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Environmental Assessment
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DESERT HILLS COMPLEX GRAZING RENEWAL
Desert Hills Allotment (No. 03025)
Desert Hills Lease (No. 05016)
Buckhorn Allotment (No. 06243)

MARICOPA AND YAVAPAI COUNTIES, 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 Desert Hills allotment (No. 03025), Desert Hills lease (No. 05016), and Buckhorn allotment (No. 06243) (Desert Hills Complex or Complex). A Rangeland Health Evaluation (RHE) was prepared for the Desert Hills Complex in 2013 (BLM 2013).¹

The Desert Hills Complex is located in Sonoran-Mojave shrub mix desert east of Wickenburg, Arizona and northeast of Highway 60 and the Hassayampa River. The Desert Hills Complex covers approximately 57,548 acres in Maricopa and Yavapai Counties. The BLM-administered portion of the Complex is approximately 23,192 acres. The remaining acreage is Arizona State Trust Lands (31,575 acres) and privately owned (2,781 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 Desert Hills Complex. 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).

Desert Hills Complex Profile

In 2000, Maugham Ranches bought the base property and base waters associated with the Desert Hills lease and Desert Hills allotment. The lease and allotment abut each other without division fences between the two allotments. There is no specified grazing system for the two units. In general, the lessee adjusts livestock numbers throughout the grazing year to take advantage of available forage. Although permitted for yearlong use, the lessee generally uses the Desert Hills lease and allotment as winter pastures for cattle that are then rotated back onto the Buckhorn allotment and other ranches for the summer. Cattle are well distributed throughout the Complex by numerous well-maintained livestock waters.

The permittee applies for full use of his grazing permit each year, but varies the number of cattle grazed based on climate condition. In 2002/2003, the permittee voluntarily reduced his herd due to drought and has since gradually increased livestock to full permitted numbers because of adequate rainfall. Historical use data is located in RHE Section 7.0 *Management Evaluation and Summary of Studies Data*.

The Buckhorn allotment lies entirely within Yavapai County at higher elevations than most areas of the Desert Hills lease or allotment. For this reason, the Buckhorn Allotment is used by the permittee primarily as a summer allotment in an informal rotational grazing system. The lessee acquired the lease for this allotment in 1997.

¹ All references in this document are on file with project record, BLM Hassayampa Field Office, 21605 North 7th Avenue, Phoenix, Arizona 85027.

Table 1 Desert Hills Allotment Profile

Desert Hills Allotment Profile Categories	Desert Hills Allotment Profile Data
Lessee	Maughan Ranches
Percent/Acres BLM Land	64 percent/5,911 acres
Percent/Acres State Land	18 percent/1,692
Percent/Acres Private Land	18 percent/1,625
Grazing Preference	365 Animal Unit Months (AUMs)
Season of Use	Yearlong
Range Classification	Perennial
Management Category	Maintain
Kind and class of livestock use	39 Cattle

Table 2 Desert Hills Lease Profile

Desert Hills Lease Profile Categories	Desert Hills Lease Profile Data
Lessee	Maughan Ranches
Percent/Acres BLM Land	64 percent/5,380 acres
Percent/Acres State Land	18 percent/4,952
Grazing Preference	432 AUMs
Season of Use	Yearlong
Range Classification	Perennial
Management Category	Maintain
Kind and class of livestock use	36 Cattle

Table 3 Buckhorn Allotment Profile

Buckhorn Allotment Profile Categories	Buckhorn Allotment Profile Data
Lessee	Maughan Ranches
Percent/Acres BLM Land	47 percent/6,789 acres
Percent/Acres State Land	46 percent/6,557
Percent/Acres Private Land	7 percent/970
Grazing Preference	924 AUMs
Season of Use	Yearlong
Range Classification	Perennial
Management Category	Maintain
Kind and class of livestock use	170 Cattle and 5 horses

Range improvements

The range improvement projects on the Desert Hills Complex were inspected in 2009 and 2010. Most were functioning properly. All fences are maintained on a regular basis, and repaired when necessary. Most water developments are maintained regularly. A description of existing range improvements is available in RHE Section 2.0 *Profile and Land Status*.

