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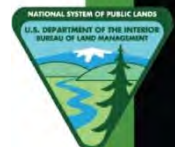
Environmental Assessment
DOI-BLM-AZ-P010-2016-0009-EA

PROPOSED GRAZING PERMIT RENEWAL FOR
Ohaco Allotment #03060
Effus Allotment #03030
Douglas Allotment #03026

MARICOPA COUNTY, ARIZONA

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Chapter 1 – Purpose and Need

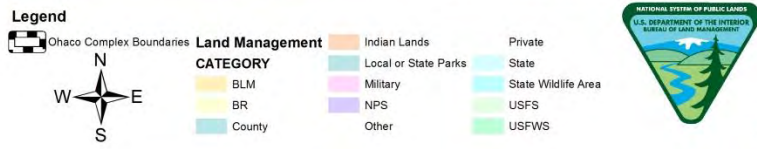
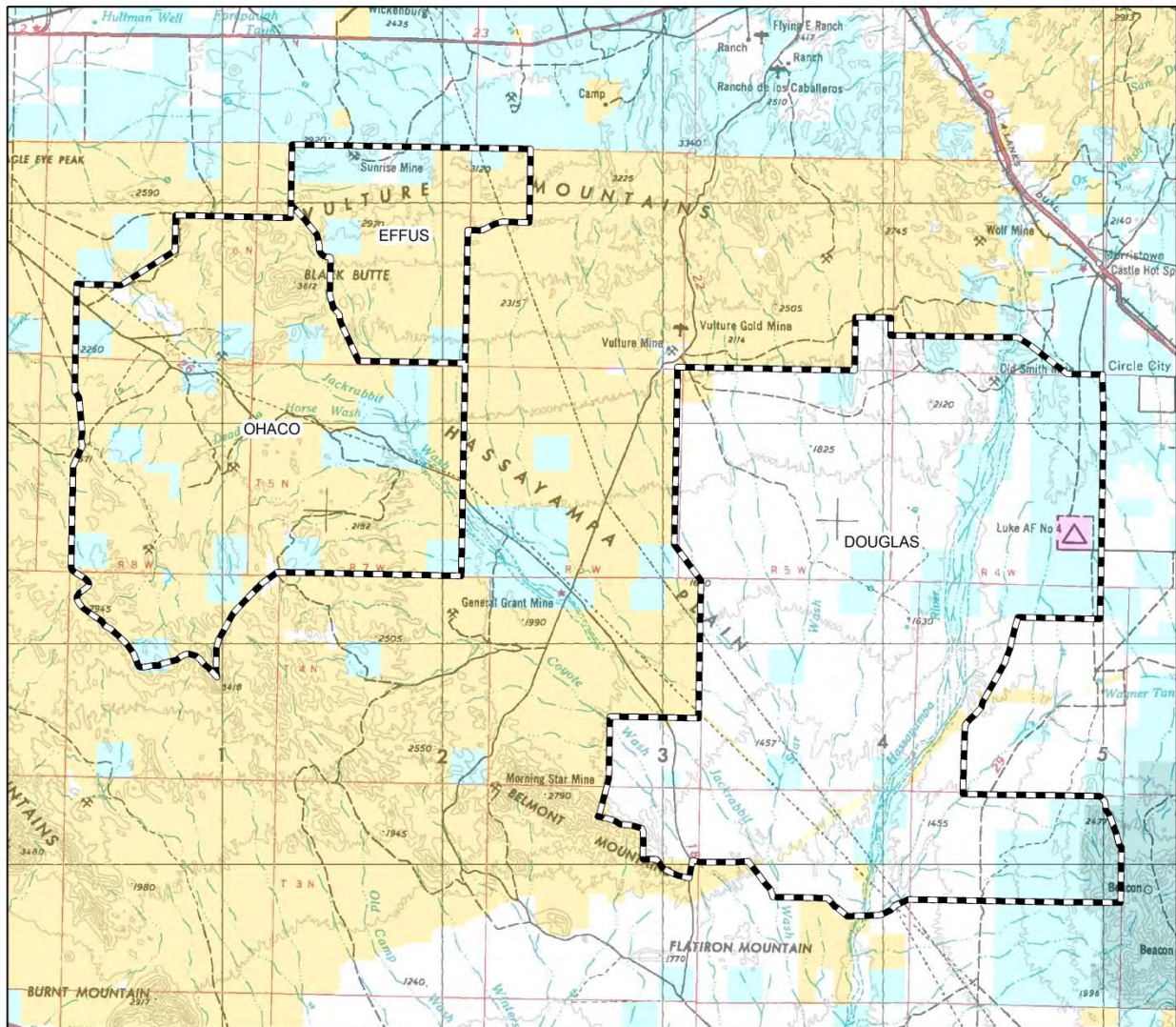
Introduction

The Bureau of Land Management (BLM) is proposing to fully process the term grazing authorizations on the Ohaco Allotment (#03060), Effus Allotment (#03030), and Douglas Allotment (#03026). A Rangeland Health Evaluation (RHE) was prepared for the three allotments in 2015 (Appendix A).

The Ohaco Complex is located south to southeast of the town of Aguila, Arizona. Aguila road bisects the Ohaco Allotment. The Effus allotment is adjacent to the Ohaco allotment, northeast of Black Butte. The Douglas allotment consists of scattered parcels east of Vulture Mine road, southwest of Wickenburg, Arizona. The Complex covers approximately 192,719 acres in Maricopa County. The BLM-administered portion of the Complex is approximately 68,347 acres. The remaining acreage is Arizona State Trust Lands (39,040 acres) and privately owned (82,388 acres) (Figure 1).

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 Ohaco 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).

Ohaco Complex



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Figure 1.

Allotment Profile

Ohaco Allotment

The current permit holder for the Ohaco allotment is the Cooper Cattle Company. The current permittee acquired the base property in 1998. The allotment is divided into three pastures. There is no formal

rotation system in place on the allotment, however, livestock are normally cycled from the southern pastures to the northern pastures based on forage availability and annual production.

Effus Allotment

The current permit holder for the Effus allotment is Rosalie Palen. The current permittee acquired the base property in 1999. The allotment is divided into three pastures. There is no formal rotation system in place on the allotment.

Douglas Allotment

The Douglas allotment does not have a grazing authorization currently. The prior permittee relinquished their base property preference in 2007. Land exchanges since 1980 have reduced the public land acreage of the Douglas from approximately 11,500 acres to the current acreage of 2,036 acres. A significant portion of the remaining acreage is associated with the Central Arizona Project canal and is unavailable for livestock grazing.

Table 1 Ohaco Allotment Profile

Ohaco Allotment Profile	
Lessee	Cooper Cattle Co.
Percent/Acres BLM Land	82 percent/52,025 acres
Percent/Acres State Land	17 percent/11,035 acres
Percent/Acres Private Land	1 percent/854 acres
Grazing Preference	1,476 Animal Unit Months (AUMs)
Season of Use	Yearlong
Range Classification	Perennial/Ephemeral
Management Category	Improve
Number and class of livestock use	150 Cattle

Table 2 Effus Allotment Profile

Effus Profile	
Lessee	Rosalie Palen
Percent/Acres BLM Land	77 percent/14,286 acres
Percent/Acres State Land	21 percent/3,999 acres
Percent/Acres Private Land	2 percent/378 acres
Grazing Preference	1,155 Animal Unit Months (AUMs)
Season of Use	Yearlong
Range Classification	Perennial/Ephemeral
Management Category	Maintain
Number and class of livestock use	125 Cattle

Table 3 Douglas Allotment Profile

Douglas Allotment Profile	
Lessee	Not Applicable
Percent/Acres BLM Land	2 percent/2,036 acres
Percent/Acres Other Federal Lands	2 percent/2,489 acres
Percent/Acres State Land	22 percent/24,006 acres
Percent/Acres Private Land	74 percent/81,156 acres
Grazing Preference	144 Animal Unit Months (AUMs)
Season of Use	Yearlong
Range Classification	Perennial
Management Category	Maintain
Number and class of livestock use	300 Cattle

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 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 Ohaco 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 Ohaco Complex Allotment determined that Standards 1 and 3 are being achieved on upland sites, while Standard 2 is not applicable due to no above ground water sources within the allotments.

Decision to be made

The Hassayampa Field Manager is the authorized officer responsible for the decisions regarding management of public lands within these allotments. Based on the results of the NEPA analysis, the authorized officer will determine whether the impacts of the Proposed Action described in this analysis are significant and would require preparation of an environmental impact statement (EIS). If the authorized officer determines that the impacts are not significant, this analysis will help to inform the decision to renew, renew with modifications, or not renew the leases and permits. If renewed,

management actions, mitigation measures, and monitoring requirements will be prescribed for the Ohaco Complex Allotments to ensure management objectives and Rangeland Health Standards continue to be achieved.

Scoping & Public Participation

Internal scoping was conducted with BLM specialists. 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 Ohaco Complex was December 15th through January 15th, 2016. No external scoping responses were received.

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 the 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 H-1790-1 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 Ohaco Complex RHE (BLM 2014) 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?

Issue 3 – Soils: Does livestock grazing affect cryptogamic crust presence?

Conformance with Land Use Plan

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 Field Manager.

Relationship to Statutes, Regulations, or 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 Ohaco Complex Allotments is a Section 3 grazing permit.

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 (2006, 22410-05-F-0785) provides USFWS review of the continued implementation of the RMP. 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
- Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001-3013; 104 Stat. 3048-3058)
- National Environmental Policy Act of 1969
- Wild Free Roaming Horse and Burro Act of 1971
- Migratory Bird Treaty Act of 1917, and Executive Order 13186 – *Responsibilities of Federal Agencies to Protect Migratory Birds*

Chapter 2: Alternatives

This chapter describes the alternatives to be analyzed in detail in Chapter 3. The IDT developed three alternatives – Proposed Action, No Action, and No Grazing – based on the analysis and technical recommendations presented in the Ohaco Complex RHE (Appendix B), 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 three 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 road construction would be permitted in conjunction with the Proposed Action. Routine maintenance would be performed on existing range improvements as required.

Alternative A – Proposed Action

The Proposed Action is to renew the Ohaco and Effus permits for a period of 10 years with the following terms and conditions (Table 4). These terms and conditions represent a recalculation of the % Public Land based on the current BLM and Arizona State Land Department permitted stocking rates. AUMs on public lands remain the same as the prior permits. A permit is not being offered on the Douglas allotment.

Table 4 Ohaco Complex Terms and Conditions

Allotment	Livestock Number and Kind	Grazing Period	AUMs	% Public Land
Ohaco	192	3/1-2/28	1476	64
Effus	123	3/1-2/28	1155	78

Other Terms and Conditions

Ohaco Permit:

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 permit under the Proposed Action:

1. Supplemental feeding is limited to salt, mineral, and/or protein in block, granular, or liquid form. If used, these supplements must be placed at least one-quarter (1/4) mile from livestock water sources, and one-eighth (1/8) mile away from major drainages and washes and sensitive wildlife habitat.
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)).

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.
4. When forage conditions warrant, cattle and horse grazing only may be authorized upon application to utilize an ephemeral forage crop pursuant to federal grazing regulations, special management requirements, and other guidance.

Effus Permit:

1. Supplemental feeding is limited to salt, mineral, and/or protein in block, granular, or liquid form. If used, these supplements must be placed at least one-quarter (1/4) mile from livestock water sources, and one-eighth (1/8) mile away from major drainages and washes and sensitive wildlife habitat.
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 9d)).
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.
4. When forage conditions warrant, livestock grazing may be authorized upon application to utilize an ephemeral forage crop pursuant to federal grazing regulations, special management requirements, and other guidance.

Range Improvements

To facilitate orderly management of the range, a pasture fence is proposed to be constructed along Aguila road, bisecting the Ohaco allotment. This fence will run on the east side of the road and tie in to the existing pasture fence west of Aguila road, then continue to the allotment boundary. This project consists of about 12 miles of fencing. A second fence between the Sprouse and Ohaco allotments is also proposed. This boundary fence was not constructed due to the distance from water sources during the adjudication process. Newer water sources on the allotments have necessitated the construction of this boundary fence.

Reconstruction of the existing pipelines on the Effus allotment is proposed. These are buried pipelines located within existing routes on the allotment. Due to the level of work needed to repair these

improvements, these repairs are not considered routine maintenance. This includes the reconstruction of the corrals and facilities at the terminus of the eastern pipeline.

Design features for range improvement construction

- While constructing range improvements look out for and avoid tortoises.
- Prior to operating equipment or vehicles, the operator/driver should check underneath and around the equipment/vehicle for desert tortoises.
- If a tortoise must be moved to avoid harming it, it should be moved in accordance with Arizona Game and Fish Department's "Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects" (Appendix).

Alternative B – No Action

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 Ohaco and Effus permits for a period of 10 years with the same terms and conditions as shown in Tables 1-6.

Alternative C – No Grazing

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 Ohaco, Effus or Douglas allotments (Ohaco Complex) for a ten-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 ten-year permit period). No new range improvement projects would be constructed and no modifications would be made to existing projects.

Alternatives Considered but Dismissed from Detailed Analysis

Alternatives may be dismissed from detailed analysis under the following conditions (BLM 2008):

- The alternative is ineffective and would not respond to the Purpose and Need
- It's technically or economically infeasible
- It's inconsistent with the land use plan
- Implementation is remote or speculative
- It's substantially similar to another alternative that is analyzed
- It would have substantially similar effects as an alternative that is being analyzed.

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 allotment 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”¹ 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.

The stocking rate analysis used Key Area utilization data from 2009, 2013, and 2014. Actual use numbers provided by the grazing permittee were available for all years of utilization data. To generate the desired stocking rate, the actual use was multiplied by the desired utilization percent, and then divided by the observed utilization percent to yield desired use.

Desired Stocking Rate Formula

$$\frac{(\text{Actual Use}) (\text{Desired Utilization Percent})}{\text{Observed Utilization Percent}} = \text{Desired Stocking Rate}$$

Desired or objective utilization levels for the allotment were calculated using 40 percent for herbaceous and grass species and 30 percent for palatable shrubs. All data were used for years that both actual use and utilization data were available in the initial calculations (see project file). When utilization levels were recorded for more than one species, the highest use level was used. This method uses the concept of “limiting factor” which recognizes that the species used the most will determine the level of grazing use that will best manage for maintenance of the key forage species.

For shrubs, a utilization limit of 30 percent was used based on Mule deer guidelines provided by Heffelfinger (2006), who recommended utilization limits between 25 percent and 35 percent based on range condition. To generate the stocking rate, actual use was multiplied by the desired utilization percent; this factor was then divided by the actual utilization percent to find desired use, or stocking rate potential. Based on the calculated potential stocking rate analysis, no reduction in stocking rate is necessary to meet objectives. Areas showing reduced stocking rate potential are offset with many areas within the complex showing increased stocking rate potential due to recovery of palatable vegetation. The table below shows the calculated average stocking rate potential by allotment within the complex. This table is based on the lowest calculated potential stocking rate for each Key Area.

Allotment	Current Authorized AUMs (including state lands)	Stocking Rate Analysis AUMs (includes state lands)
Ohaco	2312	2436
Effus	1479	1271

The analysis shows a slightly increased stocking rate potential on the Ohaco allotment. A slightly decreased stocking rate was calculated for the Effus ranch. Utilization on the northern pastures of the Effus ranch is expected to be reduced under the proposed action, making a reduced grazing alternative substantially similar to the proposed action.

¹ The desired stocking rate analysis was conducted in conformance with TR-4400-07, “Analysis, Interpretation, and Evaluation”, as given in Appendix 2 of the TR.

Chapter 3: Affected Environment and Environmental Consequences

For each resource analyzed in detail, this chapter first provides a succinct description of the conditions and trends of issue-related elements of the human environment, and then analyzes and describes the potential environmental consequences, or impacts, that would occur as a result of implementing the alternatives. Topics analyzed in this chapter are listed in Chapter 1 (see Issues for Analysis) and include upland vegetation, invasive plants, soil resources, , and wildlife resources. Resources that may exist within the project area, but would not be impacted by the Proposed Action, are described under the section titled “Resources Dismissed from Further Analysis” below.

General Project Setting

The Ohaco Complex is located south to southeast of the town of Aguila, Arizona. Aguila road bisects the Ohaco Allotment. The Effus allotment is adjacent to the Ohaco allotment, northeast of Black Butte. The Douglas allotment consists of scattered parcels east of Vulture Mine road, southwest of Wickenburg, Arizona. The BLM administered portion of the complex is approximately 68,347 acres. The remaining acreage is Arizona State Trust Lands (39,040 acres), privately owned (82,388 acres), or other Federal Acres (2,944 acres). The allotments are located in Maricopa County. The terrain is gently rolling to steep hills and mountains that are bisected by numerous drainage ways. The legal descriptions of the allotments are given in Table 6, below.

Table 7. Legal Descriptions of permitted and leased public lands

Allotment	Township	Range	Sections
Ohaco	4N	8W	Sections 3,5,9,10 And Portions of 1,4,6,7,8,11
	5N	7W	Sections 1,3-9,12,13,17-28,30,33-35 And Portions of 29,31
	5N	8W	Sections 1,3-5, 9-15,20,21,23-29,33-35 And Portions of 8,17,22
	6N	7W	Sections 18,19,29-31 And Portions of 8,17,28,33
	6N	8W	Sections 13,14,23-26,29,33,35 And Portions of 15,21,22,27,28,34
Effus	6N	7W	Sections 1,9-15,21-27,34,35 And Portions of 17,28,33
Douglas	3N	6W	Portions of Sections 3,11,13
	4N	4W	Portions of Sections 20,21,29,30,31
	4N	6W	Portions of Section 25
	5N	5W	Section 6

Upland Vegetation

Affected Environment

This section discloses the impacts of livestock grazing on upland vegetation within the 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.

In general, the BLM reported that the Complex exhibited a positive plant community structure in the Sonoran Desert environment. The most dominant plant species found across the Complex were whitethorn and catclaw acacia, tobosagrass, flattop buckwheat, paloverde, calliandra, and globemallow, many of which are key forage species. In most instances, these species were in very good condition, with little utilization. Their abundance and vigor across the Complex attest to the good condition of the rangeland and the success of the current grazing management system. If overgrazing was occurring, these species would be much less abundant, and less desirable species, such as snakeweed and triangle bursage, would dominate instead.

Key areas were monitored and analyzed in the mid-1980s again in 2013/2015 to determine whether indicators of ecological processes conform to the Rangeland 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 10 key areas have been established across the Ohaco Complex: seven key areas on the Ohaco allotment, two key areas on the Effus allotment, and one key area on the Douglas allotment (RHE Section 7.1).

All key areas on the Complex have attribute ratings of “None to Slight” or “Slight to Moderate” departure from the Ecological Site Description (ESD) Reference Sheets. These ratings do not appear to be caused by overgrazing by livestock based on the utilization levels (Ohaco Complex RHE in Appendix B). Departures from the applicable reference sheets are within the tolerances listed in the RHE.

Desired Plant Community (DPC) objectives are established for each Key Area within the Ohaco Complex. All DPC objectives are being achieved at Ohaco Key Area 2 and 3, and both key areas on the Effus allotment, at Ohaco key Areas 4,5,6,7 and 8 as well as the key area on the Douglas allotment objectives are being partially achieved.

Perennial grass composition objectives are not achieved at Ohaco Key Area 4 and 5. Palatable browse composition objectives are not achieved at Douglas Key Area 1. Ohaco Key area 5 and Douglas Key area 1 vegetative foliar cover objectives are not met. At Ohaco Key Area 6,8 and Douglas Key Area 1 bare ground cover class objectives are not met.

Utilization data do not indicate that current levels of livestock use are a causal factor for not achieving the DPC objectives. Utilization levels at all key areas on the Ohaco allotment did not exceed the “light” use category of 21-40% utilization level within the last five years. On the Effus allotment utilization levels were in the moderate use category 41-60% utilization level with no use taking place on the Douglas allotment.

Overall, the RHE reported that the Ohaco Complex allotments are meeting all Rangeland Health Standards in the upland areas. All ten sites across the Complex of allotments are consistent with ESDs in

soil/site stability, hydrologic function, and biotic integrity and meet Standard 1. Eight out of ten sites across the Complex are consistent with DPC objectives and meet Standard 3.

Environmental Consequences

Alternative A – 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 Ohaco Key Area 4 and Ohaco Key Area 5, and that the vegetative foliar cover requirements are not met at Douglas Key Area 1.

The Proposed Action “Other Terms and Conditions” stating that “Supplements would be restricted within 1/4 mile of watering facilities or 1/8 mile upslope from drainages and dry washes” will improve livestock distribution within the allotments, allowing for recruitment of native vegetation. Given adequate climatic conditions, grasses will be expected to recolonize sites. This is expected to increase vegetative foliar cover within the allotments.

The current stocking rate would be maintained under this alternative. The lessee has the flexibility to maintain current livestock numbers even through periods of drought that may cause a reduction in the carrying capacity of upland vegetation. The stocking rate analysis showed there would be adequate carrying capacity in the Complex to maintain current stock rates under drought conditions.

To facilitate orderly management of the range, a pasture fence is proposed to be constructed along Aguila road, bisecting the Ohaco allotment. This fence will run on the east side of the road and tie in to the existing pasture fence west of Aguila road, then continue to the allotment boundary. This project consists of about 12 miles of fencing. A second fence between the Sprouse and Ohaco allotments is also proposed. This boundary fence was not constructed due to the distance from water sources during the adjudication process. Newer water sources on the allotments have necessitated the construction of this boundary fence.

A replacement water development in the south pasture of the Effus allotment is proposed to be constructed. This water development is expected to consist of replacement of an existing buried pipeline and reconstruction of the southern corral and drinkers. This will reduce grazing pressure on the northern pastures that have permanent water sources. Repairs to the existing pipeline along the road running south from Outlaw tank are also proposed. This is an existing pipeline that needs repair near its southern terminus on the boundary of the south pasture.

