirt tanks allows for these water sources to be used year-round, instead of seasonally, which would allow for livestock rotation through these pastures at different times of the year. This is expected to reduce grazing pressure on vegetation at the same time each year, allowing for grass recruitment during the monsoon season.

No Action Alternative

Under the No Action Alternative, livestock would be reauthorized on the Complex at current stocking rates. No new range improvements would be authorized for construction, limiting livestock rotation on the CARCO and Forepaugh allotments by water availability in existing dirt tanks and at existing wells. Increased surface water flow rates would continue to occur north of Bullard Wash, limiting soil water availability for plant recruitment and regrowth.

Perennial grass composition and foliar cover objectives would continue not to be met on CARCO Key Areas 1 and 2, respectively, and Standard 3 would continue not to be met on the Forepaugh Allotment. Recruitment of vegetation would be limited by current use patterns. Areas showing increased utilization levels would continue to exhibit this level of utilization without modification of current livestock distributions.

No Grazing Alternative

Upland vegetation would have the most rest and recovery under a No Grazing Alternative. This would be expected to be most evident on the Forepaugh Allotment, which is currently not meeting Standard 3. Vegetative recovery north of Bullard Wash would be limited due to the water flow

patterns currently present on those uplands. Because no livestock grazing would occur, plants would remain ungrazed by livestock, with the only browse pressure coming from wildlife. Grasses would see greater benefits compared to the other alternatives because grazing pressure would not impede their ability to fix carbon and produce and set seed.

The plants that would most benefit from the No Grazing Alternative are shrub species. Current year's growth – the leaves and young stems that are important for photosynthesis – is the most digestible part of the plant and is the portion generally removed by browsing animals. The buds are especially important to protect from grazing because they would be the source of new stems. Under this alternative, upland vegetation would improve the most in productivity, vigor, species composition, and formation of new stems compared to the other alternatives.

3.2.3 Wildlife Resources

This section discloses the impacts of livestock grazing on wildlife resources within the Complex allotments. This section also responds to the following issues identified in Chapter 1:

Issue 2 –Wildlife: How would continued livestock grazing affect priority wildlife species and migratory birds?

General Wildlife Species

Wildlife species that occur within the Complex are typical and representative of the vegetative communities and topography present in the area. Species present include, but are not limited to, mule deer (*Odocoileus hemionus*), coyote (*Canis latrans*), javelina (*Pecari tajacu*), mountain lion (*Puma concolor*), bobcat (*Lynx rufus*), gray fox (*Urocyon cinereoargenteus*), desert cottontail (*Sylvilagus audubonii)*, black-tailed jackrabbits (*Lepus californicus*), Gambel's quail (*Callipepla gambelii*), great horned owls (*Bubo virginianus*), and various reptiles, small mammals, bats, and migratory birds. Desert bighorn sheep (*Ovis canadensis nelsoni*) may occupy steep, rugged habitat in the mountainous areas of the CARCO and Forepaugh allotments.

The Complex is located primarily within the Arizona Game and Fish Department management unit 44A, with roughly half the Forepaugh Allotment and the entirety of the Cross Mountain Allotment in management unit 42. Javelina, desert bighorn sheep, and mule deer are three big game species that utilize the Complex. Mule deer rely heavily on browse and forbs, which make up the majority of their diet (greater than 90 percent). Grasses and succulents were generally less than 5 percent of mule deer diet (Krausman et al. 1997, Heffelfinger et al. 2006). Desired key forage species for mule deer and javelina that exist in the Complex include the *Ephedra* species, slender janusia (*Janusia gracilis*), range and white ratany (*Krameria* sp.), jojoba (*Simmondsia chinensis*), *Eriogonum* species, *Calliandra* species, desert globemallow, and succulents including prickly pear (*Opuntia* sp.), barrel (*Ferocactus* sp.), and hedgehog cacti (*Echinocereus* sp.). Desert bighorn sheep utilize a wide variety of forage plants including desert agave (*Agave* sp.), barrel cactus, big galleta, brittlebush, catclaw acacia, desert lavender (*Hyptis emoryi*), fishhook cactus (*Mammillaria* sp.), globe mallow, ironwood (*Olneya tesota*) , foothill palo verde, ratany, ephedra, silverbush, three-awn (*Aristida* sp.), white bursage, wolfberry (*Lycium* sp.), ocotillo (*Fouqueria splendens*), canyon ragweed (*Ambrosia ambrosioides*), lupine (*Lupinus* sp.), bladder sage (*Salazaria* sp.), janusia, and fairy duster (*Calliandra* sp.) (Gedir et al. 2016).