Purpose and Need

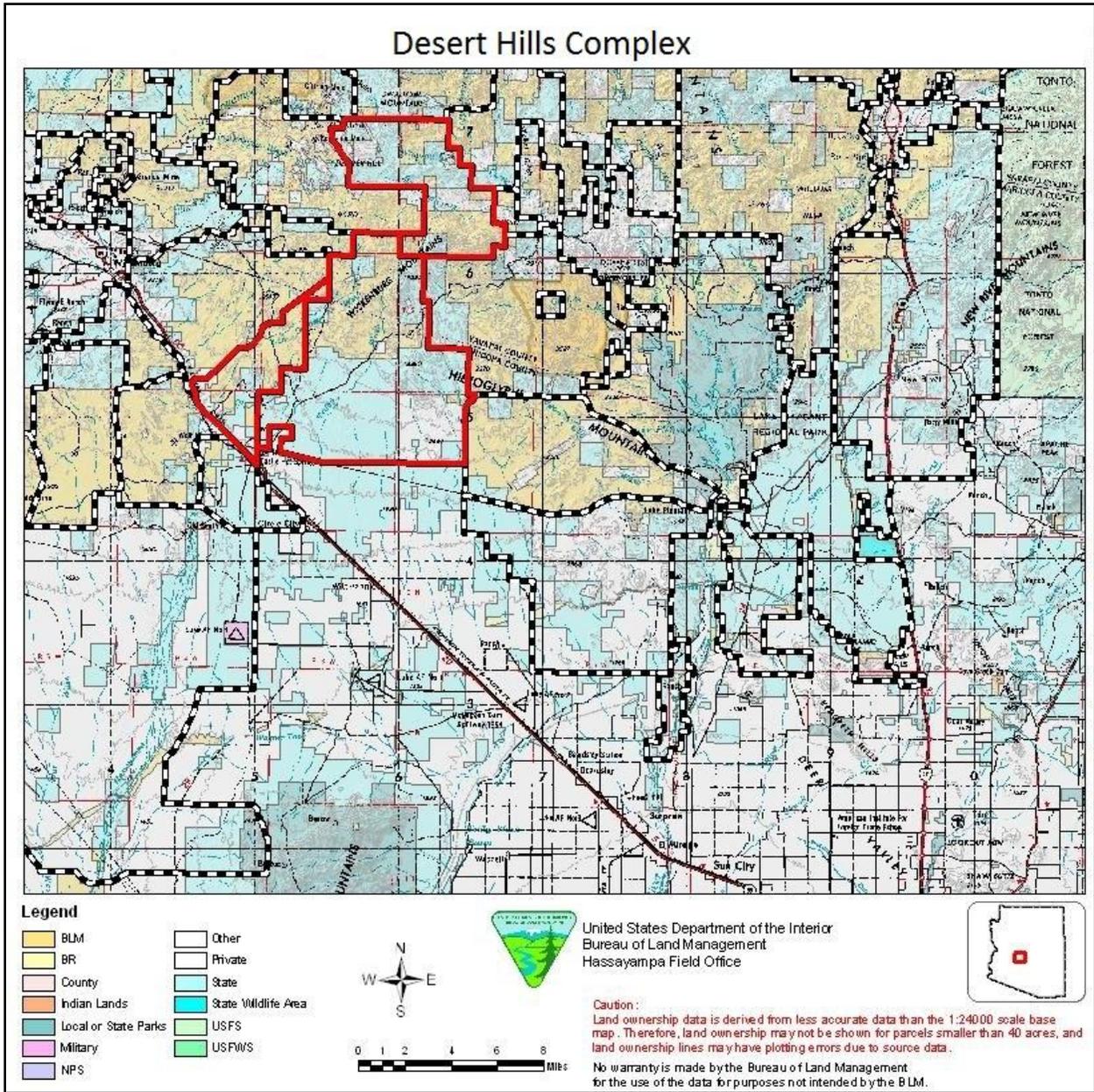
The purpose of this action is to consider livestock grazing opportunities on public lands where consistent with management objectives, including the BLM *Arizona Standards for Rangeland Health and Guidelines for Livestock Grazing Management* (Land Health Standards) (BLM 1997).

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 Bradshaw-Harquahala 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 Field Office (FO). The RMP allocated public lands within the Desert Hills 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 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 Desert Hills Complex determined that Standards 1 and 3 are being achieved, while Standard 2 is not achieved on Buzzard Roost Creek.

Decision to be Made

The Hassayampa Field Manager is the authorized officer responsible for the decisions regarding management of public lands within this allotment. Based on the results of the NEPA analysis, the authorized officer will determine whether the impacts of the alternatives described in this analysis are significant and would require preparation of 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 lease. If renewed, management actions, mitigation measures, and monitoring requirements will be prescribed for the Desert Hills Complex to ensure management objectives and Land Health Standards continue to be achieved or make significant progress toward achievement.



asked to comment on the RHE and the Proposed Action. The scoping period was July 12 through July 22. Two external scoping responses were received. Scoping comments are summarized in Appendix B.

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 Planning Team (IDT) carefully considered comments by BLM specialists, interested publics, the permittee, and affected agencies in order to identify issues relevant to issuing three 10-year grazing permits and/or leases. Comments that did not meet the criteria to be an issue statement are addressed in Appendix B – Response to Comments. The issues derived from internal and external scoping on technical recommendations of the Desert Hills Complex RHE are as follows:

- Issue 1 – Upland vegetation: How does drought-related die-back of palatable upland vegetation inform stocking rates?
- Issue 2 – Upland vegetation: How would continued livestock grazing affect the health of upland vegetation?
- Issue 3 – Riparian Systems: How would continued livestock grazing impact riparian areas and riparian-dependent species?
- Issue 4 – Riparian Systems: How would seasonal use by livestock affect riparian area vegetation?
- Issue 5 – Non-native Invasive Vegetation: How would continued livestock grazing contribute to spread of non-native, invasive plants? If a positive correlation exists, would invasive species affect the ecological function of native plant communities, such as natural fire regimes?
- Issue 6 – Soils: Does livestock grazing affect cryptogamic crust presence?
- Issue 7 – Hydrology: What is the effect of groundwater pumping on surface water availability in riparian areas for riparian-obligate vegetation?
- Issue 8 – Hydrology: Is livestock infrastructure (water pumping, diversions) contributing to the drying of Buzzard Roost Creek East?
- Issue 9 – Wildlife: How would riparian area fencing affect wildlife use of the riparian area?
- Issue 10 – Wildlife: What is the status of Gila Topminnow and Desert Pupfish in Buckhorn Spring? How does livestock grazing affect these species?

Conformance with Land Use Plan

Rangeland management decisions in the Bradshaw-Harquahala RMP³ 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

³ Management decisions applicable to Rangeland Management (GM) are numbered and listed on pages 49-52 of the web version Bradshaw-Harquahala RMP (BLM 2010).

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 Desired Plant Community (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 recognize grazing as a valid use of the public lands and require BLM to manage livestock grazing in the context of multiple use. Additionally, livestock grazing on public lands is managed according to grazing regulations found 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 Desert Hills allotment is a Section 3 grazing permit; the Desert Hills lease and the Buckhorn allotment are Section 15 grazing leases.

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 (USFWS 2006a, 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
- 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 four alternatives – Proposed Action, No Action, Active Management, and No Grazing – based on the analysis and technical recommendations presented in the Desert Hills Complex RHE, 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.

Monitoring

Rangeland monitoring would continue to analyze the effects of livestock use within the Desert Hills Complex. Section 6.0 of the Desert Hills Complex RHE describes the methodology used to inventory, monitor, and analyze data collected.

Alternative A – Proposed Action

The Proposed Action is to renew the Desert Hills Complex permits and leases for a period of 10 years with the following terms and conditions (Table 4).