In conclusion, under the Proposed Action, Rangeland Health Standards for upland vegetation would continue to be met. DPC objectives at most of the key areas would continue to be met, with improvements expected due to mineral placement and fencing that would improve livestock distribution.

Alternative B – No Action

Currently, the Ohaco Complex meets applicable Arizona Standards for Rangeland Health for upland vegetation. Eight of the ten sites meet Standard 3. All sites are consistent with ESDs in soil/site stability, hydrologic function, and biotic integrity, and meet Standard 1.

Under this alternative, no restrictions would be placed on locating mineral supplements. As a result it is expected that under the No Action scenario more trampling would occur near water developments and within drainages when compared to the Proposed Action. Overall, livestock distribution would not be expected to change.

Recruitment of vegetation will be limited by current use patterns. Areas that currently show moderate or greater levels of utilization would continue to receive these levels of utilization without modification of current livestock distributions.

Alternative C – No Grazing

Upland vegetation would have the most rest and recovery under a no grazing scenario. Although the Complex is meeting all applicable standards for rangeland health in the uplands, plant communities would still benefit from rest. 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 as compared to the other alternatives because grazing pressure would not impede their ability to fix a significant amount of carbon and produce and set seed.

The plants that would most benefit from no grazing 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 will 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.

Invasive Plants

Affected Environment

Monitoring results at the key areas on the Complex do not indicate a problem with the presence of invasive plant species. Bare ground, canopy cover, and litter – factors that can affect the presence of invasive species – were within expected ranges for all key areas. Monitoring found that departure from the ESD for invasive species was “none to slight” at all ten key areas.

The RHE reported that key areas were as expected for their ecological site descriptions for plant species composition, cover, and frequency, and that ground litter was within expected surface cover range for the ecological sites. Species composition data showed a relatively high percentage of perennial grasses and palatable shrubs: the presence of herbaceous and perennial plants is recommended to help control invasive plants like red brome (USDA 2012).

DPC objectives were only partially met at some of the key areas. Specifically, the desired perennial grass component was not met at Ohaco Key Area 4. The desired vegetative cover was not achieved at Douglas Key Area 1, and Ohaco Key Area 5. However, data indicate that progress is being made toward meeting these objectives. At Douglas Key Area 1 the high browse component helped offset the lack of vegetative foliar cover. In contrast, Ohaco Key Area 4 lacked the desired grass component for grazers, but had sufficient browse for desert tortoise on site. However, departure from ESD for invasive plants was ‘none to slight’ for these key areas.

The Hassayampa FO is not managing for red brome. No noxious weeds have been identified on the allotment.

Environmental Consequences

Alternative A – Proposed Action

The Proposed Action is designed to maintain or improve conditions favorable to meeting DPC objectives and Rangeland Health Standards.

Under the Proposed Action, vegetative cover and perennial grass composition should improve, which would help prevent the introduction and spread of invasive plants.

Red brome in abundance can alter the fire regime in desert plant communities. However, the spread and distribution of red brome would remain dependent on annual precipitation. Maintaining DPC objectives would provide conditions under which native plant species would continue to outcompete red brome, and therefore maintain the existing fire regime.

The Complex is currently meeting standards for upland conditions. As the BLM continues to monitor utilization of upland key forage species over time to ensure average utilization of key herbaceous forage species does not exceed 40 percent, which is light moderate use, it is expected that renewing the grazing permit would not contribute to spread of non-native, invasive plants.

Alternative B – No Action

Under the No Action alternative, the season of use and livestock distribution (pasture/allotment fencing and mineral placement restrictions) would remain unchanged from the present. As such, present conditions in terms of soil litter and vegetation composition and cover would remain unchanged. Because the current management of livestock does not indicate a declining trend in expected ecological site conditions based on the monitoring data, a change in the presence or distribution of invasive, non-native plant species is not expected.

Alternative C – No Grazing

Removal of grazing by domestic livestock would not automatically lead to disappearance of invasive plant species (Young and Clements 2007), and would not be expected to affect the presence or distribution of red brome within the allotments.

Although livestock grazing is observed to be one of the disturbance types that influence the invasive potential of the species (USGS 2003), red brome can be found across both disturbed and undisturbed landscapes (USDA 2012). While the No Grazing alternative may provide benefits by removing cattle and, therefore, one form of disturbance to soils and vegetative cover within the allotment, this alone would not be expected to affect the presence of red brome in the allotments. Further, there is no indication that the spread and distribution of the invasive can be controlled or eradicated outside of active management.

Competition by crowding has been shown to reduce the reproductive success of red brome (Halvorson 2003). Under the No Grazing alternative, upland vegetation would improve the most in productivity, vigor, species composition, and formation of new stems compared to the other alternatives. The expected effect would be a reduction in the presence of red brome across the allotments.

Soil Resources

This section responds to Issue 4: *Does livestock grazing affect cryptogammic crust presence?*

Affected Environment

The erosional context across the allotment is stable. Historical erosion from land use practices over the past century has produced high erosion rates with shifts in vegetation along with soil redistribution and loss by wind and water. The result of these practices left a dominant shrubland and soils with gravel and rock surfaces armored against erosion.

Soil mapping shows a low to moderate risk for erosion by wind. The wind erodibility index scores soils from 0 tons to 56 tons per acre per year assuming no groundcover, with the exception of some soils on the first terrace above the Hassayampa River, which have a potential for 86 tons per acre assuming no ground cover (see NRCS 2008).

Water erosion within the allotment occurs during intense summer thunderstorms. Soils have well drained conditions but intense rainfall can overwhelm soil infiltration capacity and create overland flow. The 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.

RHE findings did not note substantial departure from expected abiotic and biotic conditions outlined in the ESDs. The very rocky soils resist active erosion. All ten key areas showed only slight sign of active surface erosion suggesting stable soils. These areas showed either a none to slight or slight to moderate departures from the reference state for soil site stability, hydrologic function, and biotic integrity.

The biotic conditions that can indicate soil productive capacity did not show signs of substantial deviation from expected plant community composition, abundance, and annual crop.

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.

The ESDs for the key areas do not indicate a large presence of soil crusts. The absence of crusts in the sampling may be attributed to the period of sampling and crust species composition. The organisms shrink and swell according to available water, being able to quickly take advantage of short precipitation episodes (Cable and Huxman 2004). Sampling during dry periods will produce less frequency scores. In addition, gravel and rock conditions do not promote the formation of macroscopic crusts, favoring smaller organisms. A third factor for the low recorded crust presence is the inverse relationship with vascular plant cover. Vegetation across the Complex was shrub-dominated and had a foliar cover of 10-60% across all sites.

Livestock grazing does affect soil productivity by removing a portion of the standing crop. Annually produced biomass serves both a physical and biological role. 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.

The litter on the allotment is primarily produced from shrubs. The rocky soils favor shrubs and cacti that compose 54 percent to 80 percent of the total vegetation. Litter from grasses and forbs is sparse since the soils and climatic setting do not favor their production. Grasses and some forbs rely on fine soil textures since rooting concentrates in the top 10 centimeters. Since grazing targets primarily herbaceous species, the impact of the grazing on annual crop will be difficult to detect. The litter from the allotment plant communities consists of shrub and herbaceous leaves, twigs and roots. Grasses and herbs which livestock target consist of a minor part of the plant community on most of these ecological sites. Monitoring measured litter to be 21percent to 39 percent total groundcover at the key areas. The litter fraction of groundcover was not found departed from expected conditions.

Environmental Consequences

Alternative A – Proposed Action

The Proposed Action would improve soil conditions by improving livestock distribution. The greatest change would result from increased dispersal by use of mineral blocks, which would lower the pressure on forage vegetation in livestock concentrating areas. Although noticeable improvements in soil

conditions would be slight to none, the added dispersal would curtail concentrated grazing pressure that affects soil and vegetation communities. Improved fencing and implementing seasonal use would further enhance livestock dispersal and alleviate concentrated grazing pressure.

The current stocking rates would likely have a low effect on erosion since the grazed vegetation makes up a small fraction of the overall canopy cover. Canopy cover intercepts and disperses rainfall and disrupts overland flow generation. Measured vegetation cover ranged from 8 percent to 72 percent with less than 10 percent expected grasses on the majority of these ecosites. The monitoring showed bare soils ranged from 1 percent to 28 percent, largely because of the rocky surface conditions. Gravel and stone ranged from 8 percent to 62 percent. Given the low numbers and armored soils and considering the stable conditions suggested by the monitoring, continuation of the grazing permit would not result in further degradation from erosion.

The impacts of grazing on soil biotic crusts are difficult to discern because within this environment, cyanobacteria type crusts may exist below the gravel surface and would be difficult to detect.

Repairs to the existing pipeline system on the Effus ranch will have minor effects to soils. The majority of the pipeline is currently located under existing routes on the allotment, so no new soil effects are expected to occur from exposing and replacing pipeline as necessary. Effects are expected to be minimal, with some potential for limited erosion where the compaction layer under the route is removed.

Alternative B – No Action

The No Action and Proposed Action would result in similar effects to soil resources. The primary difference is that this alternative would take no actions to increase livestock dispersal across the Complex. Although present impacts to soils are minor, grazing pressure, and therefore soil impacts, would continue in areas of concentrated use. However, continuing present livestock management practices on the Complex would not result in impaired soil conditions given the findings of the RHE.

Alternative C – No Grazing

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 Chihuahu desert scrub with similar precipitation patterns to the Complex, findings indicate very little change in perennial grass cover after 16 to 25 years. In addition, because grass and forb communities are reaching late seral composition, it's likely that eliminating grazing pressure would result in a slow response.

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 (Loesser et al. 2006).

Wildlife Resources

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

Affected Environment

General Wildlife Species

Wildlife species that occur within the Ohaco 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, coyote, javelina, mountain lion, bobcat, gray fox, desert cottontail, black-tailed jackrabbits, Gambel's quail, great horned owls, and various reptiles, small mammals, bats, and migratory birds. Desert bighorn sheep may occupy steep, rugged habitat in the far southern end of the Ohaco allotment in and near the Hummingbird Springs Wilderness.

The Ohaco Complex is located within the Arizona Game and Fish Department management unit 42. Javelina (*Pecari tajacu*) and desert mule deer (*Odocoileus hemionus*) are two big game species that utilize the Ohaco Complex. Mule deer rely heavily on browse and forbs, which make up the majority of their diet (greater than 90%). 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, range and white ratany, jojoba, the eriogonum species, calliandra, desert globemallow, and succulents including prickly pear, barrel, and hedgehog cacti. Desert bighorn sheep (*Ovis canadensis nelsoni*) utilize a wide variety of forage plants including desert agave, barrel cactus, big galleta, brittlebush, catclaw acacia, desert lavender, fishhook cactus, globe mallow, ironwood, foothill palo verde, ratany, ephedra, silverbush, three-awn, white bursage, wolfberry, ocotillo, canyon ragweed, lupine, bladder sage, janusia, and fairy duster (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, Bendire's thrasher, Costa's hummingbird, ash-throated flycatcher, Scott's oriole, white-winged dove and western kingbird.

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 Ohaco Complex. Sonoran desert tortoises occupy much of the upland areas in the Ohaco 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%), perennial forbs (18.3%), grasses (27.4%), woody plants (23.2%) and prickly pear fruit (1.1%) (Van Devender, et al. 2002). These forage species are available for Sonoran desert tortoise throughout the Complex. The Ohaco Complex contains 55,130 acres of category II desert tortoise habitat and 6,858 acres of category III desert tortoise habitat (Reference Section 2.3.5, Appendix A). Category II 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.

Alternative A – 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 DPC objectives at most of the key areas are being met across the Complex. The Proposed Action is designed to improve conditions for upland vegetation near livestock water sources, major drainages and washes through restrictions on supplement placement. 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.

The construction of fencing on the Ohaco allotment would allow a rest rotation system to occur and prevent livestock drift onto and from neighboring allotments. This will enable the allotment to continue meeting Standards 1 and 3 of the Arizona Rangeland Health Standards while improving cover and forage availability for wildlife. Fence installation would cause a temporary disturbance to wildlife individuals but displacement effects for most species would be minimal and normal use would continue once construction activities were completed. The fence would be constructed to meet BLM fencing manual 1741-1 standards to restrict livestock access but facilitate wildlife movement. The fence construction would be expected to increase wildlife use of the upland areas during livestock exclusion periods as the vegetation improves and disturbance effects are minimized.

Routine maintenance of water sources (tanks and troughs) on the allotment would continue to benefit wildlife species in this arid environment. Individual 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 allotment.

Special Status Species

Desired plant community objectives we set to provide adequate forage for Sonoran desert tortoise (Appendix B). Perennial grasses are an important year-round food source for desert tortoises (Oftedal 2002). Objectives for perennial grasses were achieved at 7 out of the 8 key areas in the Complex where perennial grass objective were set (Appendix B). Palatable browse objectives were achieved at 8 of the 10 keys 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 B). The Proposed Action is designed to improve conditions for upland vegetation near livestock water sources, major drainages and washes through restrictions on supplement placement. 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. The construction of the fencing in the Ohaco allotment would allow a rest rotation system to occur which would be expected to improve cover and forage availability for Sonoran desert tortoise.

Alternative B – No Action

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 most key areas, 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.

Under this alternative, no restrictions would be placed on locating mineral supplements. As a result it is expected that more trampling would occur near water sources and desert wash habitat compared to the Proposed Action. General livestock grazing disturbance and displacement effects to wildlife in upland habitat would be similar to the Proposed Action, but there would be no disturbance related to fence construction.

Alternative C – No Grazing

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 allotment 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.

Cumulative Actions

The CEQ defines cumulative effects (also known as cumulative impacts) as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what (federal or non-federal) agency or person undertakes such actions” (40 CFR 1508.7).

The intensity, or severity, of the cumulative effects considers the magnitude, geographic extent, duration, and frequency of the effects. The magnitude of the effect reflects the relative size or amount of the effect;

the geographic extent considers how widespread the effect may be; and the duration and frequency refer to whether the effect is a one-time, intermittent, or chronic event.

If there is no net effect to a particular resource from an action, then there is no potential for cumulative effects. In addition, if effects that do not overlap in time and/or space, they do not contribute to cumulative effects. The temporal frame for analysis of cumulative effects is 10 years, which is the time period for the grazing lease. The spatial scale is the 192,719 acre Ohaco Complex.

The past, present, and reasonably foreseeable future actions considered in the cumulative effects analysis are summarized below.

A wide variety of land uses and activities are possible on the Ohaco Complex allotments, including travel, recreation, mineral development, grazing, and others. Specifically, the BLM issued a decision in 2014 for the Wickenburg Community Travel Management Plan, which encompasses portions of this area. Specific actions that are occurring, or are likely to occur in the reasonably foreseeable and contribute to cumulative effects include:

Livestock Grazing

The Ohaco Complex has been actively grazed for decades, and livestock grazing has occurred in some form on the allotment areas for over a century. The environmental effects of past grazing practices are reflected in the current description of the affected environment for the allotment. If left unchanged (No Action), current grazing practices are not expected to contribute toward downward trends in upland vegetation resource conditions on the allotments. Under the No Grazing scenario, improvement in resource conditions are expected to be mild to moderate over the long-term as soil and vegetative conditions slowly recover from long-term livestock grazing on the allotment. Continued livestock grazing is not anticipated to result in cumulative effects to non-native, invasive vegetation. Continued livestock grazing is not anticipated to result in any cumulative effects to wildlife species or habitat in the project area.

Soils

No substantial cumulative effects to soils were identified. Proposed range improvements have a minimal footprint. Localized fence effects from livestock and recreation are expected to occur but be highly localized. There may be increased trailing to new salt and supplement locations, but effects are expected to be negligible and highly localized. Compaction is expected to continue on established routes with increased recreational use in the area due to the expansion of Wickenburg and surrounding communities. The incremental impact of livestock grazing is not anticipated to result in a significant impact to soils.

Developments

No new or proposed developments or projects were identified within the project area. A number of existing rights-of-way (ROWs), including roads, pipelines, and public utilities, intersect portions of the Ohaco Complex. Owners/operators are authorized to access ROWs for routine maintenance and repair. Minor disturbances or impacts to resources may occur due to vehicle access and maintenance activities, such as brush clearing, within the ROWs. These past and continuing actions associated with ROWs are not expected to contribute additional incremental impacts beyond those described in Chapter 3 of this EA.

Resources Dismissed from Detailed Analysis

This section lists and describes the issues, resources, and concerns dismissed from analysis in this EA. These potential issues were identified during project scoping, and include elements of the environment that by statute, regulation, or EO must be considered in all EAs (BLM 2008, Appendix 1).

The purpose for dismissing issues in an EA is to focus the environmental analysis on issues that are truly significant to the proposed action, and to avoid amassing needless detail in accordance with CEQ regulations (40 CFR 1500.1(b)). CEQ requires that impacts shall be discussed in proportion to their significance, and for non-significant issues, there should be only enough discussion to show why more study is not warranted (40 CFR 1502.2). The following issues are dismissed from further analysis with explanation because (1) they do not exist in the project area, or (2) they would not be impacted by the proposed action(s), or (3) the potential impacts are not measurable or are negligible.

Air Quality – Present, Not Impacted

The Clean Air Act of 1970 and subsequent amendments required the Environmental Protection Agency to establish National Ambient Air Quality Standards (NAAQS), which specify maximum levels for six criteria pollutants: carbon monoxide, nitrogen dioxide, ozone, particulate matter (PM), sulfur dioxide, and lead. Livestock operations have the potential to release fugitive dust and carbon monoxide associated with cattle trailing, range improvements, and vehicle use. Maricopa County is classified by EPA as “attainment” for the purposes of NAAQS.

Range improvements would be authorized under the proposed action (Alternative A), but they would not result in the use of mechanized equipment. Further, the RHE for the Ohaco Complex found that conditions on the allotment are meeting rangeland health standards for vegetation cover (Standard 3) and for soil conditions (Standard 1) (BLM 2015). Because none of the actions considered in this EA would increase grazing activities, there is no expectation that the actions would measurably impact air quality or lead to non-attainment of NAAQS.

Accommodation of Sacred Sites – Not Present

EO 13007, *Indian Sacred Sites* (1996), requires Federal agencies to (1) accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners, and (2) avoid adversely affecting the physical integrity of such sacred sites. No known sacred sites are present in the project area, and during consultations with the American Indian Tribes that claim cultural affiliation to the area, no Native American religious concerns were identified in relation to livestock grazing within these allotments.

Areas of Critical Environmental Concern – Present, Not Impacted

No Areas of Critical Environmental Concern are present within the project area.

The Black Butte ACEC is located within the Ohaco Complex. This ACEC was designated for cultural resources and raptor nesting habitat. Livestock grazing has historically occurred in the ACEC, and proposed improvements are not expected to increase livestock use within the ACEC.

Cultural Resources

Cultural and heritage resources within the Hassayampa Field Office represent evidence of more than 10,000 years of human occupation of the region. The majority of the cultural resources on public lands are archaeological sites reflecting both pre-Columbian and post-contact occupation.

According to Arizona BLM Handbook H-8110, *Guidelines for Identifying Cultural Resources* (BLM 1999), livestock grazing permit renewals are generally exempt from cultural resources surveys. Range improvements, however, are land disturbing activities that require site-specific survey. Based on the proposed installation of new fencing, which would involve ground disturbing activities, the BLM conducted a Literature Search and a Class III intensive archaeological survey in 2014.

A Literature Search was conducted to identify whether previously recorded cultural resources or archaeological projects occur within or adjacent to the proposed project area. The parameters of the literature search included the locations of the proposed fence installation and a 1/4 mile search boundary. The Literature Search revealed that eight cultural resources surveys have been conducted with the Ohaco Complex allotments. None of these Class III surveys identified any cultural resources. None of the previously conducted surveys are located within the location of the proposed fence installation alignment.

Energy Conservation/Energy Requirements and Conservation Potential

The CEQ's NEPA Guidelines Section 1502.2(e) indicates that the discussion of environmental consequences must include analysis of the ". . . [e]nergy requirements and conservation potential of various alternatives and mitigation measures." Proposed range improvements include a pasture fence to be constructed along Aguila road, bisecting the Ohaco allotment. This fence will run on the east side of the road and tie in to the existing pasture fence west of Aguila road, then continue to the allotment boundary. This project consists of about 12 miles of fencing. A second fence between the Sprouse and Ohaco allotments is also proposed. This would involve standard fence construction methods. Also, a new water development in the south pasture of the Effus allotment is proposed to be constructed. This water development is expected to consist of a well, storage tank, drinker and a small corral.

While energy would be expended, the effects to energy conservation are negligible. Therefore, the topic is dismissed from further analysis.

Environmental Justice – Not Present

EO 12898, *General Actions to Address Environmental Justice in Minority Populations and Low Income Populations* (1994), requires all Federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low income populations. The proposed action would not result in disproportionate health or environmental effects on minorities or low income populations or communities. Nothing inherent in the alternatives considered would cause any statistically significant changes to ethnic composition of the resident populations and there is no indication that there would be any adverse economic effects on any particular ethnic group or any particular income group under any alternative.

Hazardous and Solid Wastes – Not Present

No known hazardous or solid waste issues occur in the allotment (BLM 2007 p. 437).

Floodplains or Wetlands – Not Present

EO 11988, *Floodplain Management* (1977) and EO 11990, *Protection of Wetlands* (1977), require all Federal agencies to avoid construction within the 100-year floodplain unless no practicable alternative exists, and to minimize the destruction, degradation, or loss of wetlands. The proposed action does not result in any impacts to floodplains or wetlands.

Paleontological Resources – Not Present

Bedrock exposures within the allotments are composed of igneous intrusive and volcanic extrusive rocks of Proterozoic and Phanerozoic age. Paleontological resources never occur in igneous rocks and only very rarely in some types of volcanic rocks. Cenozoic age unconsolidated sediments of fluvial and colluvial origin comprise the non-bedrock areas within valleys and drainages and generally have a low potential for the occurrence of paleontological resources. There are no paleontological resources known to exist within the allotments. Management actions are designed to inventory and protect fossil sites if they are discovered in the course of normal management activities (BLM 2007 (FEIS)).