Across all ecological sites, current vegetative species composition and structure provides cover and forage to support a diverse wildlife community. Abundant trees, shrubs and cacti are available to provide forage, cover, and nesting opportunity for many bird species as well as cover and palatable browse for mule deer and javelina. The mix of trees/shrubs/cactus and grasses/forbs present on the allotment provides a diversity of habitats suitable for a variety of wildlife species from reptiles and small mammals to various birds, and game species as well as predators that depend on these species groups.

Migratory Birds

All migratory birds are protected under the 1918 Migratory Bird Treaty Act (16 USC 703), which prohibits the taking of any migratory birds, their parts, nests, or eggs unless specifically permitted by regulation. Additional protection is provided by the Neotropical Migratory Bird Conservation Act of 2000 (16 USC Chapter 80). Executive Order 13186 requires the BLM and other federal agencies to work with the USFWS to provide protection for migratory birds, primarily in the form of habitat protection to avoid migratory pattern disruption. Migratory birds found within the Complex are typical of Sonoran Desert habitat. Species present include, but are not limited to, Gila woodpecker (*Melanerpes uropygialis*), Bendire's thrasher (*Toxostoma bendirei*), Costa's hummingbird (*Calypte costae*), ash-throated flycatcher (*Myiarchus cinerascens*), Scott's oriole (*Icterus parisorum*), white-winged dove (*Zenaida asiatica*) and western kingbird (*Tyrannus verticalis*).

Special Status Species

Special status species include federally listed, candidate and proposed species as well as BLM sensitive species. Sonoran desert tortoise (*Gopherus morafkai*), a BLM sensitive species, is known to occur on the Complex. Sonoran desert tortoises occupy much of the upland areas in the Complex. The desert tortoise distribution within the Complex is not uniform. Tortoises tend to occupy hillsides and ridges with outcrops of large boulders as well as areas with incised washes and caliche caves, but may be found in lower densities throughout the area. Tortoises generally use natural and excavated cover sites between or under boulders and in caliche caves along washes wherever they occur. Their diet consists of annual forbs (30.1 percent), perennial forbs (18.3 percent), grasses (27.4 percent), woody plants (23.2 percent) and prickly pear fruit (1.1 percent) (Van Devender, et al. 2002). These forage species are available for Sonoran desert tortoise throughout the Complex.

The Complex contains 21,449 acres of Category I desert tortoise habitat and 16,183 acres of Category III desert tortoise habitat (Appendix A). Category I habitat is defined as: 1) habitat that may be essential to the maintenance of viable populations; 2) habitat where most conflicts are resolvable; and 3) habitat that contains medium to high densities of tortoises or low densities contiguous with medium or high densities. Category III habitat is defined as: 1) habitat that is not considered essential to the maintenance of viable populations; 2) habitat where most conflicts are not resolvable; and 3) habitat that contains low to medium densities of tortoises not contiguous with medium or high densities.

3.2.4 Environmental Consequences for Wildlife Resources

Proposed Action

Wildlife and Migratory Birds

Both cattle and wildlife utilize herbaceous vegetation. Various wildlife species (e.g., mule deer, some migratory birds) depend on forbs and shrubs for forage and concealment. Insectivore species such as bats or some migratory birds are indirectly dependent on herbaceous vegetation to support their insect population diet or to provide a substrate for nesting, roosting, or concealment. Larger predator species are indirectly dependent on herbaceous vegetation to provide forage and cover for prey species such as small mammals and birds. The presence and movement of livestock between areas can result in the direct disturbance or displacement of individual wildlife species from areas providing cover and forage. Competition between livestock and a variety of wildlife species can occur where livestock and wildlife are utilizing the same forage plants.