Table 4 Desert Hills Complex Terms and Conditions

Allotment	Livestock Number and Kind	Grazing Period	AUMs	Percent Public Land
Desert Hills allotment	39 Cattle	3/01 – 2/28	365	78% Active
Desert Hills lease	36 Cattle	3/01 – 2/28	432	100% Active
Buckhorn allotment	170 Cattle 5 Horse	3/01 – 2/28	924	44% Active

Other Terms and Conditions

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

1. Authorized livestock use in Buckhorn Allotment – Buzzard Roost Creek riparian area is limited to November 1 through March 1 annually.
2. 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.
3. The 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)).
4. Pursuant to 43 CFR 10.4(b), the BLM Hassayampa Field Manager must be notified by telephone with written confirmation immediately upon the discovery of human remains, funerary objects, sacred objects, or objects of cultural patrimony (as defined in 43 CFR 10.2) on federal lands. Pursuant to 43 CFR 10.4(c), any ongoing activities connected with such discovery must be stopped immediately and a reasonable effort to protect the discovered remains or objects must be made. Protection of the immediate area of the discovery shall continue until notified by the authorized officer that operations may resume.

Administrative Actions

In addition, the BLM would implement the following:

- Adaptive Management: If measures of annual use indicate that the current grazing intensity or strategy is not being achieved or is inconsistent with achieving the DPC objectives in riparian and key areas, then the BLM and the permittee/lessee would identify appropriate and timely actions to correct the root cause, and implement that action. Additional environmental analysis would occur prior to implementation if necessary.
- No road construction would be permitted in conjunction with the Proposed Action. Routine maintenance would be performed on existing range improvements as required.

Range Improvements

Approximately seven miles of four-strand pasture fence would be constructed on the Desert Hills lease and Desert Hills allotment (Figure 2). Riparian areas within the Buckhorn allotment would be fenced for seasonal livestock use from November 1 through March 1 annually. Fencing would be installed per BLM standards in BLM Handbook 1741-1 (BLM 1989). Pasture fencing would be constructed as 4-strand fence, smooth wire along the lowest strand, with posts approximately 22 inches on center with 3 fence stays between posts. Stress, corner, and end panels would be installed as necessary. Stress panels would not be placed more than ¼ mile apart. Riparian fencing would be constructed as 4-strand fence, smooth wire along the upper and lower strand, with posts approximately 16 inches on center with 2 fence stays between posts. Stress, corner, and end panels would be installed as necessary.

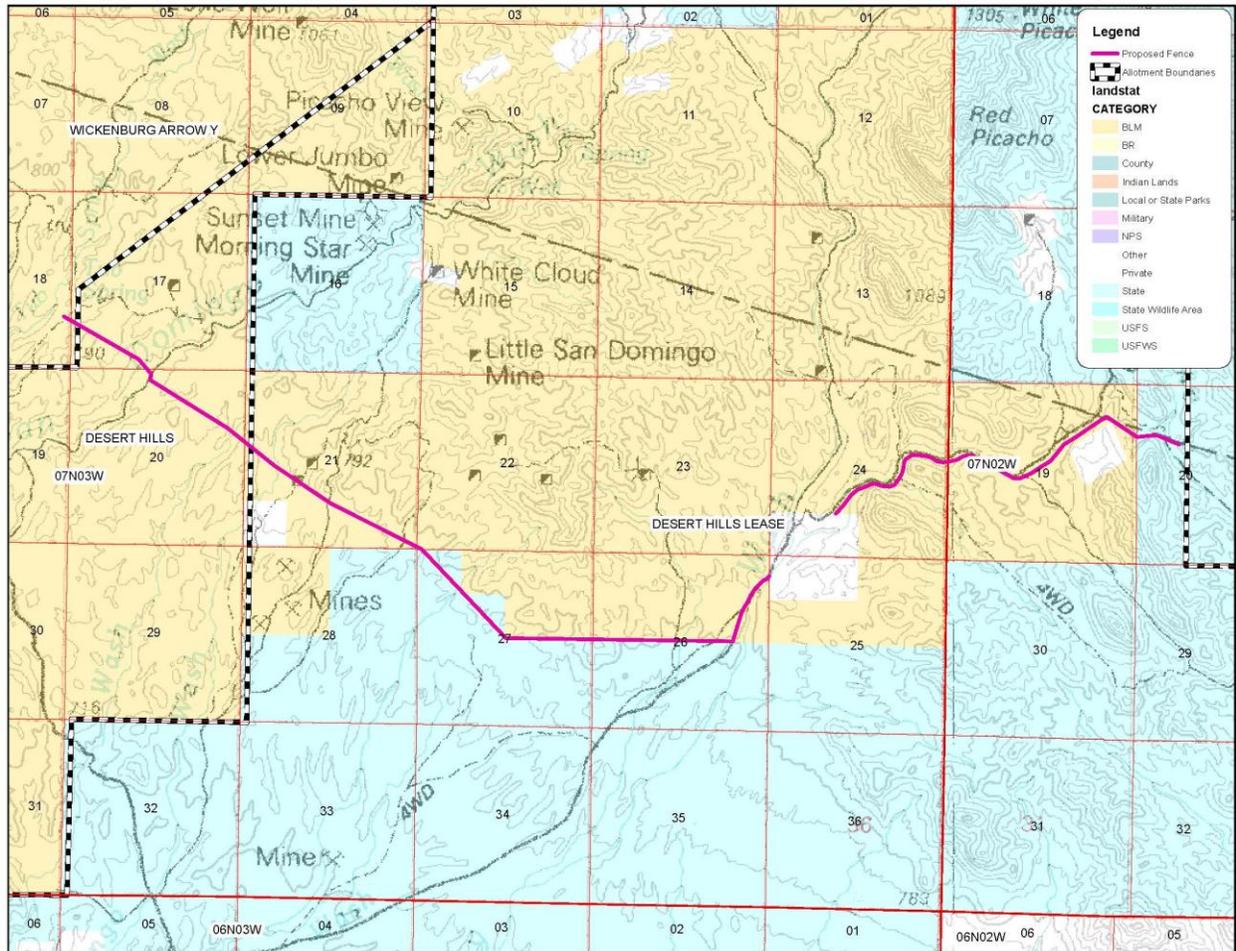


Figure 2 Location of Proposed Pasture Fence Running Through the Desert Hills Lease and Desert Hills Allotment

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 Desert Hills allotment permit, Desert Hills lease, and Buckhorn allotment lease for a period of 10 years under the existing terms and conditions (Table 4). Pasture and riparian area fencing would not be constructed. Seasonal use restrictions would not be placed on the Buzzard Roost Creek riparian area. No restrictions would be placed on supplement placement.