Prime and Unique Farmlands – Not Present

Under the *Farmland Protection Act* of 1981, Federal agencies seek to minimize the unnecessary or irreversible conversion of farmland to nonagricultural uses. No unique or prime farmlands exist within the project area; therefore, the proposed action would have no impact on this resource (BLM 2007, p. 437).

Recreation – Present, Not Impacted

Recreation opportunities within the project area are classified in the Bradshaw-Harquahala RMP. The Ohaco Complex falls within the Harquahala Management Unit. Continued livestock use would not affect the availability of recreational opportunities within the allotment. In many instances, recreationists use the same roads, primitive roads, and trails as grazing permittees where little or no conflict has occurred.

Visual Resources – Present, Not Impacted

Under the RMP, the Ohaco Complex is allocated to Visual Resource Management (VRM) Classes III. VRM Class III objective is to partially retain the existing character of the landscape, with a moderate level of change. Management activities may attract attention but should not dominate the view of the casual observer. None of the proposed actions would alter the landscape beyond the objectives of the VRM Class. Grazing practices would continue as they have in the past. VRM objectives for the allotment would be met under all alternatives.

Urban Quality, Historic and Cultural Resources, and the Design of the Built Environment – Not Present

CEQ requires that analysis of environmental consequences must discuss potential effects to urban quality, historic and cultural resources, and the design of the built environment, including the reuse and conservation potential of various alternatives and mitigation measures (40 CFR 1502.16(g)). The proposed action would have no impact on these resources.

Wild Horses and Burros – Present, Not Impacted

Wild horses or burros are present on the Complex, but no herd management area is associated with the project area. No impacts to wild burros are expected.

Wild and Scenic Rivers – Not Present

There are no river segments within the allotment that are designated, eligible, or suitable, as wild, scenic, or recreational under the Wild and Scenic Rivers Act.

Wilderness

The southern portion of the Ohaco allotment contains 3,564 public acres of the Hummingbird Springs wilderness. There would be no change in the management of livestock within the wilderness boundary.

Chapter 4: Consultation

The BLM conducts scoping to solicit internal and external input on the potential issues, impacts, and alternatives that may be addressed in an EIS or EA. The BLM conducted scoping on this EA concurrently with taking comments on the 2015 Ohaco Complex RHE. External scoping was conducted via letter sent to the Consultation, Coordination, and Cooperation list, including State agencies, Federal agencies, and interested publics. Recipients were asked to comment on the draft RHEs as well as the Proposed Action presented in this EA. The scoping period for the Ohaco Complex was December 15th to January 15th 2016. No external scoping responses were received.

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Appendix A:

Arizona's Standards for Rangeland Health and Guidelines for Grazing Administration

INTRODUCTION

The Department of the Interior's final rule for Grazing Administration, issued on February 22, 1995, and effective August 21, 1995, requires that Bureau of Land Management (BLM) State Directors develop State or regional standards and guidelines for grazing administration in consultation with BLM Resource Advisory Councils (RAC), other agencies and the public. The final rule provides that fallback standards and guidelines be implemented, if State standards and guidelines are not developed by February 12, 1997. Arizona Standards and Guidelines and the final rule apply to grazing administration on public lands as indicated by the following quotation from the Federal Register, Volume 60, Number 35, page 9955.

"The fundamentals of rangeland health, guiding principles for standards and the fallback standards address ecological components that are affected by all uses of public rangelands, not just livestock grazing. However, the scope of this final rule, and therefore the fundamentals of rangeland health of §4180.1, and the standards and guidelines to be made effective under §4180.2, are limited to grazing administration."

Although the process of developing standards and guidelines applies to grazing administration, present rangeland health is the result of the interaction of many factors in addition to grazing by livestock. Other contributing factors may include, but are not limited to, past land uses, land use restrictions, recreation, wildlife, rights-of-way, wild horses and burros, mining, fire, weather, and insects and disease. With the commitment of BLM to ecosystem and interdisciplinary resource management, the standards for rangeland health as developed in this current process will be incorporated into management goals and objectives. The standards and guidelines for rangeland health for grazing administration, however, are not the only considerations in resolving resource issues.

The following quotations from the Federal Register, Vol. 60, No. 35, page 9956, February 22, 1995, describe the purpose of standards and guidelines and their implementation:

"The guiding principles for standards and guidelines require that State or regional standards and guidelines address the basic components of healthy rangelands. The Department believes that by implementing grazing-related actions that are consistent with the fundamentals of §4180.1 and the guiding principles of §4180.2, the long-term health of public rangelands can be ensured.

"Standards and guidelines will be implemented 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.

"The Department anticipates that in most cases the standards and guidelines themselves will not be terms and conditions of various authorizations but that the terms and conditions will reflect the standards and guidelines.

"The Department intends that assessments and corrective actions will be undertaken in priority order as determined by BLM.

"The Department will use a variety of data including monitoring records, assessments, and knowledge of the locale to assist in making the "significant progress" determination. It is anticipated that in many cases it will take numerous grazing seasons to determine direction and magnitude of trend. However, actions will be taken to establish significant progress toward conformance as soon as sufficient data are available to make informed changes in grazing practices."

FUNDAMENTALS AND DEFINITION OF RANGELAND HEALTH

The Grazing Administration Regulations, at §4180.1 (43 Code of Federal Regulation [CFR] 4180.1), Federal Register Vol. 60, No. 35, pg. 9970, direct that the authorized officer ensures that the following conditions of rangeland health exist:

(a) Watersheds are in, or are making significant progress toward, properly functioning physical condition, including their upland, riparian-wetland, and aquatic components; soil and plant conditions support infiltration, soil moisture storage, and the release of water that are in balance with climate and landform and maintain or improve water quality, water quantity, and timing and duration of flow.

(b) Ecological processes, including the hydrologic cycle, nutrient cycle, and energy flow, are maintained, or there is significant progress toward their attainment, in order to support healthy biotic populations and communities.

(c) Water quality complies with State water quality standards and achieves, or is making significant progress toward achieving, established BLM management objectives such as meeting wildlife needs.

(d) Habitats are, or are making significant progress toward being, restored or maintained for Federal threatened and endangered species, Federal Proposed, Category 1 and 2 Federal candidate and other special status species.

These fundamentals focus on sustaining productivity of a rangeland rather than its uses. Emphasizing the physical and biological functioning of ecosystems to determine rangeland health is consistent with the definition of rangeland health as proposed by the Committee on Rangeland Classification, Board of Agriculture, National Research Council (Rangeland Health, 1994, pg. 4 and 5). This Committee defined Rangeland Health ". . . as the degree to which the integrity of the soil and the ecological processes of rangeland ecosystems are sustained." This committee emphasized ". . . the degree of integrity of the soil and ecological processes that are most important in sustaining the capacity of rangelands to satisfy values and produce commodities." The Committee also recommended that "The determination of whether a rangeland is healthy, at risk, or unhealthy should be based on the evaluation of three criteria: degree of soil stability and watershed function, integrity of nutrient cycles and energy flow, and presence of functioning mechanisms" (Rangeland Health, 1994, pg. 97-98).

Standards describe conditions necessary to encourage proper functioning of ecological processes on specific ecological sites. An ecological site is the logical and practical ecosystem unit upon which to base an interpretation of rangeland health. Ecological site is defined as:

". . . a kind of land with specific physical characteristics which differs from other kinds of land in its ability to produce distinctive kinds and amounts of vegetation and in its response to management" (Journal of Range Management, 48:279, 1995). Ecological sites result from the interaction of climate, soils, and landform (slope, topographic position). The importance of this concept is that the "health" of different kinds of rangeland must be judged by standards specific to the potential of the ecological site. Acceptable erosion rates, water quality, productivity of plants and animals, and other features are different on each ecological site.

Since there is wide variation of ecological sites in Arizona, standards and guidelines covering these sites must be general. To make standards and guidelines too specific would reduce the ability of BLM and interested publics to select specific objectives, monitoring strategies, and grazing permit terms and conditions appropriate to specific land forms.

Ecological sites have the potential to support several different plant communities. Existing communities are the result of the combination of historical and recent uses and natural events. Management actions may be used to modify plant communities on a site. The desired plant community for a site is defined as follows: "Of the several plant communities that may occupy a site, the one that has been identified

through a management plan to best meet the plan's objectives for the site. It must protect the site as a minimum." (Journal of Range Management, 48:279, 1995.)

Fundamentals (a) and (b) define physical and biological components of rangeland health and are consistent with the definition of rangeland health as defined by the Committee on Rangeland Classification, Board on Agriculture, National Research Council, as discussed in the paragraph above. These fundamentals provide the basis for sustainable rangelands.

Fundamentals (c) and (d) emphasize compliance with existing laws and regulation and, therefore, define social and political components of rangeland health. Compliance with Fundamentals (c) and (d) is accomplished by managing to attain a specific plant community and associated wildlife species present on ecological sites. These desired plant communities are determined in the BLM planning process, or, where the desired plant community is not identified, a community may be selected that will meet the conditions of Fundamentals (a) and (b) and also adhere to laws and regulations. Arizona Standard 3 is written to comply with Fundamentals (c) and (d) and provide a logical combination of Standards and Guidelines for planning and management purposes.

STANDARD AND GUIDELINE DEFINITIONS

Standards are goals for the desired condition of the biological and physical components and characteristics of rangelands. Standards:

- (1) are measurable and attainable; and
- (2) comply with various Federal and State statutes, policies, and directives applicable to BLM Rangelands.

Guidelines are management approaches, methods, and practices that are intended to achieve a standard. Guidelines:

- (1) typically identify and prescribe methods of influencing or controlling specific public land uses;
- (2) are developed and applied consistent with the desired condition and within site capability; and
- (3) may be adjusted over time.

IMPLEMENTING STANDARDS AND GUIDELINES

The authorized officer will review existing permitted livestock use, allotment management plans, or other activity plans which identify terms and conditions for management on public land. Existing management practices and levels of use on grazing allotments will be reviewed and evaluated on a priority basis to determine if they meet, or are making significant progress toward meeting, the standards and are in conformance with the guidelines. The review will be interdisciplinary and conducted under existing rules which provide for cooperation, coordination, and consultation with affected individuals, federal, state, and local agencies, tribal governments, private landowners, and interested publics.

This review will use a variety of data, including monitoring records, assessments, and knowledge of the locale to assist in making the significant progress determination. Significance will be determined on a case by case basis, considering site potential, site condition, weather and financial commitment. It is anticipated there will be cases where numerous years will be needed to determine direction and magnitude of trend.

Upon completion of review, the authorized officer shall take appropriate action as soon as practicable but no later than the start of the next grazing year upon determining that the existing grazing management practices or level of use on public land are significant factors contributing to failure to achieve the standards and conform with the guidelines that are made effective under 43 CFR 4180.2. Appropriate

action means implementing actions that will result in significant progress toward fulfillment of the standards and significant progress toward conformance with guidelines.

Livestock grazing will continue where significant progress toward meeting standards is being made. Additional activities and practices would not be needed on such allotments. Where new activities or practices are required to assure significant progress toward meeting standards, livestock grazing use can continue contingent upon determinations from monitoring data that the implemented actions are effective in making significant progress toward meeting the standards. In some cases, additional action may be needed as determined by monitoring data over time.

New plans will incorporate an interdisciplinary team approach (Arizona BLM Interdisciplinary Resource Management Handbook, April 1995). The terms and conditions for permitted grazing in these areas will be developed to comply with the goals and objectives of these plans which will be consistent with the standards and guidelines.

ARIZONA STANDARDS AND GUIDELINES

Arizona Standards and Guidelines (S&G) for grazing administration have been developed through a collaborative process involving the Bureau of Land Management State S&G Team and the Arizona Resource Advisory Council. Together, through meetings, conference calls, correspondence, and Open Houses with the public, the BLM State Team and RAC prepared Standards and Guidelines to address the minimum requirements outlined in the grazing regulations. The Standards and Guidelines, criteria for meeting Standards, and indicators are an integrated document that conforms to the fundamentals of rangeland health and the requirements of the regulations when taken as a whole.

Upland sites, riparian-wetland areas, and desired resource conditions are each addressed by a standard and associated guidelines.

Standard 1: Upland Sites

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

Criteria for meeting Standard 1:

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

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

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

As indicated by such factors as:

Ground Cover

- litter
- live vegetation, amount and type (e.g., grass, shrubs, trees, etc.)
- rock

Signs of erosion

- flow pattern
- gullies
- rills
- plant pedestaling

Exceptions and exemptions (where applicable):

None

Guidelines:

1-1. Management activities will maintain or promote ground cover that will provide for infiltration, permeability, soil moisture storage, and soil stability appropriate for the ecological sites within management units. The ground cover should maintain soil organisms and 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.

1-2. When grazing practices alone are not likely to restore areas of low infiltration or permeability, land management treatments may be designed and implemented to attain improvement.

Standard 2: Riparian-Wetland Sites

Riparian-wetland areas are in properly functioning condition.

Criteria for meeting Standard 2:

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

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

The checklist for riparian areas is in Technical Reference 1737-9 "Process for Assessing Proper Functioning Condition." The checklist for wetlands is in Technical Reference 1737-11 "Process for Assessing Proper Functioning Condition for Lentic Riparian-Wetland Areas."

As indicated by such factors as:

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

Exceptions and exemptions (where applicable):

- Dirt tanks, wells, and other water facilities constructed or placed at a location for the purpose of providing water for livestock and/or wildlife and which have not been determined through local planning efforts to provide for riparian or wetland habitat are exempt.
- Water impoundments permitted for construction, mining, or other similar activities are exempt.

Guidelines:

2-1. Management practices maintain or promote sufficient vegetation to maintain, improve or restore riparian-wetland functions of energy dissipation, sediment capture, groundwater recharge and stream bank stability, thus promoting stream channel morphology (e.g., gradient, width/depth ratio, channel roughness and sinuosity) and functions appropriate to climate and landform.

2-2. New facilities are located away from riparian-wetland areas if they conflict with achieving or maintaining riparian-wetland function. Existing facilities are used in a way that does not conflict with riparian-wetland functions or are relocated or modified when incompatible with riparian-wetland functions.

2-3. The development of springs and seeps or other projects affecting water and associated resources shall be designed to protect ecological functions and processes.

Standard 3: Desired Resource Conditions

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

Criteria for meeting Standard 3:

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

Desired plant community objectives will be developed to assure that soil conditions and ecosystem function described in Standards 1 and 2 are met. They detail a site-specific plant community, which when obtained, will assure rangeland health, State water quality standards, and habitat for endangered, threatened, and sensitive species. Thus, desired plant community objectives will be used as an indicator of ecosystem function and rangeland health.

As indicated by such factors as:

- Composition
- Structure
- Distribution

Exceptions and exemptions (where applicable):

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

Guidelines:

3-1. The use and perpetuation of native species will be emphasized. However, when restoring or rehabilitating disturbed or degraded rangelands, non-intrusive, non-native plant species are appropriate for use where native species (a) are not available, (b) are not economically feasible, (c) cannot achieve ecological objectives as well as non-native species, and/or (d) cannot compete with already established non-native species.

3-2. Conservation of Federal threatened or endangered, proposed, candidate, and other special status species is promoted by the maintenance or restoration of their habitats.

3-3. Management practices maintain, restore, or enhance water quality in conformance with State or Federal standards.

3-4. Intensity, season and frequency of use, and distribution of grazing use should provide for growth and reproduction of those plant species needed to reach desired plant community objectives.

3-5. Grazing on designated ephemeral (annual and perennial) rangeland may be authorized if the following conditions are met:

- ephemeral vegetation is present in draws, washes, and under shrubs and has grown to useable levels at the time grazing begins;
- sufficient surface and subsurface soil moisture exists for continued plant growth;
- serviceable waters are capable of providing for proper grazing distribution;
- sufficient annual vegetation will remain on site to satisfy other resource concerns, (i.e., watershed, wildlife, wild horses and burros); and
- monitoring is conducted during grazing to determine if objectives are being met.

3-6. Management practices will target those populations of noxious weeds which can be controlled or eliminated by approved methods.

3-7. 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.

Appendix B

Rangeland Health Evaluation

Ohaco Allotment #03060

Effus Allotment #03030

Douglas Allotment #03026

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Abstract

This Rangeland Health Evaluation is a stand-alone report designed to ascertain compliance with the Arizona Standards for Rangeland Health on the Ohaco, Effus, and Douglas grazing allotments.

Standard One is achieved on this complex of allotments.

Standard Two is not applicable to this complex of allotments.

Standard Three is achieved on the Ohaco and Effus allotments. It is not achieved on the Douglas allotment or at Ohaco Key Area 5.

1.0 Introduction

The purpose of this draft land health evaluation is to gauge whether the Arizona Standard of Rangeland Health (Standards) are being achieved on the Ohaco, Effus, and Douglas grazing allotments (hereafter the “Ohaco Complex” or “Complex”) and to determine if livestock are the causal factor for either not achieving or not making significant progress towards achieving land health standards in the case of non-achievement of Standards. An evaluation is not a decision document, but a standalone report that clearly records the analysis and interpretation of the available inventory and monitoring data. As part of the land health assessment process, Desired Plant Community (DPC) objectives were established for the Biological Resources (biological objects within the boundaries of the allotments). The DPC objectives will assure that soil condition and ecosystem function described in Standards 1 and 2 are met.

The Secretary of the Interior approved Arizona’s Standards for Rangeland Health and Guidelines for Grazing Administration (Guidelines) in April 1997. The Decision Record, signed by the BLM State Director (April 1997) provides for full implementation of the Standards and Guides in Arizona BLM Land Use Plans. See Appendix B for Arizona’s Standards for Rangeland Health.

Land Health Standards are measurable and attainable goals for the desired condition of the biological resources and physical components/characteristics of the desert ecosystems found within the boundaries of these grazing allotments.

This evaluation seeks to ascertain: 1) if standards are being achieved, not achieved, and, in cases of not achieved, if significant progress is being made towards achievement of land health. 2) Where it is ascertained that land health standards are not being achieved, determine whether livestock grazing is a significant factor causing that non-achievement.

2.0 Complex Profile

2.1 Complex Location

The Ohaco Complex is located south to southeast of the town of Aguila, Arizona. Aguila road bisects the Ohaco Allotment. The Effus allotment is adjacent to the Ohaco allotment, northeast of Black Butte. The Douglas allotment consists of scattered parcels east of Vulture Mine road, southwest of Wickenburg, Arizona. Acreages for the allotments within the complex are given in Section 2.2.1, below. A map of the Complex allotments is available in Appendix A.

2.2 Physical Description

2.2.1 Allotment Acreages

The acreages of the allotments within the Ohaco Complex are given below.

Land Classification	Ohaco Allotment	Effus Allotment	Douglas Allotment
Public Acres	52,025	14,286	2,036
State Acres	11,035	3,999	24,006
Private Land Acres	854	378	81,156
Local and State Parks	0	0	1,786
Military	0	0	653
Bureau of Reclamation	0	0	505
Total Acres	63,914	18,663	110,142

2.2.2 Climate Data

Climate data for this allotment are taken from the Western Regional Climate Center data available at www.wrcc.dri.edu. The data are based on the National Oceanic and Atmospheric Administration (NOAA) site located in Wickenburg, AZ east northeast of the complex. Average mean air temperature at this site is 65.7°F, with an average of 150.4 days per year at a daily maximum temperature above 90°F and 61.2 days a year with a daily minimum below 32°F. This is consistent with the Natural Resource Conservation Service (NRCS) Agricultural Handbook 296, which describes the climate of the area as:

“The average annual air temperature is 58 to 74 degrees F (15 to 23 degrees C). The freeze-free period averages 285 days and ranges from 205 to 365 days, decreasing in length with increasing elevation.”
(USDA 2006)

2.2.3 Precipitation

Precipitation data for the Ohaco Complex is taken from the Maricopa County Flood Control District (MCFCD). MCFCD maintains a network of rain, streamflow, and weather stations within the watershed in and surrounding Maricopa County, with publicly available historic station data. The stations below were used in the calculation of precipitation on the Complex:

Station Name	Station Number	Lat	Long	Years of Record	Mean Annual Rainfall
Box Wash	5270	33.8493	-112.7991	11	8.45
Upper Grass Wash	5145	33.8776	-113.091	12	8.23
Dead Horse Wash	5195	33.781	-113.029	14	7.65
Centennial Wash	5180	33.94325	-113.001	33	8.01
Upper Tiger Wash	5130	33.8103	-113.1752	29	8.12
Harquahala Mountain	5185	33.8121	-113.347	21	12.09
Sugarloaf Mountain	5055	33.6913	-113.0936	10	7.44
Daggs Wash	5495	33.7459	-112.7251	6	7.63

2.2.4 Soils Data

Soils data for the Complex are taken from the NRCS soil survey of the Aguila-Carefree area (1986). The soils data is limited to public lands within the allotments, and does not include soils present on State trust or privately held lands. Soil descriptions are taken from the NRCS/USDA soils website.

2.2.4.1 The Ohaco Allotment

Soils on the Ohaco allotment are typical of desert floor and mountainous soils. Many soils within the allotment are soil complexes and associations, totaling forty four soil types. The majority of these soil complexes and associations are present on less than 4% of the public land individually, and will not be discussed in depth. Individual soils within these minor complexes may be present in the major complexes discussed. There are five soil types that account for 65% of the allotment soils, discussed below:

The first and second most dominant soil map units within the allotment is the Gachado-Lomitas-Rock Outcrop complex, 7-55% slopes, comprising 24 percent of the area and the Gachado-Lomitas complex, 8-25% slopes, comprising 18.2 percent of the area. The Gachado series consists of very shallow and shallow, well drained soils formed in alluvium from volcanic rock. Gachado soils are on hills and mountains with slopes of 0 to 55 percent and elevations from 600 to 3000 feet. Depth to bedrock is between 7-20 inches. The ecological site associated with this soil is the Volcanic Hills 7-10"pz (R040XB222AZ). The Lomitas series consists of shallow, somewhat excessively drained soils formed in alluvium and colluvium. Lomitas soils are on hills and mountains and have slopes of 5 to 65 percent and elevations from 1,000 to 3,000 feet. Depth to bedrock is between 10 and 20 inches. The ecological site associated with this soil is the Volcanic Hills 7-10"pz.