Presently, Rangeland Health Standards for upland habitat are being met, and 18 of 22 DPC objectives across six Key Areas are being met. The Proposed Action is designed to improve conditions for upland vegetation near livestock water sources, major drainages and washes through allowing increase flexibility in livestock rotation and reducing soil erosion. This would maintain or improve upland vegetation productivity over current conditions in the vicinity of drainages and washes across the Complex, providing increased forage opportunities and cover for wildlife species in important desert wash habitat. This would be expected to benefit mule deer and a variety of migratory birds. This would also be expected to increase seed production in these areas for seed-eating species and residual forage for insects, providing important prey for bats, insectivorous migratory birds, and raptors.

Routine maintenance of water sources (tanks and troughs) on the allotments would continue to benefit wildlife species in this arid environment. Some wildlife species could be displaced when cattle are present at water sources, but would be expected to return once livestock moved to other locations within the allotments.

Special Status Species

Desired plant community objectives were set to provide adequate forage for Sonoran desert tortoise (Appendix A). Perennial grasses are an important year-round food source for desert tortoises (Oftedal 2002). Objectives for perennial grasses were achieved at three out of the four Key Areas in the Complex where perennial grass objective were set (Appendix A). Palatable browse objectives were achieved at six of the seven Key Areas in the Complex. At the Key Areas where tortoise forage objectives were not met, it is unlikely that current livestock grazing is the causal factor because livestock utilization was slight to light at these Key Areas (Appendix A). The Proposed Action is designed to improve conditions for upland vegetation near livestock water sources, major drainages and washes through flexibility in livestock rotation and increase soil moisture retention. This would maintain or improve upland vegetation productivity in the vicinity of drainages and washes across the Complex, providing increased forage opportunities and cover for desert tortoises in these areas.

No Action Alternative

Wildlife, Special Status Species and Migratory Birds

The No Action Alternative would not provide the additional benefits to key wildlife forage species expected under the Proposed Action. Rangeland Health Standards and DPC objectives would continue to be met at four of the six Key Areas and 18 of the 22 DPC objectives, but the improvements in upland vegetation condition and wildlife habitat expected in the Proposed Action

would not be expected to occur in this alternative. Overall, livestock distribution would not be expected to change, because no new range improvements would be authorized.

No Grazing Alternative

Wildlife, Special Status Species and Migratory Birds

In the absence of livestock grazing, competition for wildlife forage vegetation would be reduced, providing more forage for wildlife and insect populations. The absence of livestock grazing could result in cover canopy increasing over time, benefiting cover-dependent species. Water developments would not be maintained or could be turned off, reducing water availability for wildlife in the allotments over time. Livestock disturbance/displacement effects would not occur, benefiting nesting migratory birds and other wildlife individuals. With the absence of grazing year round, these improvements in vegetative cover conditions would be expected to occur more rapidly. The recruitment of herbaceous species cover would be expected to be greater under this alternative, further benefiting wildlife species.

3.2.5 Soil Resources

This section discloses the impacts of livestock grazing on soil resources within the Complex allotments.

The BLM develops RHEs to determine whether standards are being achieved on a grazing allotment and to determine if livestock grazing is a causal factor for not achieving, or failing to make significant progress toward achieving, land health standards. Land Health Standard 1 is specific to specific to soils and hydrology and is evaluated based on monitoring within the Complex allotments.

Soils of the Complex are typical of the 7-10 inch precipitation zone of the Sonoran Desert. The erosional context in the higher elevations and mountainous areas of the Complex is stable, with less stability on floodplains and fans associated with Bullard Wash. Flooding along Bullard Wash in the 1990s realigned the channel and caused downcutting in some areas. This discontinuity between soil surface elevations and wash elevations is leading to gully formation along the wash banks. This is more prevalent along the higher erodibility index soils occurring north of Bullard Wash.