Alternative C – Active Herding

This alternative was designed by the IDT in response to Issue 4 regarding the appropriate season of use for livestock grazing in riparian areas. This action is similar to the Proposed Action, but season of use stipulations on the riparian areas of the Buckhorn allotment would be managed through active herding. Season of use in the Buzzard Roost Creek riparian areas would be limited to winter months. All animals would be removed from the riparian areas within a week of initial spring plant green-up. Monitoring would be conducted at the start and end of the grazing season, and during the growing season to ensure compliance. This monitoring would take place over the first three years of the reissued permit. After three years the effectiveness of active herding would be assessed. In the case that active herding has not been effective, a livestock enclosure fence similar to that described in the Proposed Action would be constructed around the riparian area. Monitoring would continue another three years. In the case that riparian condition has not improved, winter season of use would be discontinued and the riparian pasture would be retired from use for the duration of the grazing lease.

Under this alternative, the additional terms and conditions added to the permit and leases would be the same as for the Proposed Action, with the exception of the season of use restriction. Under this alternative, the season of use restriction on the lease would be: “Livestock grazing is authorized in the Buzzard Roost Creek riparian areas beginning November 1 and ending within a week of the start of the following growing season, as determined by the Authorized Officer.”

Alternative D – 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 on the Desert Hills 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 in response to comments received during public scoping (see Appendix B, comments 15 and 36). 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.

The IDT developed a “reduced grazing” alternative in response to Issue 1: *How does drought-related die-back of palatable upland vegetation inform stocking rates?*

Rather than select an arbitrary number or percentage of reduction, the BLM typically uses a “desired stocking rate analysis”⁴ to estimate livestock carrying capacity on an allotment. 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.

Estimated carrying capacity was calculated to be 449 AUMs on the Desert Hills lease and allotment, and 2,207 on the Buckhorn allotment. The stocking rate analysis used key area utilization data from 2009, 2011, and 2012. 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

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

Desired or objective utilization levels for the allotment were calculated using 40 percent for herbaceous or palatable shrub species established in the RHE. 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.

The stocking rate analysis showed that the potential stocking rate for the Desert Hills allotment was 673 AUMs and 56 head of livestock. The allotment is currently stocked at 365 AUMs for 39 head of livestock.

⁴ 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.

For the Desert Hills lease the potential stocking rate is 449 AUMs and 37 head of livestock. The lease is currently stocked at 432 AUMs and 36 head of livestock. For the Buckhorn allotment the potential stocking rate is 2,759 AUMs and 230 head of livestock. The Buckhorn allotment is currently stocked 924 AUMs and 170 cattle and 5 horses. The analysis shows that the current stocking rates for the Desert Hills Complex fall within the rates determined in the stocking rate analysis.

A reduced grazing alternative was not analyzed in detail because the current alternatives sufficiently illustrate the full range of expected impacts since the land health standards are currently being met on the uplands. Riparian standards are not met: modifications to the lease as proposed under the Proposed Action and the active herding component of Alternative C are designed to ensure future compliance with Standards. The carrying capacity analysis demonstrates that utilization is within the desired range under current stocking rates. The IDT determined that the alternative would have substantially similar effects as an alternative (Proposed Action and No Action) that is being analyzed in detail in this EA. Therefore, the alternative is removed from detailed analysis.

Actual use alternative

This alternative was proposed and considered by the IDT to respond to a comment received during scoping (comment 36, Appendix B) Actual use is defined as the location, duration and intensity (livestock numbers) within an allotment across the course of a grazing year. Because the permittee has been running full preference since 2008, this alternative is substantially similar to the no action alternative, which is analyzed in detail in this EA. Therefore, this alternative is removed from detailed analysis.

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, riparian vegetation, invasive plants, soil resources, riparian and groundwater 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 Desert Hills allotment, Desert Hills lease, and Buckhorn allotment are three contiguous parcels of public rangeland administrated by the Bureau of Land Management, Hassayampa Field Office. The Desert Hills Complex is located in Sonoran-Mojave shrub mix desert east of Wickenburg, Arizona and northeast of Highway 60 and the Hassayampa River. It covers approximately 57,548 acres. The BLM-administered portion of the Complex is approximately 23,192 acres. The remaining acreage is Arizona State Trust Lands (31,575 acres) or privately owned (2,781 acres). The Desert Hills lease and allotment, and Buckhorn allotment are located in Maricopa and Yavapai Counties. The Complex encompasses portions of Township 6 North, Ranges 2 and 3 West; Township 7 North, Ranges 2, 3 and 4 West; and Township 8 North, Ranges 2 and 3 West. The terrain is gently rolling to steep hills and mountains that are bisected by numerous drainage ways, including San Domingo, Trilby, and Ruby Washes (refer to Figure 1 for location of the Desert Hills Complex).