The third most dominant soil within the allotment is the Greyeagle-Continental-Nickel association, 1-40% slopes, comprising 11.3 percent of the area. Greyeagle soils are somewhat excessively drained soils on fan terraces and hillslopes. The soil is derived from mixed alluvium with a depth of 24-60 inches. The ecological site associated with this soil is the Clay Loam Upland 7-10"pz (R040XB205AZ). Continental soils are well drained soils on fan terraces. The soil is derived from alluvium from mixed sources with a depth of 27-60 inches. The ecological site associated with this soil is the Clay Loam Upland 7-10"pz. Nickel soils are well drained soils on fan remnants. The soil is derived from alluvium from mixed rock sources with a depth of 31-60 inches. The ecological site associated with this soil is the Limy Upland 7-10"pz (R040XB210AZ).

The fourth most dominant soil within the allotment is the Gunsight-Cipriano complex, low precipitation, 1-7% slopes, comprising 6.2 percent of the area. The Gunsight series consists of very deep, somewhat excessively drained, strongly calcareous soils that formed in alluvium from mixed sources. Gunsight soils are on fan terraces or stream terraces and have slopes of 0 to 60 percent with elevations from 400 to 2,600 feet. Depth to bedrock is greater than 60 inches. The ecological site associated with this soil is the Limy Upland 3*7"pz Deep (R040XC311AZ). The Cipriano series consists of shallow and very shallow to a hardpan, somewhat excessively drained soils that formed in fan alluvium from volcanic rock. Cipriano soils are on fan terraces and have slopes of 0 to 55 percent with elevations from 500 to 2,200 feet. Depth to bedrock is greater than 60 inches. The ecological site associated with this soil is the Limy Upland 3-7"pz (R040XC310AZ).

The fifth most dominant soil within the allotment is the Vaiva very gravelly loam, 1-20 percent slopes, comprising 5.2 percent of the area. The Vaiva series consists of very shallow and shallow, well drained

soils formed in slope alluvium from granite and gneiss. Vaiva soils are on hills and mountains with slopes of 1 to 65 percent with elevations from 800 to 3,500 feet. Depth to lithic contact is 7-20 inches. The ecological site associated with this soil is the Granitic Upland 7-10"pz (R040XB220AZ).

2.2.4.2 The Effus Allotment

Soils on the Effus allotment are typical of hill soils in the Sonoran desert. Many soils within the allotment are soil complexes and associations, totaling 29 soil types. The majority of these soil complexes and associations are present on less than 5% of the public land individually, and will not be discussed in depth. Individual soils within these minor complexes may be present in the major complexes discussed. There are five soil types that account for 76% of the allotment soils, discussed below:

The first and second most dominant soil map units within the allotment is the Gran-Wickenburg-Rock Outcrop complex, low precipitation. The 10-65% slopes map unit accounts for 45.9% of the allotment, while the 1-10% slopes map unit accounts for 9.6% of the allotment. The Gran series consists of very shallow and shallow, well drained soils that formed in alluvium-colluvium. Gran soils are on pediments, hillslopes and mountain slopes with gradients of 1 to 65 percent with elevations from 1,800 to 4,000 feet. Depth to bedrock is 20 to 40 inches. The ecological site associated with this soil is the Granitic Hills 7-10"pz (R040XB206AZ). The Wickenburg series consists of shallow, well drained soils that formed in mixed alluvium-colluvium. Wickenburg soils are on pediment hillslopes and mountain slopes with gradients of 1 to 65 percent with elevations from 1,800 to 4,000 feet. Depth to bedrock is 40 to 60 inches or greater in some areas. The ecological site associated with this soil is the Granitic Hills 7-10"pz.

The third most dominant soil map unit within the allotment is the Momoli-Carrizo complex, comprising 8.4% of the allotment. The Momoli series consists of very deep, somewhat excessively drained soils formed in fan alluvium and eolian deposits. Momoli soils are on stream terraces and fan terraces and have slopes of 0 to 15 percent with elevations from 400 to 2,500 feet. The ecological site associated with this soil is the Limy Upland 7-10"pz Deep (R040XB208AZ). The Carrizo series consists of very deep, excessively drained soils formed in mixed igneous alluvium. Carrizo soils are on numerous landforms on flood plains, fan piedmonts and bolson floors. Slopes range from 0 to 15 percent with elevations from 0 to 2,600 feet. In this complex, this soil is associated with the Limy Upland 7-10"pz Deep ecological site.

The fourth most dominant soil map unit within the allotment is the Nickel-Cave complex, low precipitation, 3-30% slopes, comprising 7.3% of the allotment. The Nickel series consists of very deep, well drained soils that formed in alluvium from mixed rock sources. Nickel soils are on fan remnants. Slope ranges from 0 to 35 percent with elevations from 1,800 to 4,000 feet. The ecological site associated with this soil is the Limy Slopes 7-10"pz (R040XB209AZ). The Cave series consists of very shallow and shallow to a hardpan, well drained soils formed in mixed alluvium. Cave soils are on fan remnants, fan piedmonts and stream terraces and have slopes of 0 to 35 percent with elevations from 1,500 to 5,060 feet. Depth to hardpan is 4 to 20 inches. The ecological site associated with this soil is the Limy Upland 7-10"pz.

The fifth most dominant soil map unit within the allotment is the Cipriano very gravelly loam, comprising 5.5% of the allotment. The Cipriano series consists of shallow and very shallow to a hardpan, somewhat excessively drained soils that formed in fan alluvium from volcanic rock. Cipriano soils are on fan terraces and have slopes of 0 to 55 percent with elevations from 500 to 2,200 feet. Depth to duripan is 4 to 20 inches. The ecological site associated with this soil is the Limy Upland 7-10"pz.

2.2.4.3 The Douglas Allotment

Soils on the Douglas allotment are typical of desert floor soils. Many soil units within the allotment are soil complexes and associations, totaling 28 soil types. The majority of these soil complexes and associations are present on less than 5% of the public land individually, and will not be discussed in depth. Individual soils within these minor complexes may be present in the major complexes discussed. There are five soil types that account for 73% of the allotment soils, discussed below:

The most dominant soil map unit within the allotment is the Gunsight-Rillito complex, low precipitation, 1-40% slopes, accounting for 28.5% of the soils on the allotment. The Gunsight soil series is described above. In this soil complex, the Gunsight soil is associated with the Limy Fan 3-7"pz ecological site (R040XC306AZ). The Rillito series consists of very deep, somewhat excessively drained soils that formed in mixed alluvium. Rillito soils are on fan terraces or stream terraces. Slopes are dominantly 0 to 5 percent, but range to 40 percent with elevations from 400 to 2,200 feet. The ecological site associated with this soil is the Limy Upland 3-7"pz Deep.

The second most dominant soil map unit within the allotment is the Ebon-Pinamt complex, 3-20% slopes, accounting for 13.5% of the soils on the allotment. The Ebon series consists of very deep, well drained soils that formed in mixed alluvium. Ebon soils are on fan terraces and have slopes of 0 to 40 percent with elevations from 850 to 2,290 feet. The ecological site associated with this soil is the Clay Loam Upland 7-10"pz. The Pinamt series consists of very deep, well drained soils that formed in fan alluvium and stream alluvium. Pinamt soils are on fan terraces and stream terraces and have slopes of 0 to 40 percent with elevations from 700 to 3,000 feet. Depth to the base of the argillic horizon is 25 to 40 inches. The ecological site associated with this soil is the Loamy Upland 7-10"pz (R040XB213AZ).

The third most dominant soil map unit within the allotment is the Brios-Carrizo complex, low precipitation, 1-5% slopes, accounting for 12.2% of the soils on the allotment. The Brios series consists of very deep, excessively drained soils that formed in mixed and stratified alluvium. Brios soils are on flood plains and alluvial fans and have slopes of 0 to 5 percent with elevations from 175 to 2,200 feet. This soil is associated with the Sandy Wash 3-7"pz (R040XC318AZ). The Carrizo soil series is described above. In this soil complex, the Carrizo soil is associated with the Sandy Wash 3-7"pz ecological site.

The fourth most dominant soil map unit within the allotment is the Quilotosa-Vaiva-Rock outcrop complex, 20-65% slopes, accounting for 11.8% of the soils on the allotment. The Quilotosa series consists of very shallow and shallow, somewhat excessively drained soils that formed from granitic and metamorphic rocks. Quilotosa soils are on hills and mountains and have slopes of 3 to 65 percent with elevations from 400 to 3,500 feet. Depth to bedrock is 4 to 20 inches. The ecological site associated with this soil is Granitic Hills 7-10"pz. The Vaiva series is described above. In this complex, the Vaiva soil is associated with the Granitic Hills 7-10"pz ecological site.

The fifth most dominant soil map unit within the allotment is the Momoli-Carrizo complex, low precipitation, accounting for 7% of the soils on the allotment. The Momoli-Carrizo soil is described above. In this low precipitation complex, both soils are associated with the Limy Fan 3-7"pz.

2.3 Biological Resources

2.3.1 Major Land Resource Areas

The Ohaco Complex lies within Major Land Resource Area (MLRA) 40, Sonoran Basin and Range. MLRAs are described in USDA NRCS Agriculture Handbook 296: "Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin" (2006). MRLAs describe, on a large-landscape scale, the physiography, geology, climate, water, soils, biological resources and general land use.

Ecological Site Descriptions produced by the NRCS are organized by MLRA for reference purposes.

2.3.2 Ecological Sites

An ecological site is a distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation. It is the product of all the environmental factors responsible for its development, and it has a set of key characteristics (soils, hydrology, and vegetation) that are included in the ecological site description. Development of the soils, hydrology, and vegetation are all interrelated. Each is influenced by the other and influences the development of the others. (TR 1734-07, Ecological Site Inventory)

Ecological sites are named and classified based on soil parent material or soil texture and precipitation. There are several ecological sites that occur within the Ohaco Complex. The dominant ecological sites on Public lands within the complex are described below. Reference Map 3, Appendix A, for ecological sites occurring on the complex and Section 5, Appendix A, for a list of Ecological Sites and their percentage of Public Lands within the Complex.

NRCS provides Ecological Site Descriptions online at <https://esis.sc.egov.usda.gov/>.

Granitic Hills 7-10"pz R040XB206AZ

This site occurs on hillslopes and ridgetops. Slopes range from 15 to 65%. Elevations are from 1000 to 2500 feet. Soils are shallow and formed on acid igneous materials. Soils are non-calcareous, coarse textured and have well developed covers of gravels and cobbles. Large areas of rock outcrop and boulder occur up to 25% of the area. Plant-soil moisture relationships are fair. The potential plant community is a diverse mixture of desert trees, shrubs, and cacti. Perennial grass is not a major component of the ecological site. Annual vegetative production is expected to be between 400-625lbs air-dry weight per acre.

Granitic Upland 7-10"pz R040XB220AZ

This site occurs on pediments, undulating uplands in and around the low desert mountains. Slopes range from 1% to 15%. Elevations are from 1000 to 2500 feet. Soils are shallow and very shallow, formed on acid and intermediate igneous parent materials. Soils are non-calcareous, coarse textured with well-developed gravel covers. Rock outcrop makes up a small percentage of the area. Plant-soil moisture relationships are poor. The potential plant community is a mixture of desert trees, shrubs, cacti and perennial forbs and grasses. Annual vegetative production is expected to be between 402 and 513lbs air-dry weight per acre.

Limy Upland 7-10"pz R040XB210AZ

This site occurs on fan terraces, ridgetops, pediments and mesa tops. Slopes are from 1 to 15%. Elevations range from 1000 to 2200 feet. Soils are shallow over strongly cemented lime pans. Soils are

very calcareous, coarse to loamy textured. Surface rock fragments are common. Plant-soil moisture relationships are poor. The potential plant community on this site is a mixture of desert shrubs, cacti, and perennial and annual grasses and forbs. Annual vegetative production is expected to be between 138 and 210 lbs air-dry weight per acre.

Sandy Bottom 3-7"pz, 7-10"pz R040XC318AZ, R040XB

These sites occur in a bottom position. They benefit significantly from run-in moisture from adjacent areas. The soils may suffer from excessive loss from runoff. It occurs as floodplains, low terraces, alluvial fans and drainageways. Slopes are from 0% to 3%. Elevations range from 0 to 1,000 feet for the lower rainfall regime, and 900 to 2,000 feet for the higher rainfall regime. Soils are very young, and of mixed origin. Soils may or may not be calcareous. Plant-soil moisture relationships are poor in the lower rainfall regime, but tend to be good due to the extra moisture received in the higher rainfall regime. Annual vegetative production is expected to be between 950 and 1675lbs air-dry weight per acre in the lower rainfall regime, and between 1650 and 2775lbs air-dry weight in the higher rainfall regime.

Volcanic Hills 7-10"pz R040XB210AZ

This site occurs on hillslopes and ridge tops with slopes ranging from 15-65% and elevations from 1000' to 2500'. Soils are shallow and formed on intermediate igneous material. Soils are slightly calcareous, loamy textured and have very well developed covers of cobble, stones and gravel. Rock outcrops can account for up to 35% of the area. Plant-soil moisture relationships are fair to good. The potential plant community is a diverse mixture of desert shrubs, trees and cacti with limited perennial grass. Annual vegetative production is expected to be between 450-575lbs air-dry weight per acre.

2.3.3 General Wildlife Resources

Wildlife species that occur within the Ohaco Complex are typical and representative of the vegetative communities present in the area. Species present include, but are not limited to, mule deer, coyote, javelina, mountain lion, bobcat, gray fox, raccoon, desert cottontail, black-tailed jackrabbits, Gambel's quail, great horned owls, and various reptiles, small mammals and migratory birds.

2.3.4 Special Status Species, T&E

Sonoran desert tortoises (*Gopherus morafkai*), a BLM sensitive species, occupy much of the upland areas in the Ohaco 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%), perennial forbs (18.3%), grasses (27.4%), woody plants (23.2%) and prickly pear fruit (1.1%) (Van Devender, et al. 2002).

The Ohaco complex contains category II and III desert tortoise habitat. Category II 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. The table below shows the acreages of desert tortoise habitat on public lands within the complex.

Allotment	Category 1 Acres	Category 2 Acres	Category 3 Acres
Ohaco	0	41,505	6,170
Effus	0	13,625	357
Douglas	0	4	331

2.4 Special Management Areas

The southern portion of the Ohaco allotment contains 3,564 public acres of the Hummingbird Springs wilderness.

The Black Butte ACEC is located on the Ohaco and Effus allotments, along their common boundary in the Black Butte area.

The Harquahala Herd Area encompasses 32,569 acres of the allotment. The Harquahala Herd Area (HHA) was established in the mid to late 1970s based on the presence of burros at the time of survey efforts. It was determined at that time that sufficient resources were not available to sustain a healthy, self-sustaining population of burros to be in ecological balance with their surroundings and was gathered to remove burros from the area. The HHA is an unmanaged area for burros and according to the 2010 BH RMP, management action HB-5: "The Harquahala Herd Area... will not be managed as a Herd Management Area. Burros will be removed from the herd area, as funding is available, with the target reaching a population of zero." Funding has not been available to accomplish the target number of zero animals at this time, and it is unknown as to when funding will be acquired to meet the objectives set forth in the 2010 Resource Management Plan for the HAA.

2.5 Recreational Resources

The complex contains 192 miles of existing routes, which are all currently open to all travel modes.

By allotment, miles of routes in each are as follows:

Ohaco- 152.4 miles

Effus – 33.7 miles

Douglas - 6.6 miles

The complex contains 19 miles of improved roads consisting of paved, regularly graded county roads or right-of-way roads to gravel pits or homes. All other roads are primitive roads with little or no maintenance occurring.

General public access

Public access generally coincides with routes permitted for use by the grazing permittees. Minor maintenance of the existing routes is generally welcomed by the public. Major upgrades to the existing routes are less welcome due to the recreationists' expectation for rough, minimally maintained roads. Improving roads to a higher standard is generally perceived by the public, and the BLM, to invite vandals and new uses which may leave trash or displace authorized use. Improving access can have the effect of

increasing use of an area which was previously lightly used, leading to increased litter and increasing impacts to vegetation and water quality.

3.0 Grazing Management

3.1 Grazing History

The current permit holder for the Ohaco allotment is the Cooper Cattle Company. The current permittee acquired the base property in 1998. The allotment is divided into three pastures. There is no formal rotation system in place on the allotment, however, livestock are normally cycled from the southern pastures to the northern pastures based on forage availability and annual production.

The current permit holder for the Effus allotment is Rosalie Palen. The current permittee acquired the base property in 1999. The allotment is divided into three pastures. There is no formal rotation system in place on the allotment.

The Douglas allotment does not have a grazing authorization currently. The prior permittee relinquished their base property preference in 2007. Land exchanges since 1980 have reduced the public land acreage of the Douglas from approximately 11,500 acres to the current acreage of 2,036 acres. A significant portion of the remaining acreage is associated with the Central Arizona Project canal and is unavailable for livestock grazing.

BLM billing records show continuous use on these grazing allotments since the 1960s. Livestock have likely been present in this area since the mid-1800s.

3.2 Mandatory Terms and Conditions for Permitted Use

The Ohaco allotment is a perennial/ephemeral grazing permit. Additional livestock beyond the base stocking rate may be allowed on the allotment during years of additional, seasonal forage availability with prior approval. The Effus and Douglas allotments are perennial allotments. The Mandatory Terms and Conditions of the permits and leases are listed below:

Allotment Name	Allotment Number	Livestock Number	Livestock Kind	%PL	Type Use	AUMs
Ohaco	03060	150	Cattle	82	Active/Ephemeral	1476
Effus	03030	125	Cattle	77	Active/Ephemeral	1155
Douglas	03026	300	Cattle	4	Active	144

4.0 Objectives

4.1 Relevant Planning and Environmental Documents

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. All three allotments within the Complex are Section 3 grazing permits.

The BLM is responsible for establishing the appropriate levels and management strategies for livestock grazing in these allotments. Grazing permits issued must be in compliance with the multiple use and sustained yield concepts of FLPMA and the Fundamentals of Rangeland Health (43 CFR 4180), and be in accordance with the Guidelines for Grazing Administration while continuing to achieve Arizona Standards for Rangeland Health.

Land Health Standards:

On April 28, 1997, the Secretary of Interior approved the implementation of the *Arizona Standards for Rangeland Health and Guidelines for Grazing Administration* for all Land Use Plans in Arizona. The purpose of the Standards and Guidelines is to maintain or improve the health of the public rangelands. Standards and guidelines are intended to help the Bureau, rangeland users and others focus on a common understanding of acceptable resource conditions and work together to achieve that vision. Standards and Guidelines were incorporated into Phoenix District land use plans in 1997 and into the *Bradshaw-Harquahala RMP* in 2010.

As defined by the Arizona Resource Advisory Council, “Standards” are goals for the desired condition of the biological and physical components and characteristics of rangelands. “Guidelines” are management approaches, methods, and practices that are intended to achieve a standard. Guidelines are developed and applied consistent with the desired condition and within the site’s capability and specific public land uses, and may be adjusted over time. Arizona S&Gs are defined as the following:

Standard 1 - Upland Sites

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

Standard 2 - Riparian - Wetland Site

Riparian-wetland areas are in proper functioning condition.

Standard 3 - Desired Resource Conditions

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

The Bradshaw-Harquahala Resource Management Plan (2010) contains additional desired future condition objectives for wildlife special status species. For the Ohaco Complex, the desired future condition objectives for Sonoran desert tortoise are applicable. These objectives are given below:

“TE-3. In Category I and II areas, vegetation will consist of at least 5 percent native perennial grasses, at least 10 percent native perennial forbs or subshrubs, at least 30 percent native trees and cacti, by dry weight, as limited by the potential of the ecological site as described by the Natural Resource Conservation Service (NRCS) ecological site guides.”

4.2 Key Area Objectives

Specific Key Area objectives step down from the Desired Future Condition objectives found in the Bradshaw-Harquahala RMP (2010). These Key Area specific objectives are designed to assess Public Land conformance to the Arizona Standards for Rangeland Health on the Ohaco Complex.

There are 10 active Key Areas on the Ohaco Complex. The Ohaco allotment contains 8 Key Areas. Key Area 1 was abandoned in 1986. The Effus contains 2 Key Areas. The Douglas contains 1 Key Area. The table below shows the active key areas on the complex:

Allotment	Key Area	Ecological Site
Ohaco	KA1	ABANDONED
	KA2	Volcanic Hills 7-10"pz
	KA3	Granitic Hills 7-10"pz
	KA4	Volcanic Hills 7-10"pz
	KA5	Limy Upland 7-10"pz
	KA6	Granitic Upland 7-10"pz
	KA7	Limy Upland 7-10"pz
	KA8	Sandy Wash 7-10"pz
Effus	KA1	Granitic Hills 7-10"pz
	KA2	Granitic Hills 7-10"pz
Douglas	KA1	Sandy Wash 3-7"pz

Desired Plant Community (DPC) Objectives were developed for each Key Area within the Complex by an interdisciplinary team of BLM resource specialists and biologists. These objectives are designed to maintain or improve the biotic integrity of the Public Lands, provide for wildlife habitat, and provide for usable forage as limited by the potential of the ecological site. These objectives, and the rationale for each objective, are given below.

4.2.1 Standard 1- Upland Sites, applies to all key areas.

Objective: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate, and landform (ecological site). (Bradshaw-Harquahala RMP decision LH-1)

Soil erosion on the key area is appropriate to the ecological site on which it is located. Factors indicating conformance to Standard 1 include ground cover, litter, vegetative foliar cover, flow patterns, rills, and plant pedestalling in accordance to developed NRCS Ecological Site Guides and/or Reference Sheets. Deviations that are "slight" or "slight to moderate" from the appropriate site guide or reference are considered meeting the Standard. Departures of Moderate or greater will not meet the Standard except in cases where the departure is documented as showing an improvement of land health over what is expected on a reference site.