Soil mapping shows a wind erodibility of 38 to 86 tons per acre per year across the Complex, with lower erodibility scores in mountainous areas and soils armored by rock and cobbles. Wind erodibility scores assume areas devoid of vegetation, and actual erodibility on the Complex is lower than the mapped values due to existing vegetative cover.

Water erosion within the allotment occurs during intense summer thunderstorms. While allotment soils are well drained, intense rainfall can overwhelm soil infiltration capacity and create overland flow. Intense monsoon rainfall can produce overland flow in part due to dry soils forming crusts that resist percolation. Overland flow transports soil particles along erosion pathways from runoff surfaces to run-on areas, typically formed by vegetation patches or topographic breaks. Compaction and trailing from cattle can exacerbate erosion when trails align with water flow pathways when soils are wet. This effect is mostly localized around livestock water sources on the Complex.

Desert soils have known contributions from biological soil crusts, also called cryptogamic crusts, for soil biologic function. The particular ecological province of the project area with a thermic climate is expected to favor cyanobacteria that have a flat appearance. A byproduct of crust presence is aggregation that binds soil particles. Using the RHE measures, the soil aggregate stability tests did not find aggregation substantially departed. Cryptogamic soil crusts were noted at CARCO Key Areas 1, 2, and 4. Soil crusts were absent at CARCO Key Area 3, Forepaugh Key Area 1 and Cross Mountain Key Area 1.

Livestock grazing does affect soil productivity by removing a portion of the vegetative standing crop. Annually produced biomass serves both a physical and biological role. Plant litter physically works to insulate soils from evaporation and contributes as protective groundcover. Decomposition of litter provides substrate for soil microbes that increases available nutrients.

Soils on the Cross Mountain Allotment do not meet Standard 1. The parcel located north of US 60 is the site of Echeverria Field, a military glider training center associated with the Second World War. Construction of the airfield has led to soil compaction, and associated facilities, such as buried aircraft tie-down bolts, are present across most of the parcel. Erosion control has not been maintained on the airstrip since its abandonment, and some areas show increased erosion due to runoff from compacted soils. The parcel located south of US 60 is associated with the Sunrise Mine, which is not currently in operation. Soils in this area have been disturbed by mining activity. The third parcel of public lands is located approximately four miles east of Echeverria Field, and is also modified by mining activity.

3.2.6 Environmental Consequences for Soil Resources

Proposed Action

The Proposed Action is designed to mitigate effects to soils by livestock grazing and excessive erosion occurring along Bullard Wash. Installation of a water pipeline and gabions are expected to have short-term slight negative effects to localized soils on the CARCO and Forepaugh allotments at the installation sites. Long-term improvements to soil stability and productivity are expected following completion of the range improvement projects centered on stabilizing soil erosion.

Construction of gabions in incised channels and gullies would have localized short-term impacts to soils on and adjacent to wash banks. Installation would require insetting the gabion into the wash bank and stream bed, causing localized soil displacement at the installation site. Gabions would be constructed with wire and medium sized 4-12 inch stone. Over multiple winter rainfall seasons, it is expected that these semi-permeable gabions would decrease erosion rates by retaining soils in incised channels. This reduction in flow grade would decrease surface flow rates, leading to increased moisture retention. Increased soil moisture would positively affect soil productivity, allowing for vegetation recruitment and foliar cover improvements. Reconstruction of gabions damaged or removed during high flow events would have the same localized effects as initial construction.

Construction of a new well and installation of a buried pipeline would have negligible effects on soils. The proposed well location is on a previously compacted and disturbed area at the confluence of several mining roads. Installation of the pipeline would occur down the centerline of the existing road. Excavation of the road centerline by trenching would have a localized negligible impact, as

these soils are already compacted due to vehicular traffic. Proposed livestock drinkers fed by this pipeline are all located on previously disturbed sites with compacted soils, such as prior mining camps and livestock dirt tanks. Increased livestock use on these areas would have a negligible impact on soil stability and productivity due to their compacted nature.