Upland Vegetation

Affected Environment

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

Issue 1 – Upland vegetation: *How does drought-related die-back of palatable upland vegetation inform stocking rates?*

Issue 2 – Upland vegetation: *How would continued livestock grazing affect the health of upland vegetation?*

The RHE for the Desert Hills Complex 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, exhibiting good abundance and vigor with little utilization. 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 2008/2009, and again in 2011/2012 to determine whether indicators of ecological processes conform to the land health standards. A key area is an indicator area that represents a larger ecological site. Key areas reflect the current grazing management over similar areas in the unit and serve as representative samples of range condition, trend, use and production. A total of 9 key areas have been established across the Desert Hills Complex: six key areas on the Desert Hills lease and Desert Hills allotment, and three key areas on the Buckhorn allotment (RHE Section 7.3 Summary of Data for the Desert Hills Complex).

Eight out of nine key areas on the Complex have ratings of “None or Slight” for deviations from the Ecological Site Descriptions (ESDs). The only exception is Desert Hills Key Area 4 that scored “Slight to Moderate”. This rating does not appear to be caused by overuse by livestock, as indicated by light utilization on key forage species (see Table 7.3.5 in RHE) and little past or current cattle sign in the area. Key Area 4 is also the lowest in elevation of all key areas, located in the 7 inches to 10 inches precipitation zone, which limits vegetation production potential. A “Slight to Moderate” rating indicates that this site is functioning within the natural range of variability for this ecological site (BLM 2005).

Desired Plant Community (DPC) objectives are established for each key area within the Desert Hills Complex. DPC objectives address the desired resource conditions based on vegetation attributes, such as composition, structure, and cover that are desired within the allotment. DPC objectives can be found in the Desert Hills Complex RHE.

All DPC objectives are being achieved at Desert Hills Key Areas 1, 4, and 5. DPC objectives are partially met at Desert Hills Key Areas 2, 3, and 6: The desired perennial grass component was not met at Key Areas 3 and 6, and the desired vegetative cover was not achieved at Key Area 3 (see Section 8 in RHE). However, data indicate that progress is being made toward meeting these objectives. At Key Areas 3 and 6, the high browse component helped offset the lack of perennial grasses. In contrast, Key Area 2 lacked the desired browse component, but had abundant perennial grasses on site.

Utilization was classified between ‘negligible’ to ‘light’ at all key areas in 2008 and 2009. Utilization was classified as ‘moderate’ at Desert Hills Key Areas 1 and 2 during 2011/2012, while remaining largely unchanged for all other key areas. Key Areas 1 and 2 are located in the northern section of the Desert Hills allotment, where utilization has been higher. Utilization data do not indicate that current levels of livestock use are a causal factor for not achieving the DPC objectives.

When comparing frequency and cover data from 1987 to 2008 or 2009 it is evident that the historical key areas have improved (data contained in RHE Appendix A). Highly preferred and palatable species have increased and less desirable species have declined. Recruitment of plant species across the community is excellent. Overall, the RHE reported that the Desert Hills Complex is meeting all land health standards in the upland areas. All nine sites across the Complex are consistent with ESDs in soil/site stability, hydrologic function, and biotic integrity.

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 for Key Areas 3 and 6, livestock use patterns are higher in the southern portion of the Desert Hills allotment, and utilization at Key Areas 1 and 2 was increasing.

The Proposed Action is intended to address and improve conditions related to upland vegetation by restricting supplements within 1/4 mile of watering facilities or 1/8 mile upslope from drainages and dry washes, and constructing approximately seven miles of pasture fence on the Desert Hills lease and allotment.

The restrictions on mineral placement should improve or meet the perennial grass objectives at Key Area 6, where DPC objectives were partially met, with only 1 percent compared to the desired 5 percent perennial grass found along the “green line” of this sandy wash site. The restrictions on mineral placement should help move livestock from this area. In addition, the steep western slope of this wash held grasses that were vigorous and seeding out at the time of the 2009 inspection. While grasses are limited on the east side of the wash, the west side (facing east toward the wash) should be capable of replenishing the seedbank for the area.

Utilization levels indicate use patterns that are greater on the southern portions of BLM administered lands within the Desert Hills allotment. Construction of the pasture fence would facilitate improved livestock distribution and should result in more uniform utilization across the allotment. In addition, restrictions on supplement placement should pull livestock away from sensitive areas where livestock may concentrate. Improving livestock distribution would allow upland vegetation to maintain vigor, productivity, species composition, and cover over the current situation. It is possible that livestock may create trails along both sides of the pasture division fence and in the process trample some upland vegetation.

From 2008/2009 to 2011/2012, utilization rates rose from ‘light’ to ‘moderate’ at Key Areas 1 and 2. Improving livestock distribution would be expected to reduce grazing pressure at these key areas.

As stated in the RHE, attempting to improve site conditions for Key Area 3, which failed to meet DPC objectives for perennial grass composition and vegetative cover, may not be feasible; however, improved livestock distribution could help. This key area is a shrub-dominated site, with two key forage species comprising up to 33 percent of total plant composition on the site, well above DPC objectives. The high browse component helps to offset the low grass component. This site is very well-armored and stabilized with 53 percent gravel and stone cover, so the risk of erosion is minimal.

The current stocking rate would be maintained under this alternative. The stocking rate analysis showed that even with the die-back of palatable upland vegetation within the Complex, the die-back did not have a detrimental effect on stocking rate. In addition, 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. Aside from one key area on the Desert Hills lease, the stocking rate analysis showed there would be adequate carrying capacity in the Desert Hills and Buckhorn allotments to maintain current stock rates under drought conditions.

In conclusion, under the Proposed Action, land 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 at Key Area 6 and potentially Key Area 3. Utilization at Key Areas 1 and 2 would stabilize and possibly improve with reduced livestock concentration.

Alternative B – No Action

Under this alternative, no restrictions would be placed on locating mineral supplements and the pasture fence would not be constructed. As a result it is expected that under the No Action scenario more trampling would occur near water developments compared to the Proposed Action. In addition, the

southern portions of the Complex would continue to receive higher grazing pressure than the northern portions. Overall, livestock distribution would not be expected to change.