4.2.2 Standard 3- Desired Resource Condition Objectives

Objective: Productive, diverse upland and riparian-wetland plant communities exist and are maintained.

DPC objectives detail a site-specific plant community, which, when obtained, will assure rangeland health, State water quality standards, and habitat for endangered, threatened and sensitive species. Because DPC objectives are site-specific, Key Areas located on similar stratum may have different DPC objectives. This is due to differences in slope, elevation, aspect and rainfall factors, as well as other site potential limiting factors such as prior disturbance, rock outcroppings, or heavy gravel cover. The recommended palatable shrub and grass compositions will provide for adequate wildlife forage on the site for species such as Sonoran desert tortoise, mule deer, quail, and other non-game wildlife species. The foliar cover and bare ground cover class objectives will provide thermal and hiding cover for wildlife species and will prevent accelerated erosion on the sites.

Sonoran desert tortoise habitat requirements are listed in the Bradshaw-Harquahala RMP. The DPC objectives for each key area are consistent with the Sonoran desert tortoise habitat requirements based on the potential for the site.

Ohaco Allotment

Volcanic Hills 7-10" p.z

- Maintain perennial grass species composition at $\geq 5\%$
- Maintain palatable browse species composition at $\geq 20\%$
- Maintain vegetative foliar cover of $\geq 15\%$
- Maintain a Bare Ground cover class of $\leq 15\%$

Rationale:

Rationale for DPC objectives is taken from the NRCS Volcanic Hills 7-10" p.z. Reference Sheet (R040XB222AZ). The reference sheet shows an expected foliar cover of 10-20%, of which 2-5% is shrubs and 1-2% is half shrubs. There is no expected grass foliar cover on the site per the reference sheet. The ecological site guide shows a grass component of 2-5%. Maintaining a grass component of 5% or greater will maintain important forage for desert tortoise and is appropriate for the site. This site, in the reference state, calls for between 10-20% canopy cover. Maintaining a vegetative foliar cover of 15% or greater is appropriate to the site due to its aspect and slope, and will prevent accelerated erosion of the site. Maintaining a palatable browse composition of 20% or greater will provide adequate forage on the site. Bare ground cover class is expected to be between 1-5% in the reference state. Maintaining a bare ground cover class of 15% or less is appropriate to this site due to its slope, vegetative community, and low gravel cover, and will prevent accelerated erosion of the site above what is expected in the reference state.

Ohaco Key Areas 2 and 4 fall within the Volcanic Hills ecological site.

Limy Upland 7-10" p.z

- Maintain perennial grass composition $\geq 5\%$
- Maintain palatable browse species composition at $\geq 15\%$
- Maintain vegetative foliar cover of $\geq 20\%$
- Maintain a Bare Ground cover class of $\leq 20\%$

Rationale:

Rationale for DPC objectives is taken from the NRCS Limy Upland 7-10" p.z. Reference Sheet. The reference sheet does not show an expected foliar cover for perennial grasses. The ecological site guide shows grasses composing 1-6% of the plant community. The perennial grass objective is appropriate to the site and will maintain important forage for desert tortoise. The reference sheet shows an expected foliar cover of 20-25%, of which 50% is shrubs and 20% is trees. Maintaining a vegetative foliar cover of 20% or greater is appropriate to the site due to its aspect and slope, and will prevent accelerated erosion of the site. Maintaining a palatable browse composition of 20% or greater will provide adequate forage on the site. Bare ground cover class is expected to be between 10-60% in the reference state. Maintaining a bare ground cover class of 20% or less is appropriate to this site due to its slope and gravel cover, and will prevent accelerated erosion of the site above what is expected in the reference state.

Ohaco Key Areas 5 and 7 fall within the Limy Upland ecological site.

Granitic Hills 7-10"pz

- Maintain perennial grass composition $\geq 10\%$
- Maintain palatable browse species composition at $\geq 15\%$
- Maintain vegetative foliar cover of $\geq 20\%$
- Maintain a Bare Ground cover class of $\leq 15\%$

Rationale:

Rationale for DPC objectives is taken from the NRCS Granitic Hills 7-10" p.z. Reference Sheet (R040XB206AZ). The reference sheet shows a perennial grass cover of 1-2%, and the ecological site guide shows a perennial grass composition between 2-6%. The perennial grass objective exceeds the reference state and will maintain important forage for desert tortoise. The reference sheet shows an expected canopy cover of 15-20%, of which 50% is shrubs, 23% trees, and 1-2% perennial grass. Maintaining a vegetative foliar cover of 20% or greater is appropriate to the site due to its aspect and slope, and will prevent accelerated erosion of the site. Maintaining a palatable browse composition of 15% or greater will provide adequate forage on the site. Bare ground cover class is expected to be between 1-15% in the reference state. Maintaining a bare ground cover class of 15% or less is appropriate to this site due to its slope and will prevent accelerated erosion of the site above what is expected in the reference state.

Ohaco Key Area 3 falls within the Granitic Hills ecological site.

Granitic Upland 7-10"pz

- Maintain perennial grass composition $\geq 10\%$
- Maintain palatable browse species composition at $\geq 20\%$
- Maintain vegetative foliar cover of $\geq 20\%$
- Maintain a Bare Ground cover class of $\leq 10\%$

Rationale:

Rationale for DPC objectives is taken from the NRCS Granitic Upland 7-10" p.z. Reference Sheet (R040XB220AZ). The reference sheet shows a perennial grass cover of 1-2%, and the ecological site guide shows a perennial grass composition between 2-6%. The perennial grass objective exceeds the reference state and will maintain important forage for desert tortoise. The reference sheet shows an expected canopy cover of 15-20%, of which 50% is shrubs, 23% trees, and 1-2% perennial grass. Maintaining a vegetative foliar cover of 20% or greater is appropriate to the site due to its aspect and slope, and will prevent accelerated erosion of the site. Maintaining a palatable browse composition of 15% or greater will provide adequate forage on the site. Bare ground cover class is expected to be between 1-15% in the reference state. Maintaining a bare ground cover class of 15% or less is appropriate to this site due to its slope and will prevent accelerated erosion of the site above what is expected in the reference state.

Ohaco Key Area 6 falls within the Granitic Upland ecological site.

Sandy Wash 7-10" p.z

- Maintain palatable browse species composition at $\geq 30\%$
- Maintain vegetative foliar cover of $\geq 60\%$
- Maintain a Bare Ground cover class of $\leq 10\%$

Rationale:

Rationale for DPC objectives is taken from the NRCS Sandy Wash 7-10" p.z. Reference Sheet (R040XB216AZ). The reference sheet shows a cover from 10-30% perennial grass, and the ecological site guide shows a perennial grass composition between 5-9%. Due to the incised nature of this site, a perennial grass component was not developed. Bank steepness limits water availability on the site for shallow rooted species. The reference sheet shows an expected foliar cover of 60-70%, of which 40% is shrubs, 10% subshrubs, and 5-10% trees. Maintaining a vegetative foliar cover of 60% or greater is appropriate to the site due to its slope and the incised nature of the banks, and will prevent accelerated erosion of the site. Maintaining a palatable browse composition of 30% or greater will provide adequate forage on the site. Bare ground cover class is expected to be between 15-40% in the reference state. Maintaining a bare ground cover class of 10% or less is appropriate to this site due to its low slope gradient and will prevent accelerated erosion of the site above what is expected in the reference state.

Ohaco Key Area 8 falls within the Sandy Wash ecological site.

Effus Allotment

Granitic Hills 7-10" p.z

- Maintain perennial grass composition $\geq 20\%$
- Maintain palatable browse species composition at $\geq 15\%$
- Maintain vegetative foliar cover of $\geq 20\%$
- Maintain a Bare Ground cover class of $\leq 10\%$

Rationale:

Rationale for DPC objectives is taken from the NRCS Granitic Hills 7-10" p.z. Reference Sheet (R040XB206AZ). The reference sheet shows a perennial grass cover of 1-2%, and the ecological site guide shows a perennial grass composition between 2-6%. The perennial grass objective exceeds the reference state and will maintain important forage for desert tortoise. The reference sheet shows an expected canopy cover of 15-20%, of which 50% is shrubs, 23% trees, and 1-2% perennial grass. Maintaining a vegetative foliar cover of 20% or greater is appropriate to the site due to its aspect and slope, and will prevent accelerated erosion of the site. Maintaining a palatable browse composition of 15% or greater will provide adequate forage on the site. Bare ground cover class is expected to be between 1-15% in the reference state. Maintaining a bare ground cover class of 10% or less is appropriate to this site due to its slope and will prevent accelerated erosion of the site above what is expected in the reference state.

Effus Key Areas 1 and 2 fall within the Granitic Hills ecological site.

Douglas Allotment
Sandy Wash 3-7"pz

- Maintain palatable browse species composition at $\geq 20\%$
- Maintain vegetative foliar cover of $\geq 40\%$
- Maintain a Bare Ground cover class of $\leq 20\%$

Rationale:

Rationale for DPC objectives is taken from the NRCS Sandy Wash 3-7" p.z. Reference Sheet (R040XB318AZ). The reference sheet shows a cover from 10-30% perennial grass, and the ecological site guide shows a perennial grass composition between 39-60%. A perennial grass component was not developed for this site because perennial grasses were absent, with no available seed source in the area. The reference sheet shows an expected foliar cover of 60-70%, of which 40% is shrubs, 10% subshrubs, and 5-10% trees. Maintaining a vegetative foliar cover of 40% or greater is appropriate to the site due to its slope and the incised nature of the banks, and will prevent accelerated erosion of the site. Maintaining a palatable browse composition of 20% or greater will provide adequate forage on the site. Bare ground cover class is expected to be between 15-40% in the reference state. Maintaining a bare ground cover class of 20% or less is appropriate to this site due to its low rainfall regime and slope, and will prevent accelerated erosion of the site above what is expected in the reference state.

5.0 Inventory and Monitoring Data

5.1 Rangeland Survey Data

Rangeland Inventory was completed on the Ohaco Complex in 1981. This inventory was completed using the Modified Soil Vegetation Inventory Methodology based on BLM Handbook H-4410-1, "National Range Handbook" and Technical Reference 1734-7, "Ecological Site Inventory". The inventory was used to determine range condition and apparent trend as described in the 1982 Lower Gila North Draft Grazing Environmental Impact Statement.

5.2 Monitoring Protocols

Monitoring protocols used at the Key Areas on the allotments include a variety of study methods. Compliance with Standard One is completed using the Interpreting Indicators of Rangeland Health study method, as described in BLM Technical Reference 1734-6 Version 4 (2005). This study method is supplemented with quantitative data collected in the methods described below.

Compliance with Standard Three is completed using a variety of upland study methods. All Key Areas except for Ohaco Key Area 7 were conducted using Pace Frequency, Dry Weight Rank, and Point Cover for the 2005-2015 data sets. Earlier data sets consisted of Pace Frequency and Point Cover only. These study methods were conducted using a 40x40cm frame with a centrally located point. These methods are described in detail in BLM Technical Reference 1734-4, "Sampling Vegetation Attributes".

Point cover methods have varied since some of the Key Areas within the complex were established, and historic data is generally not comparable to current data for the Bare Ground, Gravel, and Rock cover classes due to different methods of collection. Pace frequency methods are equivalent across all years.

Ohaco Key Area 7 was conducted using Line Intercept, Point Cover, and Belt Density transects because of the low cover nature of the site.

Utilization data was collected at each Key Area using the Key Species method from 2013-2015. Prior studies on these sites were completed using either the Key Species or Grazed Class method. These methods are described in BLM Technical Reference 1734-3, "Utilization Studies and Residual Measurements".

6.0 Management Evaluation and Summary of Studies Data

6.1 Actual Use

Actual Use reporting is not required on the allotments in the Ohaco Complex. Livestock numbers provided in the tables below are based on actual use reports as available, and billed use. Ephemeral years on the Ohaco allotment are based on actual billings. Due to multiple turnout and gather dates, the ephemeral numbers have been simplified to show the average number of animals on the allotment during the ephemeral season.

6.1.1 Ohaco

<u>Number of Active Livestock</u>	<u>Kind</u>	<u>Type Use</u>	<u>Grazing Begin</u>	<u>Period End</u>	<u>%PL</u>	<u>AUM"s</u>
472	Cattle	Ephemeral	2/6/15	5/15/15	82	1261
45	Cattle	Active	3/1/14	2/28/15	82	443
532	Cattle	Ephemeral	4/2/13	6/15/13	82	1076
150	Cattle	Active	3/1/13	2/28/14	82	1476
799	Cattle	Ephemeral	2/22/13	4/1/13	82	840
473	Cattle	Ephemeral	3/30/12	5/20/12	82	663
75	Cattle	Active	3/1/12	2/28/13	82	738
150	Cattle	Active	3/1/11	2/28/12	82	1476

150	Cattle	Active	3/1/10	2/28/11	82	1476
1200	Cattle	Ephemeral	2/11/10	5/31/10	82	3560
141	Cattle	Active	9/1/09	2/28/10	82	688
136	Cattle	Active	3/1/09	9/1/09	82	678
1337	Cattle	Ephemeral	1/15/09	5/3/09	82	3930
146	Cattle	Active	9/1/08	2/28/09	82	712
743	Cattle	Ephemeral	3/2/08	5/15/08	82	1502
147	Cattle	Active	3/1/08	9/1/08	82	733
147	Cattle	Active	9/1/07	2/28/08	82	717
150	Cattle	Active	3/1/07	9/1/07	82	748
150	Cattle	Active	3/1/06	2/28/07	82	1476
150	Cattle	Active	3/1/04	2/28/05	82	1476

6.1.2 Effus

Number of Active Livestock	Kind	Grazing Begin	Period End	%PL	AUM"s
125	Cattle	3/1/14	2/28/15	77	1155
125	Cattle	3/1/13	2/28/14	77	1155
85	Cattle	3/1/12	2/28/13	77	786
125	Cattle	3/1/11	2/28/12	77	1155
67	Cattle	3/1/10	2/28/11	77	619
125	Cattle	3/1/09	2/28/10	77	1155
125	Cattle	3/1/08	2/28/09	77	1155
125	Cattle	3/1/07	2/28/08	77	1155
125	Cattle	3/1/06	2/28/07	77	1155
125	Cattle	3/1/05	2/28/06	77	1155
125	Cattle	3/1/04	2/28/05	77	1155

6.1.3 Douglas

Number of Active Livestock	Kind	Grazing Begin	Period End	%PL	AUM"s
0	Cattle	3/1/2005	2/28/2015	4	0

7.0 Conclusions

7.1 Upland Health Conclusions

Summary of Standard Achievement or Non-achievement for all Key Areas:

Allotment	Key Area	Standard One	Standard Three
Ohaco	KA2	Achieved	Achieved
	KA3	Achieved	Achieved

	KA4	Achieved	Achieved
	KA5	Achieved	Not Achieved
	KA6	Achieved	Achieved
	KA7	Achieved	Achieved
	KA8	Achieved	Achieved
Effus	KA1	Achieved	Achieved
	KA2	Achieved	Achieved
Douglas	KA1	Achieved	Not Achieved

Upland Health Conclusions are based on the analysis of the current monitoring data for each key area. Standard Three analysis is based on Dry Weight Rank and Point Cover study methods or on Belt Density and Line Intercept study methods. Grass composition results are based on the sum composition percent for all grass species occurring on the study area. Palatable shrub composition results are based on the sum composition percent for all palatable browse species as listed, by animal species, in Appendix A, Section 3, "Ohaco Complex Plant List". Vegetative foliar cover and bare ground cover class results are based on point cover data.

Utilization data is used to determine if livestock are a potential causal factor for non-achievement of Standards. Based on Holechek (1988), livestock utilization levels on perennial grass species in this precipitation zone should be between 30-40% for moderate use without producing deleterious effects to the ecological site. Based on Heffelfinger(2006), browse utilization in this precipitation zone should be limited to 35% to prevent deleterious effects to deer habitat.

7.1.1 Ohaco allotment

Key Area 2

Standard One: Upland Site Achieves Standard

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

Signs of accelerated erosion are minimal and are consistent with the site reference state. Soil and Site Stability and Hydrologic Function ratings are both categorized as a "Slight to Moderate Departure" from the reference state. Reference Section 2.1.1 of Appendix A.

Standard Three: Standard is achieved on this site.

- Maintain perennial grass species composition at $\geq 5\%$ ACHIEVED
- Maintain palatable browse species composition at $\geq 20\%$ ACHIEVED
- Maintain vegetative foliar cover of $\geq 15\%$ ACHIEVED
- Maintain a Bare Ground cover class of $\leq 15\%$ ACHIEVED

Rationale:

This key area meets objectives for perennial grass species, with a perennial grass composition of 5%. Palatable browse composition objectives are met for desert tortoise, with slightly less than 51% of the plant community. Browse composition objectives are met for mule deer, at slightly more than 73% of the plant community. Vegetative foliar objectives are met, with a foliar cover of 15%. Bare ground cover class objectives are met, with a bare ground cover class of 1.5%.

Trend:

Prior pace frequency studies conducted on the site show a reduction in *Pleuraphis* species across the last 30 years, from 14% to 2%. Woody species, particularly less palatable woody species, have generally maintained similar frequencies or increased gradually, such as Whitethorn Acacia, which has increased in frequency from 4.5 to 11%. Browse species important to mule deer, particularly Ratany, have slightly increased in occurrence on the site, from 4 to 5.5%. Utilization levels in the 1980s and 1990s were slight to light. With the decrease in grass species abundance, utilization levels have increased on the site. Based on the historic use patterns, it is unlikely that livestock grazing is a major causal factor for the reduction in grasses on the site. Long-term drought is expected to increase grass mortality and affect grass recruitment on this ecological site. The site could benefit from several grazing seasons of reduced livestock use during the monsoon season.

Key Area 3

Standard One: Upland Site Achieves Standard

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

Signs of accelerated erosion are minimal and are consistent with the site reference state. Soil and Site Stability and Hydrologic Function ratings are both categorized as a “Slight to Moderate Departure” from the reference state. Reference Section 2.1.1 of Appendix A.

Standard Three: Standard is achieved on this site.

- Maintain perennial grass composition $\geq 10\%$ ACHIEVED
- Maintain palatable browse species composition at $\geq 15\%$ ACHIEVED
- Maintain vegetative foliar cover of $\geq 20\%$ ACHIEVED
- Maintain a Bare Ground cover class of $\leq 15\%$ ACHIEVED

Rationale:

This key area meets objectives for perennial grass species, with a perennial grass composition of slightly more than 20%. Palatable browse composition objectives are met for desert tortoise, at slightly more than 57% of composition. Browse composition objectives are met for mule deer, at slightly less than 53% of composition. Vegetative foliar cover objectives are met, with a vegetative foliar cover of slightly more than 26%. Bare ground cover class objectives are met, with a bare ground percentage of 6%.

Trend:

Perennial grass frequency has oscillated on this site. *Pleuraphis* species had increased during the late 1980s and early 1990s, and are currently slightly below 1982 levels, at 25.5% frequency versus 28.0% frequency, respectively. Succulents greatly increased in frequency in the late 1980s, and have returned to levels at or slightly below what was observed in 1982. Larger woody species, such as Parkinsonia, Larrea, and Lycium have increased consistently since 1982. Utilization on this site has varied significantly since the site was established, however, most years utilization was in the slight to light category. Increases in woody vegetation is expected with prolonged drought on this ecological site. Grass recruitment appears to be stable across the site.

Key Area 4

Standard One: Upland Site Achieves Standard

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

Signs of accelerated erosion are minimal and are consistent with the site reference state. Soil and Site Stability and Hydrologic Function ratings are both categorized as a “None to Slight Departure” from the reference state. Reference Section 2.1.1 of Appendix A.

Standard Three: Standard is achieved on this site.

- | | |
|--|--------------|
| • Maintain perennial grass species composition at $\geq 5\%$ | NOT ACHIEVED |
| • Maintain palatable browse species composition at $\geq 20\%$ | ACHIEVED |
| • Maintain vegetative foliar cover of $\geq 15\%$ | ACHIEVED |
| • Maintain a Bare Ground cover class of $\leq 15\%$ | ACHIEVED |

Rationale:

Perennial grass composition objectives are not met on this site, with a perennial grass composition of slightly more than 2%. Palatable browse objectives for desert tortoise are met on this site, at slightly more than 50% of composition. Browse objectives for mule deer are met on this site, at slightly more than 52% of composition. Vegetative foliar cover objectives are met on this site, with a foliar cover of 22%. Bare ground cover class objectives are met on this site, with a bare ground cover class of 1%.

Utilization on this site has been slight. It is unlikely that the utilization level is a causal factor for the non-achievement of the perennial grass objective on this site.

Key Area 5

Standard One: Upland Site Achieves Standard

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

Signs of accelerated erosion are minimal and are consistent with the site reference state. Soil and Site Stability and Hydrologic Function ratings are both categorized as a “None to Slight Departure” from the reference state. Reference Section 2.1.1 of Appendix A.

Standard Three: Standard is not achieved on this site.

- | | |
|--|--------------|
| • Maintain perennial grass composition $\geq 5\%$ | ACHIEVED |
| • Maintain palatable browse species composition at $\geq 15\%$ | NOT ACHIEVED |
| • Maintain vegetative foliar cover of $\geq 20\%$ | NOT ACHIEVED |
| • Maintain a Bare Ground cover class of $\leq 20\%$ | ACHIEVED |

Rationale:

Perennial grass composition objectives are met on this site, with a perennial grass composition of slightly less than 10%. Palatable browse composition objectives are not met on this site for desert tortoise. While approximately 43% of the browse community meets tortoise palatability, and slightly more than 45% of the browse community is palatable to mule deer, the availability and relative desirability of this forage is not high enough to warrant meeting objectives. Vegetative foliar cover objectives are not met on this site, with a foliar cover of 13.4%. Bare ground cover class requirements are met on this site, with a bare ground cover class of 10.9%.