Soils would benefit from improved livestock distribution on the CARCO and Forepaugh allotments by allowing more uniform utilization levels on the allotments. This would increase vegetative litter and foliar cover, increasing soil productivity.

No effects to soils are expected on the Cross Mountain Allotment under the Proposed Action. Soils within this Allotment on public lands are compacted from prior uses, and livestock management on these areas would have no additional effects to soil resources.

No Action Alternative
The No Action Alternative would not authorize construction of new range improvement projects and would continue livestock grazing at the currently authorized levels. Localized soil impacts from range improvement construction would not occur. Localized increased soil erosion rates along Bullard Wash would continue. Although present impacts to soils are minor, grazing pressure, and therefore soil impacts, would continue in areas of concentrated use.

No Grazing Alternative
The removal of livestock from the Complex would increase the litter for soil processes and reduce compaction and bare soil exposure from livestock trampling. Impacts would be highest where groundcover slowly re-establishes at grazing congregation areas.

The impacts to vegetation and soils across the range would be slow and depend on the level of forage that livestock grazing previously impacted. Potentially, an increase in annual crop would boost substrate available for soil functional processes. However, the response from livestock removal would be low since rangeland forage makes up a small percentage of the annual crop. Changes would be highest where grasses and forbs thrive.

Using Michunas's (2006) review of plant community response to livestock grazing, we would expect a very slow vegetation response to livestock removal in arid and semi-arid environments. In reviews of long-term studies on Chihuahua desert scrub with similar precipitation patterns to the Complex, findings indicate very little change in perennial grass cover after 16 to 25 years. Finally, the response from no grazing may be small since less change is associated with reductions from moderate compared to heavy grazing levels. A seven year study near Flagstaff found significant reductions in vegetation cover and plant community composition only in the heavily grazed treatment when compared to the moderate and no grazing treatments (Loeser et al. 2007).

3.3 Residual Effects

Residual effects are defined as adverse impacts that remain after mitigation measures and design features have been applied (BLM 2008).

Proposed Action
Under the Proposed Action, no residual effects are expected on the allotments within the Complex.

No Action Alternative
Under the No Action Alternative, no residual effects are expected on the allotments within the Complex.

No Grazing Alternative
Under the No Grazing Alternative, maintenance on water sources within the allotments would cease. Water availability for wildlife would be reduced, changing wildlife use patterns within the Complex.

4.0 CUMULATIVE EFFECTS

A cumulative effect is defined under NEPA as "the change in the environment which results from the incremental impact of the action, decision, or project when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other action". "Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR Part 1508.7). Past, present, and reasonably foreseeable future actions are analyzed to the extent that they are relevant and useful in analyzing whether the reasonably foreseeable effects of the Proposed Action and/or Alternatives may have an additive and significant relationship to those effects.

4.1 Geographic Scope

The geographic scope of the cumulative effects study area is the boundaries of the allotments within the Complex, comprising approximately 131,998 acres of public, private, and State trust lands (Map 1).

4.2 Timeframe of Effects

The timeframe evaluated for direct and indirect effects of livestock grazing and range improvements is 10-years, the lifespan of the grazing authorization.

4.3 Past and Present Actions

Livestock grazing has been present on the Complex since the 1800s and continues to this day. Early range improvements consisted of dirt stock tanks located along drainages and fencing of the allotment boundaries. Much of the allotment boundary fencing dates from the early to mid-1900s, and requires ongoing maintenance. Additional water sources in the form of wells were installed beginning in the 1940s. Most utilize windmills to pump water and require periodic maintenance. Dirt tanks located within the allotments require periodic clean outs to remove accumulated sediment.

Historically, mining activities took place on the Complex. In the mountainous areas of the Complex, most of the road network is related to these abandoned mine sites.