The Proposed Action is designed to improve upland vegetation conditions across the allotment, including the utilization increases recorded at Key Areas 1 and 2, and the failure to achieve the perennial grass component at Key Areas 3 and 6. Under the No Action alternative, it is expected that these conditions would not improve.

Alternative C – Active Herding

Alternative C would have the same effects to upland vegetation as described for the Proposed Action. The active herding component of this alternative is designed to enhance conditions within riparian areas at Buzzard Roost Creek, and therefore would not be expected to have beyond a minimal positive impact to upland vegetation. As a result, the effect of drought-related die-back of palatable upland vegetation on stocking rates of this alternative would be the same as Alternative A. Standards for upland vegetation would continue to be met, and improvement in DPC objectives for Key Areas 3 and 6 would be expected as described for the Proposed Action.

Alternative D – No Grazing

Since no grazing would occur, there is no effect on stocking rates from the die-back of palatable upland vegetation.

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.

Riparian Vegetation

The analysis of riparian systems responds to two issues identified during scoping that could have impacts from the various alternatives:

Issue 3 – Riparian Systems: *How would continued livestock grazing impact riparian areas and riparian-dependent species?*

Issue 4 – Riparian Systems: *How would seasonal use by livestock affect riparian area vegetation?*

Affected Environment

There are three riparian areas within the Buckhorn allotment: Buckhorn Creek on the south end of the allotment; and two reaches of Buzzard Roost Creek (west and east) in the northwest corner of the

allotment. No riparian areas administered by the BLM are located within the Desert Hills allotment and lease.

Riparian areas within the Complex were evaluated in 2012 using the Proper Functioning Condition methodology, as defined in BLM Technical References 1737-8 and 1737-15 (Winward 2000, Prichard 1998). Riparian areas are evaluated, and categorized as Proper Functioning Condition (PFC), Functional At Risk (FAR), or Non-Functional. In the case of riparian areas classified as FAR, an apparent trend rating of upward, downward, or not apparent is assigned.

Two of the riparian areas (Buckhorn Spring and Buzzard Roost Creek west) were found to be in PFC. However, Buzzard Roost Creek east was found to be FAR. The rationale for a FAR rating was that there was insufficient riparian vegetative cover present in much of the reach to protect banks and dissipate energy during high flow events, there were no seedling and young age-class riparian trees, and the system was not vertically stable in the lower end of the reach. Due to the sparse cover of riparian obligate species, and the lack of seedling and young age classes of riparian trees, this riparian area does not meet the DPC objectives.

Riparian areas were also assessed under land health standards 2 (riparian-wetland sites) and 3 (Desired Resource Conditions). Buckhorn Springs and Buzzard Roost Creek west both met Standard 2. Buzzard Roost Creek east did not meet Standard 2 due to its FAR rating.

Buckhorn Springs also met Standard 3 for desired resource conditions. Both reaches of Buzzard Roost Creek however failed to meet Standard 3. The west reach was found to have a well-developed overstory but lacked seedlings and young age classes of riparian trees. The east reach also lacked seedlings and young age classes of trees, as well as lacking vegetative cover necessary to meet DPC objectives.

Drought has had an indirect effect on riparian systems. Buzzard Roost Creek east has been dry for several years, resulting in low vigor in existing riparian-dependent species and a lack of establishment of new species.

Environmental Consequences

Alternative A – Proposed Action

Under the Proposed Action riparian vegetation in the Buckhorn allotment would only be grazed in the winter months, from November 1 to March 1, when riparian species are dormant and not actively growing. This proposed change in the grazing season would remove livestock during the summer months when riparian-dependent species actively grow.

Winter-only grazing of riparian systems would help with recruitment and survival of cottonwood, willow, ash, and sycamore trees. It would also reduce livestock loafing along creek bottoms, which degrades streambanks and alters channel morphology. Over time, the removal of livestock from creek bottoms should help increase the channel width-to-depth ratio and create a deeper channel with more pools. In addition, the change in grazing seasons should allow the accumulation of vegetation in the herbaceous layer that protects the natural function of streams. These effects would be expected to increase the diversity and abundance of riparian-dependent species and their complexity.

The proposed fencing of the riparian areas on the Buckhorn allotment would eliminate livestock impacts to the riparian areas, especially in Buzzard Roost Creek East. In this stretch, grazing has caused riparian-dependent species to lose vigor and slowly be replaced by upland species along the stream's greenline.

Loss of riparian-dependent species has led to bank instability along the greenline, resulting in downcutting of the stream channel in some reaches from high flow events.

Proposed restrictions on supplement placement (outside 1/8 mile from drainages) would help move livestock away from washes and would reduce grazing pressure in riparian areas.

With winter grazing and fencing, riparian systems in Buzzard Roost Creek would improve more quickly from the effects of livestock grazing than under Alternative B. In Buzzard Roost Creek west the number of seedling age class riparian trees should increase to meet DPC objectives. The riparian system in Buzzard Roost Creek west would improve in riparian condition if water became present to rehydrate the stream, seedling and young age class riparian trees would eventually become established and riparian cover would increase. It would take a longer time for Buzzard Roost Creek east to eventually reach PFC and meet DPC objectives, but the Proposed Action should eventually result in an upward trend.

Alternative B – No Action

Under this alternative, the riparian systems in Buzzard Roost Creek would continue to be grazed during the spring and summer months when riparian dependent species would be actively growing. Without riparian fencing, livestock would continue impacting the riparian systems in the Buckhorn allotment. With grazing occurring during the spring and summer and the lack of protection from fencing to limit the intensity of livestock grazing, riparian-dependent species would continue to lose their vigor and would eventually be replaced by upland species that do not have the beneficial soil-holding root systems that riparian species have. With nothing to stabilize the soil along the streambanks, downcutting would continue to occur along Buzzard Creek. Under the No Action alternative, riparian systems in Buzzard Creek East would not reach PFC and not meet DPC objectives. The condition of riparian reaches in Buzzard Creek west would likely remain in PFC, but livestock use would continue to put pressure on riparian vegetation.