Utilization on this site was light. It is unlikely that livestock grazing is causing undue degradation to the site or a causal factor for the non-achievement of the browse and foliar cover objectives.

Key Area 6

Standard One: Upland Site Achieves Standard

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

Signs of accelerated erosion are minimal and are consistent with the site reference state. Soil and Site Stability and Hydrologic Function ratings are both categorized as a “None to Slight Departure” from the reference state. Reference Section 2.1.1 of Appendix A.

Standard Three: Standard is achieved on this site.

- | | |
|--|--------------|
| • Maintain perennial grass composition $\geq 10\%$ | ACHIEVED |
| • Maintain palatable browse species composition at $\geq 20\%$ | ACHIEVED |
| • Maintain vegetative foliar cover of $\geq 20\%$ | ACHIEVED |
| • Maintain a Bare Ground cover class of $\leq 10\%$ | NOT ACHIEVED |

Rationale:

The perennial grass composition objective is met on this site, with a perennial grass composition of slightly less than 21%. Palatable browse composition is met on this site for desert tortoise, at slightly more than 48% of composition. Browse composition objectives are met for mule deer, at slightly less than 48% of composition. Vegetative foliar cover objectives are met on this site, with a foliar cover of 26.4%. Bare ground cover class objectives are not met on this site, with a bare ground cover class of 17.3%.

Utilization on this key area was negligible. It is unlikely that livestock are the causal factor for the non-achievement of the bare ground cover class objective.

Key Area 7

Standard One: Upland Site Achieves Standard

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

Signs of accelerated erosion are minimal and are consistent with the site reference state. Soil and Site Stability and Hydrologic Function ratings are both categorized as a “None to Slight Departure” from the reference state. Reference Section 2.1.1 of Appendix A.

Standard Three: Standard is achieved on this site.

- | | |
|--|--------------|
| • Maintain perennial grass composition $\geq 5\%$ | ACHIEVED |
| • Maintain palatable browse species composition at $\geq 15\%$ | NOT ACHIEVED |
| • Maintain vegetative foliar cover of $\geq 20\%$ | ACHIEVED |
| • Maintain a Bare Ground cover class of $\leq 20\%$ | ACHIEVED |

Rationale:

The perennial grass composition objective is met on this site, with a perennial grass composition of nearly 57%. The majority of grasses on the site are short-lived perennial species. Palatable browse composition objectives are not met on this site for desert tortoise. While approximately 36% of the browse community meets tortoise palatability, and slightly more than 37% of the browse community is palatable to mule deer, the availability and relative desirability of this forage is not high enough to warrant meeting objectives. Foliar cover objectives are met on this site, with a foliar cover of 21.8%. Bare ground cover class objectives are met on this site, with a bare ground cover class of 7.9%.

Utilization on this key area was slight. It is unlikely that livestock are the causal factor for the non-achievement of the palatable browse species objective.

Key Area 8

Standard One: Upland Site Achieves Standard

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

Signs of accelerated erosion are minimal and are consistent with the site reference state. Soil and Site Stability and Hydrologic Function ratings are both categorized as a “None to Slight Departure” from the reference state. Reference Section 2.1.1 of Appendix A.

Standard Three: Standard is achieved on this site.

- | | |
|--|--------------|
| • Maintain palatable browse species composition at $\geq 30\%$ | ACHIEVED |
| • Maintain vegetative foliar cover of $\geq 60\%$ | ACHIEVED |
| • Maintain a Bare Ground cover class of $\leq 10\%$ | NOT ACHIEVED |

Rationale:

Palatable browse composition objectives are met on this site for desert tortoise, at slightly more than 53% of composition. Browse composition objectives are met for mule deer, at 83% of composition. Foliar cover objectives are met on this site, with a foliar cover of 72%. Bare ground cover class objectives are not met on this site, with a bare ground cover class of 20%.

Utilization on this site was slight. It is unlikely that livestock are the causal factor for the non-achievement of the bare ground cover class objective.

7.1.2 Effus Allotment

Key Area 1

Standard One: Upland Site Achieves Standard

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

Signs of accelerated erosion are minimal and are consistent with the site reference state. Soil and Site Stability and Hydrologic Function ratings are both categorized as a “None to Slight Departure” from the reference state. Reference Section 2.2.1 of Appendix A.

Standard Three: Standard is achieved on this site.

- | | |
|--|----------|
| • Maintain perennial grass composition $\geq 20\%$ | ACHIEVED |
| • Maintain palatable browse species composition at $\geq 15\%$ | ACHIEVED |
| • Maintain vegetative foliar cover of $\geq 20\%$ | ACHIEVED |
| • Maintain a Bare Ground cover class of $\leq 10\%$ | ACHIEVED |

Rationale:

The perennial grass composition objective is met on this site, with a perennial grass composition of slightly less than 40%. Palatable browse composition objectives are met for desert tortoise, at slightly more than 40% of composition. Browse objectives are met for mule deer, at slightly less than 55% of composition. The vegetative foliar cover objective is met on the site, with a foliar cover of 21.5%. The bare ground cover class objective is met, with a bare ground cover class of 3.5%.

Trend:

Perennial grass on this site appears to be stable. Prior studies identified the dominant grass as *Pleuraphis rigida*, however, the most recent studies identified this grass as *Pleuraphis mutica*. These species are directly comparable in life cycle, nutrition, and palatability. Woody species have remained stable or increased slightly, with the exception of *Menodora*, which has increased from 0.5% frequency to 16.5%, and *Eriogonum fasciculatum*, which has decreased from 31.0% to 19.0%. Both are highly palatable to both livestock and wildlife. Utilization on the site has been higher in recent studies than in the past on perennial grasses, and where noted, browse utilization at this site has been consistently high. Livestock grazing may be contributing to vegetation shifts in composition relating to palatable browse species.

Key Area 2:

Standard One: Upland Site Achieves Standard

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

Signs of accelerated erosion are minimal and are consistent with the site reference state. Soil and Site Stability and Hydrologic Function ratings are both categorized as a “None to Slight Departure” from the reference state. Reference Section 2.2.2 of Appendix A.

Standard Three: Standard is achieved on this site.

- Maintain perennial grass composition $\geq 20\%$ ACHIEVED
- Maintain palatable browse species composition at $\geq 15\%$ ACHIEVED
- Maintain vegetative foliar cover of $\geq 20\%$ ACHIEVED
- Maintain a Bare Ground cover class of $\leq 10\%$ ACHIEVED

Rationale:

The perennial grass composition objective is met on this site, with a perennial grass composition of slightly more than 25%. The majority of grasses on the site are short-lived perennial species. Palatable browse composition objectives are met for desert tortoise, at 52% of composition. Browse objectives are met for mule deer, at slightly more than 62%. Vegetative foliar cover objectives are met on this site, with a foliar cover of 29%. Bare ground cover class objectives are met on this site, with a bare ground cover class of 4.4%.

Trend:

Perennial grass species on this site have generally declined since the site was established. *Pleuraphis* species have declined from 24.5% frequency to 3.4% frequency. *Dasyochloa* species have increased from 1% frequency to 21%. *Dasyochloa* grasses tend to be short-lived perennials with limited palatability. Browse species have generally remained constant, with *Eriogonum fasciculatum* decreasing from 34% to 22.3% frequency, and *Krameria erecta* increasing from 3.5% to 6.8% frequency. Utilization on this site is moderate. This site is located directly between, and within 1/4 mile of, two livestock waters along a pipeline in the Outlaw pasture. Constant livestock use of the site yearlong coupled with prolonged drought is the most probably causal factor for removal of perennial grass species and declines in palatable browse species.

7.1.1 Douglas allotment

Key Area 1

Standard One: Upland Site Achieves Standard

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

Signs of accelerated erosion are minimal and are consistent with the site reference state. Soil and Site Stability and Hydrologic Function ratings are both categorized as a “None to Slight Departure” from the reference state. Reference Section 2.3.1 of Appendix A.

Standard Three: Standard is not achieved on this site.

- | | |
|--|--------------|
| • Maintain palatable browse species composition at $\geq 20\%$ | ACHIEVED |
| • Maintain vegetative foliar cover of $\geq 40\%$ | NOT ACHIEVED |
| • Maintain a Bare Ground cover class of $\leq 20\%$ | NOT ACHIEVED |

Rationale:

The palatable browse composition objective is met for desert tortoise, at slightly more than 57% of composition. The browse objective for mule deer is met, at slightly less than 65% of composition. The vegetative cover objective is not met, with a foliar cover of 8%. The bare ground cover class objective is not met, with a bare ground cover class of 24%.

Livestock have not been present on the allotment for at least a decade. It is unlikely that current livestock management has been a causal factor for non-achievement of the standard.

8.0 Recommended Management Actions

8.1 Recommended Management Actions for all Allotments

To facilitate orderly management of the range, Actual Use reporting should be added to the terms and conditions of the permits. The permittees have voluntarily submitted Actual Use for several years, however, adding the reporting requirement will ensure appropriate use levels have been maintained during drought years, and will facilitate desired stocking rate calculations in years that Utilization data is collected.

In order to reduce grazing pressure on Sandy Wash sites and near livestock water sources within the complex, any salt or supplement blocks placed on the public lands should be located at least one-quarter of a mile from available water sources, and should be located at least one-eighth of a mile above major drainages. Given the number of active livestock waters and number of major drainages within the complex, this is expected to more evenly distribute livestock across the uplands, reducing grazing pressure along the banks of washes.

The Ohaco allotment would benefit from additional pasture fencing in the large northern pasture. This would allow for greater control of ephemeral (seasonal) turnouts of livestock, and reducing the impacts to areas of the ranch that produce greater perennial forage.

The Effus ranch should implement a pasture rotation system to reduce grazing pressure on the Outlaw pasture during the monsoonal growing season until perennial grasses reestablish in the area. Development of additional livestock water in the South pasture would facilitate this management change.

9.0 List of Preparers

Name	Title
James Holden	Rangeland Management Specialist
Codey Carter	Wildlife Biologist
Steve Bird	Wild Horse and Burro Specialist
Mary Skordinsky	Recreation Specialist
Tom Bickauskas	Travel Management Specialist

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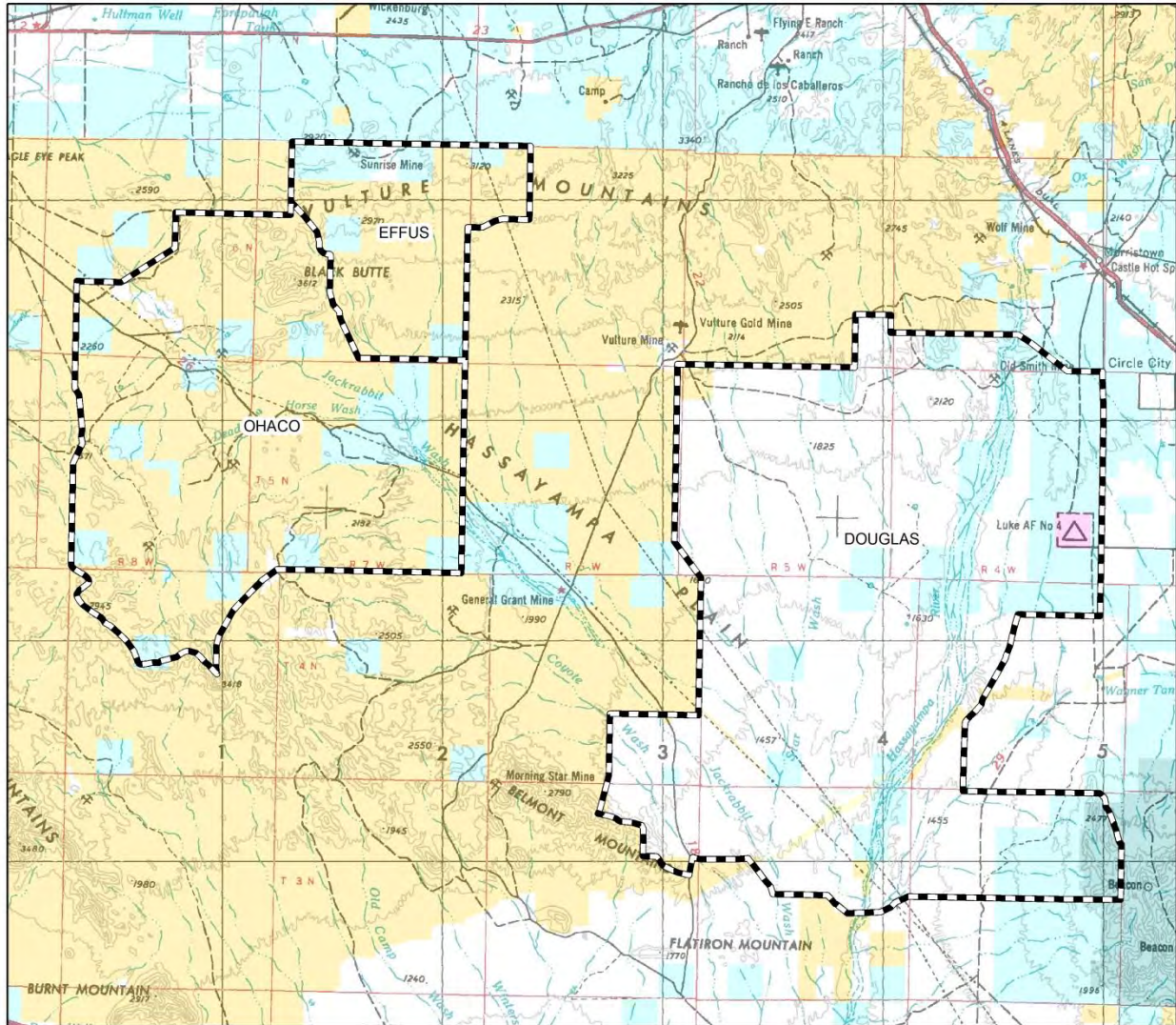
Ohaco Complex Data Appendices

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1.0 Complex Maps

Map 1, Ohaco Complex Boundaries
Ohaco Complex



Legend

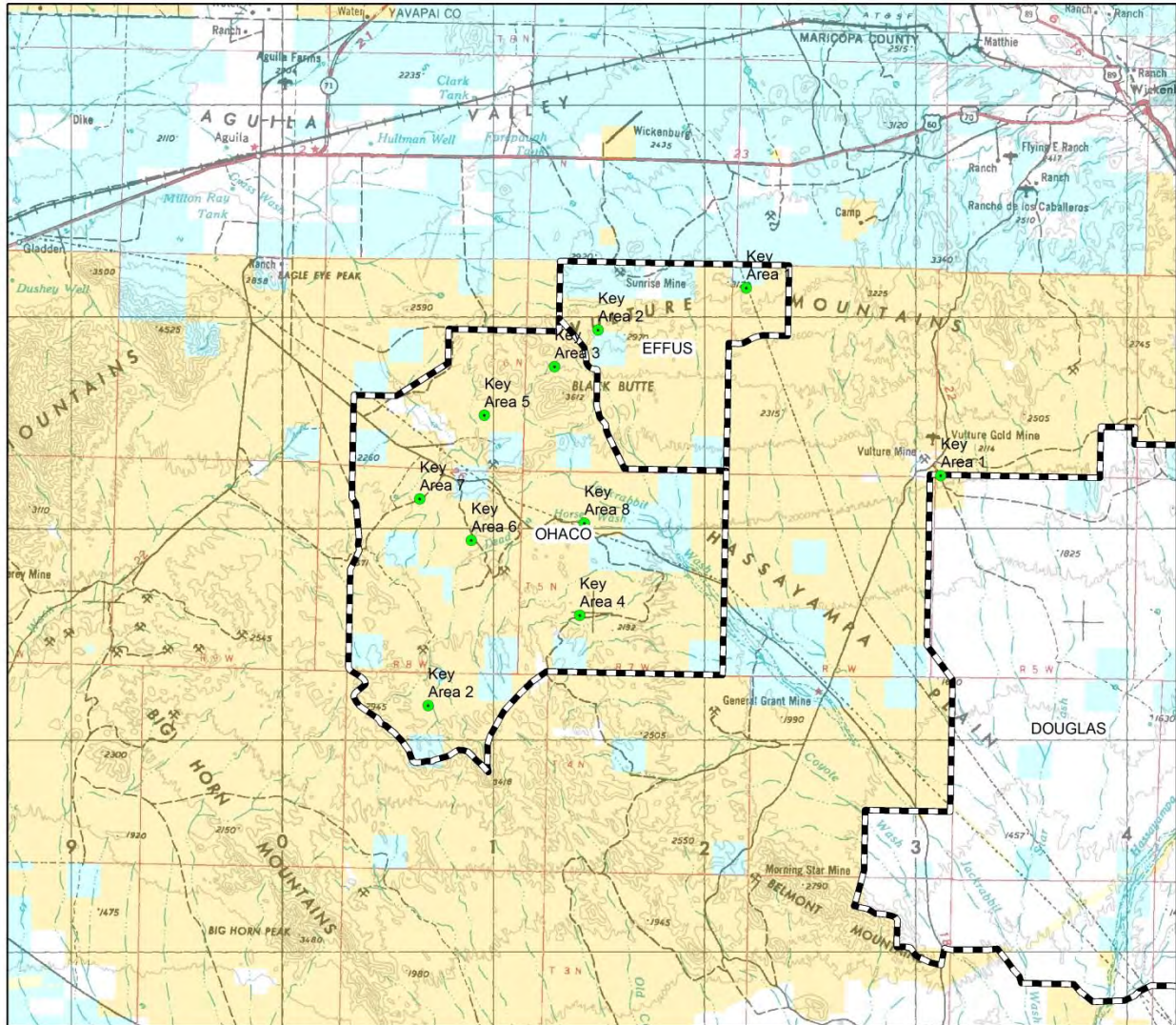
Ohaco Complex Boundaries	Land Management	Indian Lands	Private
	CATEGORY	Local or State Parks	State
	BLM	Military	State Wildlife Area
	BR	NPS	USFS
	County	Other	USFWS



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Map 2, Ohaco Complex Key Areas

Ohaco Complex Key Areas



Legend

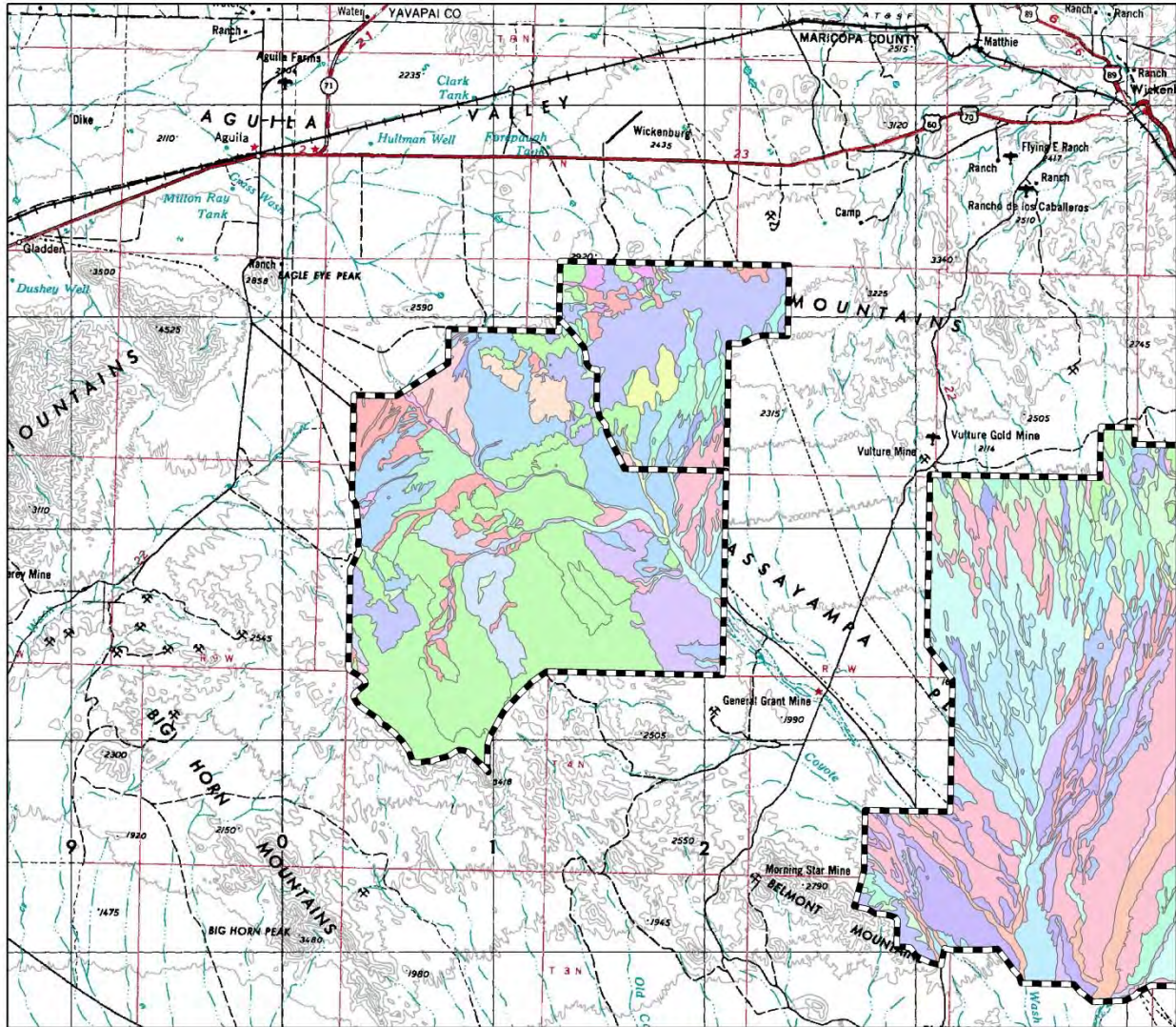
- Ohaco_Key_Areas
- Ohaco Complex Boundaries

Land Management CATEGORY

<ul style="list-style-type: none"> BLM BR County 	<ul style="list-style-type: none"> Indian Lands Local or State Parks Military NPS Other 	<ul style="list-style-type: none"> Private State State Wildlife Area USFS USFWS
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Map 3, Ohaco Complex Ecological Sites
 Ohaco Complex Ecological Sites



Legend

ecoclassna

Limy Fan 7-10" p.z.	Limy Upland 10-12" p.z.	Sandy Bottom 3-7" p.z.
Basalt Hills 7-10" p.z.	Limy Upland 2-7" p.z.	Sandy Bottom 7-10" p.z.
Clay Loam Upland 10-12" p.z.	Limy Upland 3-7" p.z. Deep	Sandy Loam 7-10" p.z. Deep
Clay Loam Upland 7-10" p.z.	Limy Upland 7-10" p.z.	Sandy Loam Slopes 7-10" p.z. Limy
Clayey Bottom 7-10" p.z.	Limy Upland 7-10" p.z. Deep	Sandy Loam Upland 3-7" p.z.
Clayey Upland 10-12" p.z.	Loamy Hills 7-10" p.z.	Sandy Loam Upland 7-10" p.z.
Clayey Upland 7-10" p.z.	Loamy Upland 3-7" p.z.	Sandy Upland 3-7" p.z.
Granitic Hills 7-10" p.z.	Loamy Upland 10-12" p.z.	Sandy Upland 7-10" p.z.
Granitic Upland 7-10" p.z.	Loamy Upland 7-10" p.z.	Schist Hills 7-10" p.z.
Limy Fan 2-7" p.z.	Loamy Upland 7-10" p.z. Saline	Shallow Upland 7-10" p.z.
Limy Fan 3-7" p.z.	Saline Upland (Loamy) 2-7" p.z.	Volcanic Hills 7-10" p.z.