4.4 Reasonably Foreseeable Future Actions

Under the No Action and Proposed Action alternatives, livestock grazing would continue to occur for a 10-year period under the renewed grazing authorizations. Maintenance would continue to occur as necessary on range improvements located within the Complex.

Under the Proposed Action, construction of the pipeline would require approval from the State Land Department where the pipeline and associated facilities would be located on State trust lands.

No future grazing actions are expected under the No Grazing Alternative.

4.5 Analysis by Resource

Only those resources directly or indirectly affected by the Proposed Action or No Action Alternative are considered for cumulative effects. Reference Section 3.1 for definitions of effect types.

Vegetation Resources

Proposed Action

Under the Proposed Action, livestock grazing would continue at existing levels. Range improvements would facilitate improved livestock distribution and livestock rotation throughout the Complex, as well as increasing soil moisture availability. This would have a beneficial cumulative effect on vegetation resources through reduced utilization and increased vegetative growth potential.

No Action Alternative

Under the No Action Alternative, livestock grazing would continue at existing levels. Range improvements would not be constructed, and current vegetation trends would continue. This would have a negligible adverse cumulative effect on vegetation resources.

No Grazing Alternative

Under the No Grazing Alternative, livestock grazing would not be authorized on the public lands within the Complex for a period of 10-years. Reduced utilization levels on vegetation would have a negligible cumulative effect on vegetation resources due to grazing continuing on State and private lands within the Complex.

Wildlife Resources

Proposed Action

Under the Proposed Action, livestock grazing would continue at existing levels. Range improvements would increase water availability for livestock and wildlife use, a beneficial cumulative effect on wildlife species. Competition for forage between wildlife and livestock would continue. However, range improvements would facilitate improved livestock distribution and livestock rotation throughout the Complex, as well as increasing soil moisture availability. This would have a beneficial cumulative effect on wildlife forage through reduced utilization and increased vegetative growth potential.

No Action Alternative

Under the No Action Alternative, livestock grazing would continue at existing levels. Additional water sources would not be constructed, which could be utilized by wildlife in addition to cattle. Competition for forage between wildlife and livestock would continue, without the beneficial effects of the range improvements associated with the Proposed Action.

No Grazing Alternative

Under the No Grazing Alternative, livestock grazing would not be authorized on public lands within the Complex. In the absence of livestock grazing, competition for wildlife forage vegetation would be reduced, which would have a beneficial cumulative effect by providing more forage for wildlife and insect populations. The absence of livestock grazing could result in cover canopy increasing over time, a beneficial cumulative effect for cover-dependent species. Livestock disturbance/displacement effects would not occur, benefiting nesting migratory birds and other wildlife individuals. Water developments would not be maintained or could be turned off, reducing water availability for wildlife in the allotments over time.

Soil Resources

Proposed Action

Under the Proposed Action, livestock grazing would continue at existing levels. Construction of range improvements relating to gullies present on the CARCO Allotment would have a slight beneficial cumulative effect on soil moisture and productivity.

No Action Alternative

Under the No Action Alternative, livestock grazing would continue at existing levels. Range improvements would not be constructed to control accelerated erosion within the Complex. This would have a slightly adverse cumulative effect on soils.

No Grazing Alternative

Under the No Grazing Alternative, livestock grazing would not be authorized on the public lands within the Complex. Range improvements would not be constructed or maintained to control erosion on the Complex. This would have a negligible adverse cumulative effect on soils within the CARCO and Forepaugh allotments. Removal of livestock from public lands would have a negligible beneficial effect on soils due to the reduced compaction of soils in livestock congregation areas.

5.0 PERSONS, GROUPS, AND AGENCIES CONSULTED

5.1 List of Preparers

The following individuals were involved in the preparation of this EA:

Bureau of Land Management

Name	Title	Project Expertise
James Holden	Rangeland Management Specialist	Livestock Grazing, Vegetation and Soil Resources
Codey Carter	Wildlife Biologist	Wildlife Resources
Brian Buttazoni	Planning & Environmental Specialist	NEPA

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