Alternative C – Active Herding

Active Herding would be monitored for three years. If effective, riparian condition on the two Buzzard Roost Creek riparian systems would improve, but to a lesser extent than Alternative A because it is believed that fencing and seasonal grazing are more effective than active herding. If active herding management is unsuccessful, the effects would be similar to Alternative B, where riparian system objectives would likely not be met.

If after three years of active herding there is no improvement of riparian conditions, fencing of riparian systems in Buzzard Roost Creek as described under the Proposed Action would be employed. Under this scenario, there would be improvements in riparian condition but less so than Alternative A because livestock would continue to have access to riparian areas for limited amounts of time before being removed through herding. After an additional three years of monitoring, if riparian fencing does not lead to improvement in riparian condition, the riparian systems in Buzzard Roost Creek would be excluded from grazing. This last action would improve riparian conditions to a greater extent than Alternative A, but would reduce available forage and put more pressure on adjacent uplands to provide forage for livestock.

Mineral placement restrictions would be the same as proposed under the Proposed Action.

Alternative D – No Grazing

With the total exclusion of livestock, this alternative would provide the greatest improvement of the riparian conditions on the Buzzard Roost Creek riparian systems when compared to the other alternatives. Except for some grazing by wildlife, the riparian systems would be rested, and would improve in vigor. Riparian-dependent species over time would be expected to replace upland species along the streambanks. Vegetation cover would increase, and areas with headcutting and downcutting would slowly recover. Recruitment of riparian dependent species would increase, and establishment of seedling and young age class trees would take place. Plant diversity and habitat complexity should increase over time. Both riparian systems in Buzzard Roost Creek would be expected to reach PFC and meet DPC objectives in all reaches more rapidly than all other alternatives.

Invasive Plants

Affected Environment

This section addresses public comments received regarding the presence of invasive plant species within the Desert Hills Complex. The comments resulted in Issue 5: *How would continued livestock grazing contribute to the spread of non-native, invasive plants? If a positive correlation exists, would invasive species affect the ecological function of native plant communities, such as natural fire regimes?*

Red brome (*Bromus rubens*) is present on the Complex and was noted in Buckhorn Key Area 3 and along the east stretch of Buzzard Roost Creek. A non-native, invasive plant, red brome is not highly competitive with established perennials, especially native grasses (Halvorson and Guertin 2003, USDA 2012). The plant has a short growing season and low palatability.

Red brome can alter the fire regime in native desert plant communities by increasing fuel loads and shortening the fire return interval (Simonin 2001). This increased fire activity can adversely affect native species. However, the abundance of red brome in the project area is limited due to low precipitation. During dry seasons, red brome is typically only found in shaded areas, and not in the interspace areas between vegetation. This patchiness does not support continuous fuel loading to carry wildfire.

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. For five of the key areas, monitoring found that departure from the ESD for invasive species was “none to slight”. The departure was classified as “slight to moderate” for Desert Hills Key Area 4, and all three key areas on the Buckhorn allotment. For all four sites, utilization was found to be negligible to slight, indicating that grazing pressure was not a contributing factor to the presence of invasive plants. All three buckhorn key areas were found to have the expected vegetative communities well-represented on the 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).

The Hassayampa FO is not managing for red brome.⁵ No noxious weeds have been identified on the allotment.

⁵ Personal communication with Amanda James, BLM, November 21, 2013.

Environmental Consequences

Alternative A – Proposed Action

Red brome cannot be eradicated from desert ecosystems. However, proper grazing management to maintain the desired plant communities for the ecological site will aid in suppression of red brome and other undesirable plant species (USDA 2012). Establishing and maintaining competitive grasses can minimize the invasion and spread of rangeland weeds (Sheley 1995).

The Proposed Action was designed to address the areas of potential concern noted in the RHE. The restrictions on mineral placement should improve or meet the perennial grass objectives at Key Area 6. The restrictions on mineral placement should help move livestock from this area. Construction of the pasture fence would facilitate improved livestock distribution. Improving livestock distribution would allow upland vegetation to maintain vigor, productivity, species composition, and cover over the current situation.

As stated above, 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. Under the Proposed Action it is expected that rangeland health conditions would be maintained or improved, and continued livestock grazing would not contribute to the spread of non-native, invasive plants.

Alternative B – No Action

Under the No Action alternative, the season of use and livestock distribution (pasture 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 – Active Herding

Alternative C would have the same effects to the presence and distribution of invasive plants as described for the Proposed Action. The active herding component of this alternative is designed to enhance conditions within riparian areas at Buckhorn Springs, and therefore would not affect the expected condition of upland vegetation: maintaining the desired plant communities for these ecological sites is the most effective means of controlling the spread of invasive plant species. Maintaining DPC objectives would provide conditions under which native plant species would continue to outcompete red brome, and therefore the presence of red brome would not be expected to alter the existing fire regime.

Alternative D – 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 allotment.

Studies have demonstrated that an intermediate level of cattle grazing may maintain greater levels of native plant diversity, while cattle removal resulted in little increase in native plant cover and reduced plant species richness relative to the moderate grazing control (Loeser et al. 2007).

Although livestock grazing is observed to be one of the disturbance types that influence the invasive potential of the species (Halvorson and Guertin 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 allotment.

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 allotment.

Soil Resources

This section responds to Issue 6: *Does livestock grazing affect cryptogammic crust presence?*

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 310 tons per acre per year assuming no groundcover. The estimates for the Buckhorn allotment are 38 tons to 56 tons/acre/year. For the Desert Hills lease and allotment, the estimates are zero (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. Compaction and trailing from cattle can exacerbate erosion when trails align with water flow pathways. This condition was noted at Desert Hills Key Areas 1 and 4, and Buckhorn Key Area 2, though occurrences were minimal and localized.

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 nine key areas showed only slight sign of active surface erosion suggesting stable soils. These areas showed slight to moderate departures for rilling. Key Area 4 had signs of pedestalling that indicates some loss of topsoil. The RHE findings did not suggest impaired conditions given the expected cactus and shrub abundance at the site.