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2.0 Key Area Data

2.1 Ohaco Allotment

2.1.1 Key Area 1

This Key Area was abandoned in 1986.

2.1.2 Key Area 2

Interpreting Indicators of Rangeland Health:

Attribute Rating:	Rationale:
Soil and Site Stability (S):	Slight to Moderate Departure. This is due to the slope of the site, the thin nature of the soils, and the slightly clumpy distribution of vegetation.
Hydrologic Function (H):	Slight to Moderate Departure. This is due to the slope of the site, the thin nature of the soils, and the slightly clumpy distribution of vegetation.
Biotic Integrity (B):	Slight to Moderate Departure. This is due to drought effect.

Codes: N-S (None to Slight) S-M (Slight to Moderate) M (Moderate) M-E (Moderate to Extreme) E-T (Extreme to Total)

Point Cover Data:

Point Cover data were collected in conjunction with dry weight rank and frequency data in 2013. Bare ground cover measures should not be directly compared. In prior years, gravel cover (2mm-1/2" size class) was included in the "Bare Ground" cover measure. The percent cover by cover class is given below:

Year	Site	Bare Ground	Foliar Cover	Basal Cover	Litter	Gravel (2mm-2")	Rock (>1/2")	Rock (>2")
2013	2	1.5%	15.0%	N/A	12.0%	52.0%	N/A	19.5%
1993	2	29.0%	N/A	4.5%	51.0%	N/A	15.5%	N/A
1988	2	40.5%	N/A	4.5%	22.5%	N/A	32.5%	N/A
1982	2	43.5%	35.5%	N/A	1.5%	N/A	19.5%	N/A

Frequency and Composition Data:

Composition data is based on Dry Weight Rank.

Plant Species KA2	Symbol	Frequency (%)				Composition (%)
		2013	1993	1988	1982	
Tree and Shrub Species						
Acacia constricta	ACCO2	11.0	9.0	5.0	4.5	22.71
Acacia greggii	ACGR	1.0	3.0	2.0	3.0	2.35
Echinocereus engelmannii	ECEN	-	-	1.0	-	-
Ephedra nevadensis	EPNE	-	2.5	1.0	-	-
Eriogonum wrightii	ERWR	0.5	-	2.0	-	1.18
Gutierrezia sarothrae	GUSA2	2.0	6.0	4.0	2.5	1.53
Krameria erecta	KRER	5.5	6.0	6.0	4.0	11.18
Larrea tridentata	LATR2	12.5	16.0	12.0	8.0	23.18
Lycium pallidum	LYPA	-	0.5	1.0	-	-
Menodora scabra	MESC	-	-	0.5	0.5	-
Opuntia sp.	OPUNT	0.5	4.5	5.5	1.0	1.06

Parkinsonia microphylla	PAMI5	5.0	2.0	3.0	4.5	11.76
Prosopis juliflora	PRJU3	-	1.0	1.0	0.5	-
Psilostrophe cooperi	PSCO2	-	0.5	-	-	-
Salazaria mexicana	SAME	-	0.5	0.5	-	-
Senna	SENN4	2.5	-	-	-	4.82
Teucrium canadense	TECAC	-	5.0	5.0	-	-
Ziziphus obtusifolia	ZIOB	1.5	1.0	1.0	1.5	3.41
Grasses and Forbs						
Aristida sp.	ARIST	-	-	1.0	2.0	-
Dasyochloa pulchella	DAPU7	0.5	2.0	2.0	-	1.18
Dichelostemma capitatum	DICAC5	3.5	11.0	12.0	18.5	7.18
Eriogonum inflatum	ERIN4	2.0	0.5	-	-	4.71
Muhlenbergia porteri	MUPO2	-	0.5	0.5	0.5	-
Pleuraphis mutica	PLMU3	2.0	9.0	9.0	14.0	3.76
Sphaeralcea ambigua	SPAM2	-	3.0	3.0	1.5	-
Annuals						
Annual forbs	AAFF	48.5	100	100	100	-
Annual grasses	AAGG	97.0	100	100	100	-

Utilization data:

KA 2 Utilization	Utilization %	
Year	PLMU2/ HIMU2/ HIRI	KRER
1/2013	30.5%	24.5%
10/93	8.0%	
10/92	6.8%	
1/92	8.0%	
1/91	16.9%	
10/89	16.2%	
1/89	18.6%	
11/87	22.1%	
6/86	30.0%	
6/85	19.6%	
1/83	44.5%	
9/82	31.2	

2.1.3 Key Area 3

Interpreting Indicators of Rangeland Health:

Attribute Rating:	Rationale:
Soil and Site Stability (S):	Slight to Moderate Departure. The departure is due to soil movement on the site in excess of what is expected in the reference state.
Hydrologic Function (H):	Slight to Moderate Departure. The departure is due to soil movement on the site in excess of what is expected in the reference state.
Biotic Integrity (B):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.

Codes: N-S (None to Slight) S-M (Slight to Moderate) M (Moderate) M-E (Moderate to Extreme) E-T (Extreme to Total)

Point Cover Data:

Point Cover data were collected in conjunction with dry weight rank and frequency data in 2013. In prior years, gravel cover (2mm-1/2" size class) was included in the "Bare Ground" cover measure. The percent cover by cover class is given below:

Year	Bare Ground	Foliar Cover	Basal Cover	Litter	Gravel (2mm-2")	Rock (>1/2")	Rock (>2")
2014	6.0%	26.5%	N/A	23.5%	23.0%	N/A	20.5%
1993	19.5	N/A	9.0	50.0	N/A	21.5	N/A
1988	32.5	N/A	10.5	20.5	N/A	36.5	N/A
1982	42.5	24.0	N/A	5.0%	N/A	28.5	N/A

Frequency and Composition Data:

Composition data is based on Dry Weight Rank.

Plant Species KA3	Symbol	Frequency (%)				Composition (%)
		2014	1993	1988	1982	
Tree and Shrub Species						
Cylindropuntia acanthocarpa	CYAC8	8.0	15.0	18.0	10.0	5.31
Encelia farinosa	ENFA	23.5	1.0	-	0.5	14.91
Echinocereus engelmannii	ECEN	-	0.5	0.5	0.5	-
Ephedra	EPHED	-	0.5	0.5	-	-
Janusia gracilis	JAGR	0.5	-	-	0.5	0.06
Krameria grayi	KRGR	0.5	-	1.0	0.5	0.57
Larrea tridentata	LATR2	21.5	12.5	16.0	12.0	17.77
Lycium	LYCIU	4.0	2.0	4.5	0.5	1.71
Mammillaria sp.	MAMMI	-	0.5	-	-	
Menodora scabra	MESC	0.5	-	-	-	0.4
Opuntia	OPUNT	5.0	6.0	12.0	6.5	2.63
Parkinsonia microphylla	PAMI5	17.0	9.0	-	3.5	14.29
Prosopis velutina	PRVE	0.5	0.5	1.5	-	0.17
Stephanomeria	STEPH	1.5	-	-	0.5	0.34
Grasses and Forbs						
Dasyochloa pulchella	DAPU7	-	21.0	14.0	28.5	-

Dichelostemma capitatum	DICAC5	44.5	-	-	-	20.34
Marina parryi	MAPA7	0.5	-	-	-	0.06
Muhlenbergia porteri	MUPO2	-	0.5	-	-	-
Pleuraphis mutica	PLMU2	25.5	43.5	45.0	28.0	20.46
Sphaeralcea ambigua	SPAM2	2.5	-	2.5	1.0	0.97
Annuals						
Annual forbs	AAFF	88.5	100	100	100	-
Annual grasses	AAGG	19.5	100	100	100	-

Utilization data:

KA 3 Utilization	Utilization %
Year	PLMU2/HIMU2 /HIRI
3/2014	7.1%
10/93	5.0%
10/92	8.0%
1/92	4.6%
1/91	5.3%
10/89	21.1%
1/89	19.7%
6/86	31%
6/85	6.2%
1/83	21.2%
9/82	14.2%

2.1.4 Key Area 4

Interpreting Indicators of Rangeland Health:

Attribute Rating:	Rationale:
Soil and Site Stability (S):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Hydrologic Function (H):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Biotic Integrity (B):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.

Codes: N-S (None to Slight) S-M (Slight to Moderate) M (Moderate) M-E (Moderate to Extreme) E-T (Extreme to Total)

Point Cover Data:

Year	Site	Bare Ground	Herb. Cover	Litter	Gravel	Rock
2005	4	1%	22%	29%	46%	2%

Frequency and Composition Data:

Composition data is based on Dry Weight Rank.

Plant Species KA4	Symbol	Frequency (%)	Composition (%)
Tree and Shrub Species		2005	2005
Acacia constricta	ACCO2	4.0	3.16
Ambrosia deltoidea	AMDE4	9.0	7.25
Ambrosia dumosa	AMDU2	1.5	2.48
Cylindropuntia acanthocarpa	CYAC8	0.5	0.62
Dalea sp.	DALEA	2.0	1.67
Encelia farinosa	ENFA	4.0	2.73
Ephedra	EPHED	1.0	0.68
Eriogonum fasciculatum	ERFA2	1.5	1.67
Fouquieria splendens	FOSP2	0.5	0.56
Gutierrezia sarothrae	GUSA2	3.0	1.61
Janusia gracilis	JAGR	0.5	0.06
Krameria erecta	KRER	7.5	9.85
Larrea tridentata	LATR2	14.5	10.78
Lycium	LYCIU	2.5	2.79
Menodora scabra	MESC	0.5	0.12
Parkinsonia microphylla	PAMI5	15.0	11.15
Psilostrophe cooperi	PSCO2	4.0	2.29
Viguiera dentata	VIDE3	0.5	0.43
Grasses and Forbs			
Aristida sp.	ARIST	2.0	1.98
Argythamnia neomexicana	ARNE2	0.5	0.62
Euphorbia sp.	EUPHO	4.5	4.34
Mirabilis laevis	MILAV	0.5	0.56
Pleuraphis mutica	PLMU2	0.5	0.43
Senna covesii	SECO10	30.0	31.10
Unknown forb	UNK	1.0	1.05

Utilization data:

KA 4 Utilization	Utilization %
Year	PLMU2/HIMU2 /HIRI
1/2015	10.9%

2.1.5 Key Area 5

Interpreting Indicators of Rangeland Health:

Attribute Rating:	Rationale:
Soil and Site Stability (S):	None to Slight Departure. The observed indicators, when compared to the reference state,

	are consistent with the expected conditions on the site.
Hydrologic Function (H):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Biotic Integrity (B):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.

Codes: N-S (None to Slight) S-M (Slight to Moderate) M (Moderate) M-E (Moderate to Extreme) E-T (Extreme to Total)

Point Cover Data:

Year	Site	Bare Ground	Herb. Cover	Litter	Gravel	Rock	Cryptogam
2005	5	10.9%	13.4%	36.4%	35.4%	1.8%	2.1%

Frequency and Composition Data:

Composition data is based on Dry Weight Rank.

Plant Species KA5	Symbol	Frequency (%)	Composition (%)
		2005	2005
Tree and Shrub Species			
Acacia constricta	ACCO2	1.5	1.25
Fouquieria splendens	FOSP2	0.5	0.60
Krameria erecta	KRER	5.5	5.60
Larrea tridentata	LATR2	34.5	35.48
Lycium	LYCIU	3.0	1.31
Parkinsonia microphylla	PAMI5	1.5	1.61
Grasses and Forbs			
Aristida sp.	ARIST	2.0	0.89
Argythamnia neomexicana	ARNE2	1.5	1.31
Dasyochloa pulchella	DAPU7	8.5	8.99
Euphorbia sp.	EUPHO	38	40.5
Senna covesii	SECO10	0.5	0.60
Sphaeralcea ambigua	SPAM2	1.5	1.43

Utilization data:

KA 5 Utilization	
	Utilization %
Year	PLMU2/HIMU2 /HIRI
1/2015	17%

2.1.6 Key Area 6

Interpreting Indicators of Rangeland Health:

Attribute Rating:	Rationale:
Soil and Site Stability (S):	None to Slight Departure. The observed indicators, when compared to the reference state,

	are consistent with the expected conditions on the site.
Hydrologic Function (H):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Biotic Integrity (B):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.

Codes: N-S (None to Slight) S-M (Slight to Moderate) M (Moderate) M-E (Moderate to Extreme) E-T (Extreme to Total)

Point Cover Data:

Year	Site	Bare Ground	Herb. Cover	Litter	Gravel	Rock
2005	6	17.3%	26.4%	20.0%	33.6%	2.7%

Frequency and Composition Data:

Composition data is based on Dry Weight Rank.

Plant Species KA6	Symbol	2005	2005
Tree and Shrub Species			
Acacia constricta	ACCO2	2.5	1.79
Ambrosia dumosa	AMDU2	17.0	11.52
Dalea sp.	DALEA	1.0	0.70
Ephedra sp.	EPHED	1.0	0.40
Fouquieria splendens	FOSP2	0.5	0.35
Krameria erecta	KRER	5.5	3.94
Larrea tridentata	LATR2	21.0	14.56
Lycium	LYCIU	0.5	0.50
Mirabilis laevis	MILAV	3.0	2.14
Parkinsonia microphylla	PAMI5	21.5	15.35
Psilostrophe cooperi	PSCO2	1.0	0.45
Salazaria mexicana	SAME	1.0	0.45
Stephanomeria pauciflora	STPA4	0.5	0.45
Viguiera	VIGUI	0.5	0.35
Grasses and Forbs			
Aristida sp.	ARIST	18.5	10.52
Argythamnia neomexicana	ARNE2	2.0	1.05
Dasyochloa pulchella	DAPU7	11.0	9.72
Eriogonum inflatum	ERIN4	0.5	0.50
Euphorbia sp.	EUPHO	32.5	24.13
Muhlenbergia porteri	MUPO2	0.5	0.10
Pleuraphis rigida	PLRI3	0.5	0.35
Sphaeralcea ambigua	SPAM2	1.0	0.80

Utilization data:

KA 6 Utilization

	Utilization %
Year	ARIST
1/2015	3%

2.1.7 Key Area 7

Interpreting Indicators of Rangeland Health:

Attribute Rating:	Rationale:
Soil and Site Stability (S):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Hydrologic Function (H):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Biotic Integrity (B):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.

Codes: N-S (None to Slight) S-M (Slight to Moderate) M (Moderate) M-E (Moderate to Extreme) E-T (Extreme to Total)

Point Cover Data:

Year	Site	Bare Ground	Foliar Cover	Basal Veg	Litter	Gravel	Cryptogam
2015	7	7.9%	21.8%	0.9%	56.4%	30.2%	4.4%

Frequency and Composition Data:

Composition data is based on Belt Density.

Plant Species KA7	Symbol	Composition (%)
Tree and Shrub Species		
		2014
Acacia constricta	ACCO2	1.8
Ambrosia dumosa	AMDU2	1.2
Krameria erecta	KRER	1.2
Larrea tridentata	LATR2	27.9
Lycium	LYCIU	2.4
Parkinsonia microphylla	PAMI5	3.0
Psilostrophe cooperi	PSCO2	0.6
Tiquilia canescens	TICA3	0.6
Grasses and Forbs		
Aristida sp.	ARIST	3.0
Argythamnia neomexicana	ARNE2	6.7
Dasyochloa pulchella	DAPU7	53.9
Euphorbia sp.	EUPHO	0.6
Sphaeralcea ambigua	SPAM2	0.6

Utilization data:

KA 7 Utilization	
	Utilization %

Year	KRER
1/2015	7.6%

2.1.8 Key Area 8

Interpreting Indicators of Rangeland Health:

Attribute Rating:	Rationale:
Soil and Site Stability (S):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Hydrologic Function (H):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Biotic Integrity (B):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.

Codes: N-S (None to Slight) S-M (Slight to Moderate) M (Moderate) M-E (Moderate to Extreme) E-T (Extreme to Total)

Point Cover Data:

Year	Site	Bare Ground	Foliar Cover	Basal Veg	Litter	Gravel	Rock	Cryptogam
2015	8	20%	72%	17%	44%	10%	6%	3%

Frequency and Composition Data:

Composition data is based on Dry Weight Rank.

Plant Species KA8	Symbol	Frequency (%)	Composition (%)
Tree and Shrub Species		2015	2015
Acacia greggii	ACGR	28	12.27
Ambrosia confertifolia	AMCO3	8	5.26
Ambrosia deltoidea	AMDE4	11	3.81
Ambrosia dumosa	AMDU2	1	0.72
Hymenoclea salsola	HYSA	10	5.57
Larrea tridentata	LATR2	17	8.66
Lycium	LYCIU	10	4.43
Olneya tesota	OLTE	1	0.1
Parkinsonia florida	PAFL6	34	24.33
Phoradendron californicum	PHCA	2	0.82
Prosopis velutina	PRVE	32	23.50
Grasses and Forbs			
Aristida sp.	ARIST	4	2.06
Aristolochia watsonii	ARWA	4	2.27
Delphinium parishii	DEPA	1	0.21
Euphorbia sp.	EUPHO	3	1.96
Funastrum cynanchoides	FUCY	7	2.47
Nicotiana obtusifolia	NIOB	1	0.31
Senna covesii	SECO10	1	0.21

Sphaeralcea ambigua	SPAM2	2	0.62
Annual Forbs	AAFF	11	0.41

Utilization data:

KA 8 Utilization	
	Utilization %
Year	ARIST
1/2015	27%

2.2 Effus Allotment

2.2.1 Key Area 1

Interpreting Indicators of Rangeland Health:

Attribute Rating:	Rationale:
Soil and Site Stability (S):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Hydrologic Function (H):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Biotic Integrity (B):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.

Codes: N-S (None to Slight) S-M (Slight to Moderate) M (Moderate) M-E (Moderate to Extreme) E-T (Extreme to Total)

Ground Cover Data:

Year	Bare Ground	Gravel	Herb. Canopy	Litter	Rock	Live Basal Veg.
2013	3.5%	10.0%	21.5%	33.5%	24.0%	7.0%
1989	48.5%	N/A	N/A	9.5%	39.5%	2.5%
1985	33.5%	N/A	N/A	8.5%	46.5%	11.5%
1983	32.5%	N/A	N/A	7.5%	47.0%	13.0%

Frequency and Composition Data:

Composition data is taken from dry weight rank.

Plant Species KA1 2013	Symbol	Frequency (%)				Composition (%)
Tree and Shrub Species		2013	1989	1985	1983	2013
Acacia constricta	ACCO	-	0.5	-	-	-
Acacia gregii	ACGR	2.5	0.5	3.0	2.5	1.47
Ambrosia deltoidea	AMDE4	8.5	2.5	5.5	5.0	8.08
Castela emoryi	CAEM4	3.5	0.5	3.0	2.5	2.05
Dyssodia porophylloides	DYPO	0.5	1.5	-	-	.64
Echinocereus engelmannii	ECEN	1.0	0.5	-	0.5	.51
Encelia frutescens	ENFR	-	-	2.5	0.5	-
Ephedra	EPHED	2.0	1.5	1.0	1.0	.9

Eriogonum fasciculatum	ERFA2	19.0	30.0	30.0	31.0	17.69
Fouquieria splendens	FOSP2	1.0	-	1.0	0.5	.71
Janusia gracilis	JAGR	6.0	-	1.0	0.5	4.74
Krameria erecta	KRER	3.50	3.0	-	-	2.37
Larrea tridentata	LATR2	-	-	1.0	0.5	-
Lycium andersonii	LYAN	.50	-	-	-	.45
Menodora scabra	MESC	16.5	5.5	1.0	0.5	12.44
Opuntia sp.	OPUNT	1.0	1.0	2.0	0.5	.83
Parkinsonia microphylla	PAMI5	6.0	0.5	3.5	2.0	4.74
Stephanomeria pauciflora	STPA4	-	-	1.5	1.0	-
Viguiera dentata	VIDE3	3.50	-	-	-	1.73
Grasses and Forbs						
Aristida	ARIST	6.5	4.0	1.0	-	4.29
Argythamnia neomexicana	ARNE2	.5	-	-	-	.64
Dasyochloa pulchella	DAPU7	-	1.0	0.5	0.5	-
Eriogonum	ERIOG	2	-	-	-	.9
Muhlenbergia porteri	MUPO2	-	0.5	-	-	-
Pleuraphis mutica	PLMU3	32.50	-	-	-	35.58
Pleuraphis rigida	PLRI3	-	28.5	42.5	39.5	-
Sphaeralcea ambigua	SPAM2	-	1.0	-	-	-
Tridens muticus	TRMU	.5	-	-	-	.06

Utilization Data:

KA 1 Utilization Year	Utilization %	
	PLMU2/HIMU2 /HIRI	MESC
1/2015	43%	
5/2013	43%	55%
9/92	0%	
8/91	0%	
12/90	13.75%	
11/88	17.7%	Moderate/Heavy
11/86	17.9%	

2.2.2 Key Area 2

Interpreting Indicators of Rangeland Health:

Attribute Rating:	Rationale:
Soil and Site Stability (S):	None to Slight Departure. This attribute borders on the Slight to Moderate departure due to the steepness of the slope on the site increasing the probability of erosion.
Hydrologic Function (H):	Slight to Moderate Departure. The departure is due to the steepness of the site in comparison to the reference state.
Biotic Integrity (B):	Slight to Moderate Departure. The departure is mainly due to drought effects

exacerbated by frequent grazing due to proximity to water sources.

Codes: N-S (None to Slight) S-M (Slight to Moderate) M (Moderate) M-E (Moderate to Extreme) E-T (Extreme to Total)

Ground Cover Data:

Year	Bare Ground	Gravel (2mm-2")	Rock (>1/2")	Rock (>2")	Basal Veg	Litter	Cryptogam	Canopy
2015	4.4%	27.2%	N/A	17.0%	5.8%	45.6%	0%	29%
1985	38.0%	N/A	55.0%	N/A	4.5%	3.0%	N/A	N/A
1983	34.0	N/A	58.5	N/A	7.0%	0.5%	N/A	N/A

Composition Data:

Composition data is taken from dry weight rank.

KA2 Plant Species	Symbol	Frequency (%)			Composition (%)
		2015	1985	1983	2015
Tree and Shrub Species					
Acacia constricta	ACCO2	4.8	-	-	4.74
Acacia gregii	ACGR	1.4	6.0	4.5	0.78
Ambrosia deltoidea	AMDE4	0.5	-	-	0.06
Dyssodia porophylloides	DYPO	4.8	1.0	2.0	1.17
Echinocereus engelmannii	ECEN	0.5	1.5	2.5	0.06
Encelia farinosa	ENFA	5.3	1.0	1.0	3.96
Encelia frutescens	ENFR	2.9	0.5	0.5	1.75
Ephedra	EPHED	1.0	1.0	1.5	0.52
Eriogonum fasciculatum	ERFA2	22.3	36.0	34.0	15.39
Fouquieria splendens	FOSP2	2.9	5.5	6.0	2.79
Janusia gracilis	JAGR	9.2	-	-	6.75
Krameria erecta	KRER	6.8	3.0	3.5	4.87
Larrea tridentata	LATR2	1.9	-	-	2.34
Menodora scabra	MESC	6.8	-	-	4.02
Opuntia sp.	OPUNT	0.5	2.0	2.5	0.12
Parkinsonia microphylla	PAMI5	19.9	15.0	7.0	18.77
Phoradendron californicum	PHCA8	0.5	-	-	0.45
Psilostrophe cooperi	PSCO2	1.0	1.0	0.5	1.3
Ziziphus obtusifolia	ZIOB	-	0.5	0.5	-
Grasses and Forbs					
Aristida	ARIST	-	0.5	1.0	-
Argythamnia neomexicana	ARNE2	2.9	-	-	1.62
Dasyochloa pulchella	DAPU7	21.4	-	1.0	22.21
Euphorbia	EUPHO	4.4	-	-	2.4
Pellaea truncata	PETR3	1.0	-	-	0.71
Pleuraphis mutica	PLMU3	3.4	-	-	3.18

Pleuraphis rigida	PLRI3	-	25.5	24.5	-
Annuals					
Annual Forbs	AAFF	16.6	-	-	-
Annual Grasses	AAGG	85.4	-	-	-

Utilization Data:

KA 2 Utilization		
	Utilization %	
Year	PLMU2/HIMU2 /HIRI	ERFA2
9/2015	55.4%	27.0%
9/92	0%	
8/91	0%	
12/90	1%	Slight/Light
11/88	1%	
11/86	23.5%	

2.3 Douglas Allotment

2.3.1 Key Area 1

Interpreting Indicators of Rangeland Health:

Attribute Rating:	Rationale:
Soil and Site Stability (S):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Hydrologic Function (H):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.
Biotic Integrity (B):	None to Slight Departure. The observed indicators, when compared to the reference state, are consistent with the expected conditions on the site.

Codes: N-S (None to Slight) S-M (Slight to Moderate) M (Moderate) M-E (Moderate to Extreme) E-T (Extreme to Total)

Ground Cover Data:

Ground Cover data were collected as point cover data in conjunction with Dry Weight Rank and Frequency data. The percent cover by cover class is given below:

Year	Site	Bare Ground	Herb. Cover	Litter	Gravel	Rock	Cryptogams
2013	1	24%	8%	46%	8%	2%	12%

Frequency and Composition Data:

Composition data is relative composition based on the Dry Weight Rank study method.

KA1 2013 Plant Species	Symbol	Frequency (%)	Composition (%)
Tree and Shrub Species			
Acacia greggii	ACGR	8.0	8.31
Ambrosia ambrosioides	AMAM2	6.0	4.42
Ambrosia deltoidea	AMDE4	9.0	7.53
Beloperone californica	BECA7	26.0	22.08
Hymenoclea salsola	HYSA	6.0	4.16
Larrea tridentata	LATR2	30.0	30.91
Lycium	LYCUI	11.0	6.62
Olneya tesota	OLTE	8.0	10.0
Parkinsonia florida	PAFL6	5.0	4.03
Parkinsonia microphylla	PAMI5	3.0	1.56
Trixis	TRIXI	1.0	0.39

3.0 Ohaco Complex Plant List

The following plant list comprises all the plant species identified on long-term monitoring transects. This list is not exhaustive nor all inclusive of the plants on the Complex. Plant species on the list are identified by common name, scientific name, and NRCS Plants Database symbol. Palatable plants are identified, by species, for Sonoran desert tortoise, mule deer, and domestic livestock (cattle). Palatability of plant species for Sonoran desert tortoise is taken from VanDevender, et al (2002) and Oftedal (2002). Palatability of plant species for mule deer is taken from the “Habitat Guidelines for Mule Deer: Southwest Deserts Ecoregion” (Heffelfinger 2006) and “Diets of Desert Mule Deer” (Krausmann et al, 1997). Livestock plant palatability is taken from the Complex-associated Ecological Site Descriptions.

Common Name	Scientific Name	Symbol	Sonoran Tortoise	Mule Deer	Livestock
Whitethorn Acacia	<i>Acacia constricta</i>	ACCO2		X	
Catclaw Acacia	<i>Acacia greggii</i>	ACGR	X	X	
Weakleaf bursage	<i>Ambrosia confertifolia</i>	AMCO3		X	
Triangle leaf bursage	<i>Ambrosia deltoidea</i>	AMDE4	X	X	
White bursage	<i>Ambrosia dumosa</i>	AMDU2	X	X	
N/A	Annual forbs	AAFF	X	X	X
N/A	Annual grasses	AAGG	X	X	X
New Mexico silverbush	<i>Argythamnia neomexicana</i>	ARNE2		X	X
Three-awn	<i>Aristida</i> sp.	ARIST	X		X
Watson’s dutchman’s pipe	<i>Aristolochia watsonii</i>	ARWA			
Beloperone	<i>Beloperone californica</i>	BECA7			X
Crucifixion thorn	<i>Castela emoryi</i>	CAEM4			
Buckhorn cholla	<i>Cylindropuntia acanthocarpa</i>	CYAC8	X		
Prairie clover	<i>Dalea</i> sp.	DALEA			
Fluffgrass	<i>Dasyochloa pulchella</i>	DAPU7	X		X
Desert larkspur	<i>Delphinium parishii</i>	DEPA			
Bluedicks	<i>Dichelostemma capitatum</i>	DICAC5			
Slender poreleaf	<i>Dyssodia porophylloides</i>	DYPO			X
Engelmann’s hedgehog	<i>Echinocereus engelmannii</i>	ECEN			
Brittlebush	<i>Encelia farinosa</i>	ENFA	X	X	
Button brittlebush	<i>Encelia frutescens</i>	ENFR			
Mormon tea	<i>Ephedra</i>	EPHED	X		X
Mormon tea	<i>Ephedra nevadensis</i>	EPNE	X		X
Buckwheat	<i>Eriogonum</i>	ERIOG		X	
Flat-top buckwheat	<i>Eriogonum fasciculatum</i>	ERFA2	X	X	X

Desert Trumpet	<i>Eriogonum inflatum</i>	ERIN4	X	X	X
Shrubby buckwheat	<i>Eriogonum wrightii</i>	ERWR	X	X	X
Spurge	<i>Euphorbia</i> sp.	EUPHO	X		
Ocotillo	<i>Fouquieria splendens</i>	FOSP2			
Fringed twinevine	<i>Funastrum cynanchoides</i>	FUCY			
Snakeweed	<i>Gutierrezia sarothrae</i>	GUSA2			
Burrobrush	<i>Hymenoclea salsola</i>	HYSA			X
Slender janusia	<i>Janusia gracilis</i>	JAGR	X	X	X
Range ratany	<i>Krameria erecta</i>	KRER	X	X	X
White ratany	<i>Krameria grayi</i>	KRGR	X	X	X
Creosote bush	<i>Larrea tridentata</i>	LATR2	X	X	
Wolfberry	<i>Lycium</i>	LYCIU	X	X	
Anderson's wolfberry	<i>Lycium andersonii</i>	LYAN	X	X	X
Pale desert-thorn	<i>Lycium pallidum</i>	LYPA		X	X
Fishhook pincushion	<i>Mammillaria</i> sp.	MAMMI	X		
Parry's false prairie-clover	<i>Marina parryi</i>	MAPA7	X		
Rough menodora	<i>Menodora scabra</i>	MESC		X	X
Wishbone-bush	<i>Mirabilis laevis</i>	MILAV	X		
Bush muhly	<i>Muhlenbergia porteri</i>	MUPO2	X		X
Desert tobacco	<i>Nicotiana obtusifolia</i>	NIOB			
Desert Ironwood	<i>Olneya tesota</i>	OLTE	X	X	X
Prickly pear	<i>Opuntia</i>	OPUNT	X	X	X
Blue palo verde	<i>Parkinsonia florida</i>	PAFL6		X	
Little leaf palo verde	<i>Parkinsonia microphylla</i>	PAMI5	X	X	X
Spiny cliffbrake	<i>Pellaea truncata</i>	PETR3	X		
Mesquite mistletoe	<i>Phoradendron californicum</i>	PHCA8		X	
Tobosagrass	<i>Pleuraphis mutica</i>	PLMU3	X		X
Big galleta	<i>Pleuraphis rigida</i>	PLRI3	X		X
Mesquite	<i>Prosopis juliflora</i>	PRJU3	X	X	X
Velvet mesquite	<i>Prosopis velutina</i>	PRVE	X	X	X
Whitestem paperflower	<i>Psilostrophe cooperi</i>	PSCO2	X		
Mexican bladdersage	<i>Salazaria mexicana</i>	SAME		X	
Cassia	<i>Senna</i>	SENN			
Rattlesnake bush	<i>Senna covesii</i>	SECO10			
Globemallow	<i>Sphaeralcea ambigua</i>	SPAM2	X	X	X
Wirelettuce	<i>Stephanomeria</i>	STEPH			
Brownplume wirelettuce	<i>Stephanomeria pauciflora</i>	STPA4			

Canada germander	Teucrium canadense	TECAC			
Rat-ear coldenia	Tiquilia canescens	TICA3	X		
Slim tridens	Tridens muticus	TRMU	X		X
Trixis	Trixis sp.	TRIXI		X	X
N/A	Unknown forb	UNK			
Goldeneye	Viguiera	VIGUI	X	X	
Toothleaf goldeneye	Viguiera dentata	VIDE3		X	
Graythorn	Ziziphus obtusifolia	ZIOB			

4.0 Ohaco Complex Soils List

Highlighted soils are described in detail in section 2.2.4 of the Ohaco Complex RHE.

Soil Name	Allotment Percentage		
	Ohaco	Effus	Douglas
Antho-Carrizo-Maripo complex	0.2	0.8	2.1
Antho-Carrizo-Maripo complex, low precipitation	1.3	0.6	0.1
Anthony sandy loam	0.3	N/A	N/A
Brios-Carrizo complex, 1 to 5 percent slopes	1.1	N/A	N/A
Brios-Carrizo complex, low precipitation, 1 to 5 percent slopes	0.1	N/A	12.2
Carefree-Beardsley complex	T	0.5	N/A
Carrizo very gravelly sand	N/A	N/A	0.3
Cherioni-Rock outcrop complex, 5 to 60 percent slopes	2.5	N/A	N/A
Chuckwall-Gunsight complex, low precipitation, 1 to 8 percent slopes	N/A	N/A	3.2
Cipriano very gravelly loam	3.3	5.5	N/A
Continental-Mohave complex, 1 to 4 percent slopes	3.2	N/A	N/A
Continental-Ohaco complex	N/A	0.3	N/A
Denure-Momoli-Carrizo complex	T	1.6	T
Denure-Momoli-Carrizo complex, low precipitation	0.8	N/A	1.9
Eba-Continental complex, 1 to 8 percent slopes	0.2	0.3	N/A
Eba-Pinaleno complex, low precipitation, 3 to 20 percent slopes	0.2	3.5	N/A
Eba-Pinaleno complex, low precipitation, 20 to 40 percent slopes	N/A	0.2	N/A
Eba very gravelly loam, low precipitation, 8 to 20 percent slopes	N/A	T	N/A
Ebon-Contine complex, 1 to 8 percent slopes	0.1	N/A	N/A
Ebon-Gunsight-Cipriano association, 3 to 25 percent slopes	0.4	0.1	2.4
Ebon-Pinamt complex, 3 to 20 percent slopes	N/A	1.3	13.5
Ebon-Pinamt complex, 20 to 40 percent slopes	T	N/A	T
Gachado-Lomitas-Rock outcrop complex, 7 to 55 percent slopes	24	N/A	0.1
Gachado-Lomitas complex, 8 to 25 percent slopes	18.2	N/A	N/A
Gadsden clay	T	N/A	N/A
Gilman loams	N/A	N/A	T
Gran-Wickenburg-Rock outcrop complex, low precipitation, 10 to 65 percent slopes	2.6	45.9	N/A
Gran-Wickenburg complex, low precipitation, 1 to 10 percent slopes	0.2	9.6	N/A
Greyeagle-Continental-Nickel association, 1 to 40 percent slopes	11.3	T	N/A
Greyeagle-Suncity variant complex, 1 to 7 percent slopes	3	0.4	N/A
Guest clay	0.4	N/A	N/A
Gunsight-Cipriano complex, low precipitation, 1 to 7 percent slopes	6.2	N/A	T
Gunsight-Rillito complex, 1 to 25 percent slopes	T	2.9	N/A
Gunsight-Rillito complex, low precipitation, 1 to 40 percent slopes	1.8	0.7	28.5
Lehmans-Rock outcrop complex, low precipitation, 8 to 65 percent slopes	1.7	5.2	N/A
Luke-Cipriano association, 1 to 15 percent slopes	N/A	N/A	T

Mohall-Tremant complex, low precipitation, 1 to 8 percent slopes	T	N/A	T
Mohall loam, calcareous solum	N/A	N/A	0.1
Mohave-Guest complex	1.3	T	N/A
Mohave clay loam	T	0.4	N/A
Mohave complex	1.2	N/A	N/A
Mohave loam, calcareous solum	N/A	T	N/A
Momoli-Carrizo complex	T	8.4	0.4
Momoli-Carrizo complex, low precipitation	N/A	N/A	7
Nickel-Cave complex, low precipitation, 8 to 30 percent slopes	N/A	7.3	N/A
Ohaco gravelly loam	0.1	N/A	N/A
Pinaleno-Tres Hermanos complex, low precipitation, 1 to 10 percent slopes	T	0.5	N/A
Pinamt-Tremant complex, 1 to 10 percent slopes	0.6	2.6	3.1
Pinamt-Tremant complex, low precipitation, 1 to 10 percent slopes	N/A	0.4	2.1
Quilotosa-Vaiva-Rock outcrop complex, 20 to 65 percent slopes	2.6	N/A	11.8
Rillito gravelly loam, 1 to 8 percent slopes	N/A	N/A	T
Rock outcrop- Gachado complex, 5 to 55 percent slopes	0.1	N/A	N/A
Schenco-Tock outcrop complex, 3 to 25 percent slopes	N/A	N/A	0.9
Suncity-Cipriano complex, 1 to 7 percent slopes	0.7	0.8	3.4
Tremant-Gunsight-Rillito complex, 1 to 5 percent slopes	3.1	0.2	N/A
Tremant-Gunsight-Rillito complex, low precipitation, 1 to 5 percent slopes	1.4	N/A	4.5
Tremant-Suncity complex, 1 to 8 percent slopes	0.1	N/A	0.2
Tremant gravelly loams	N/A	N/A	1.9
Vaiva very gravelly loam, 1 to 20 percent slopes	5.2	N/A	N/A
Water	T	N/A	N/A

*T- Trace soils present at less than 0.1% of the soil series present on Public Lands

*N/A- Soil not present on public lands within the allotment.

5.0 Ohaco Complex Ecological Sites

Ecological Site	Allotment Percent		
	Ohaco	Effus	Douglas
Unassigned/Rock Outcrop	0.1	-	3.2
Basalt Hills 7-10"	0.5	-	-
Clay Loam Upland 7-10"	0.7	2.6	16
Clayey Bottom 7-10"	0.4	-	-
Clayey Upland 7-10"	3.3	0.5	-
Clayey Upland 10-12"	-	0.3	-
Granitic Hills 7-10"	5.1	45.9	11.8
Granitic Upland 7-10"	5.2	-	-
Limy Fan 3-7"	0.1	-	0.2
Limy Fan 7-10"	-	T	2.0
Limy Upland 3-7"	6.2	-	T
Limy Upland 7-10"	15.3	9.2	3.4
Limy Upland 10-12"	3.0	0.4	-
Limy Upland Deep 3-7"	2.4	1.1	37.6
Limy Upland Deep 7-10"	0.2	11	3.5
Loamy Hills 7-10"	T	0.2	T
Loamy Upland 3-7"	1.4	-	4.5
Loamy Upland 7-10"	5.8	3.8	-
Loamy Upland 10-12"	0.1	-	-
Sandy Wash 3-7"	0.1	-	12.2
Sandy Wash 7-10"	1.1	-	-
Sandy Loam Deep 7-10"	0.4	1.6	T
Sandy Loam Slopes 7-10" Limy	-	7.3	-
Sandy Loam Upland 3-7"	2.1	0.6	2.0
Sandy Loam Upland 7-10"	0.2	0.8	2.1
Sandy Upland 3-7"	-	-	0.3
Schist Hills 7-10"	-	-	0.9
Shallow Upland 7-10"	0.2	9.5	-
Volcanic Hills 7-10"	43.9	5.2	0.1

Appendix C

GUIDELINES FOR HANDLING SONORAN DESERT TORTOISES ENCOUNTERED ON DEVELOPMENT PROJECTS

Arizona Game and Fish Department

Revised September 22, 2014

The Arizona Game and Fish Department (Department) has developed the following guidelines to reduce potential impacts to desert tortoises, and to promote the continued existence of tortoises throughout the state. These guidelines apply to short-term and/or small-scale projects, depending on the number of affected tortoises and specific type of project.

The Sonoran desert tortoise occurs south and east of the Colorado River. Tortoises encountered in the open should be moved out of harm's way to adjacent appropriate habitat. If an occupied burrow is determined to be in jeopardy of destruction, the tortoise should be relocated to the nearest appropriate alternate burrow or other appropriate shelter, as determined by a qualified biologist. Tortoises should be moved less than 48 hours in advance of the habitat disturbance so they do not return to the area in the interim. Tortoises should be moved quickly, kept in an upright position parallel to the ground at all times, and placed in the shade. Separate disposable gloves should be worn for each tortoise handled to avoid potential transfer of disease between tortoises. Tortoises must not be moved if the ambient air temperature exceeds 40° Celsius (105° Fahrenheit) unless an alternate burrow is available or the tortoise is in imminent danger.

A tortoise may be moved up to one-half mile, but no further than necessary from its original location. If a release site or alternate burrow is unavailable within this distance, and ambient air temperature exceeds 40° Celsius (105° Fahrenheit), contact the Department for guidance. Tortoises salvaged from projects which result in substantial permanent habitat loss (e.g. housing and highway projects), or those requiring removal during long-term (longer than one week) construction projects, may be placed in the Department's tortoise adoption program. *Managers of projects likely to affect desert tortoises should obtain a [scientific collecting license](#) from the Department to facilitate handling or temporary possession of tortoises.* Likewise, if large numbers of tortoises (>5) are expected to be displaced by a project, the project manager should contact the Department for guidance and/or assistance.

Please keep in mind the following points:

- Use the Department's [Environmental On-Line Review Tool Department](#) during the planning stages of any project that may affect desert tortoise habitat.
- Unless specifically authorized by the Department, or as noted above, project personnel should avoid disturbing any tortoise.
- Take is prohibited by state law.
- These guidelines do not apply to Mojave desert tortoises (north and west of the Colorado River). Mojave desert tortoises are listed as threatened under the Endangered Species Act, administered by the U.S. Fish and Wildlife Service.
- These guidelines are subject to revision at the discretion of the Department.