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 cryptogammic crusts, for soil biologic function. Within the key areas, biologic soil crusts were only observed at Key Area 2, and accounted for only one percent groundcover. 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. However, slight to moderate departure for soil aggregation was observed at Key Area 4.

The ESDs for the key areas does 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 frequency score of 35 percent.

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 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, twig and roots. Grasses and herbs which livestock target consist of a minor part of the plant community at 6 percent to 53 percent of the vegetation. Monitoring measured litter to be 11percent to 53 percent total groundcover at the key sites. 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 and distribution across the Complex by restricting placement of mineral block to lower the pressure on forage vegetation in livestock concentrating areas, as well as construction of pasture fencing to improve livestock distribution. 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 around riparian areas.

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 6 percent to 60 percent with less than 10 percent expected grasses on these ecosites. The monitoring showed bare soils ranged from 0 percent to two percent, largely because of the rocky surface conditions. Gravel and stone ranged from 12 percent to 58 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.

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 – Active Herding

The intent of active herding is to improve the dispersal of livestock to avoid concentrated grazing impacts. Potential benefits would be less gathering areas with a reduction in overall compaction, bare soil and erosion. The expected affects are similar to those described for the Proposed Action above.

Alternative D – 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 Chihuahua 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 (Loeser et al. 2006).

Groundwater Resources

Affected Environment

This section addresses two issues raised during scoping for this project:

Issue 9 – Hydrology: *What is the effect of groundwater pumping on surface water availability in riparian areas for riparian-obligate vegetation?*

Issue 10 – Hydrology: *Is livestock infrastructure (water pumping, diversions) contributing to the drying of Buzzard Roost Creek East?*

Range improvements on the Complex are listed in Tables 1, 2, and 3 of the Desert Hills RHE. Eleven water developments currently are maintained across the Complex, although three are in need of

reconstruction due to failure. Three of the water developments located on public lands pump groundwater: Molina Well and Schooler Well on the Desert Hills allotment and Hackberry Pasture windmill on the Buckhorn allotment. The wells feed into 10,000 gallon storage tanks for livestock watering.

Precipitation

The Buckhorn Mountains in the center of the complex and Bradshaw Mountains on the western edge are the highest points in the project area. Annual precipitation ranges from a low of 10 inches in the Desert Hills allotment at the lowest slopes to a high of about 28 inches in the Buckhorn Mountains – the source of Buckhorn Spring – and 20 inches in the Bradshaws from which Buzzard Roost Creek flows. The highest ridges are 4,000 feet to 4,500 feet elevation.

Mean minimum temperatures for the Buckhorn Mountains are 48 degrees Fahrenheit (F) up to 53.6 degrees F on the lower slopes outside of Wickenburg. Average annual precipitation across the allotments is about 24 inches for Buckhorn allotment, and 17 inches for Desert Hills allotment and lease (PRISM 2013). These precipitation values are somewhat higher than those reported in the Desert Hills RHE because a longer period of record was used (30-year normal).

Buzzard Roost Creek east was noted as flowing perennially in a 1991 visit, with longfin dace and native frogs present (BLM 2013). There was flowing water in the channel in 1998 and 2010 visits (both in spring months) and none in 2009 and 2012. Reasons given in the RHE were a lowered water table directly and indirectly related to climatic conditions.

Figure 3 below gives the 30-year normal for Wickenburg weather station (2013). The Wickenburg station is the closest to the project area with a full period of record. However, the precipitation totals at the elevation of the station (2,000 feet) are not sufficient to promote perennial flow. It is likely that the headwater elevation of Buzzard Creek is too low to provide reliable perennial flow. The year 1991 was average and the few preceding years below average, though the average for the decade preceding (1981 to 1990), 13.06 inches, was 24 percent higher than the years 2003 through 2012, with 10.5 inches.

From the figure below it can be seen that years 1998 and 2010 were notable peaks in precipitation totals and that years 2009 and 2012 were low. It is also worth noting that the Buzzard Creek west site on the same date in 2009 had flowing water, yet this reach is also isolated occurrence of as is Buzzard Creek east, with no flow immediately above or below.

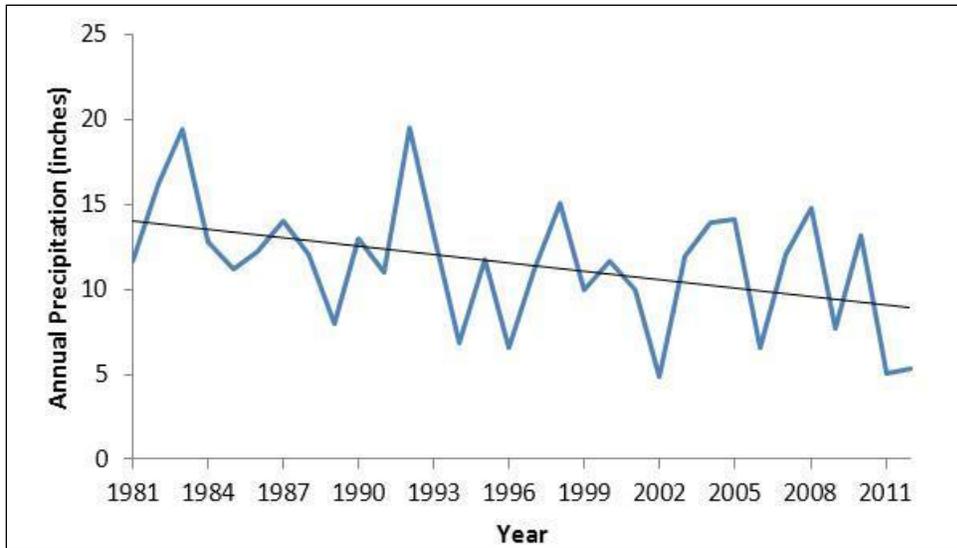


Figure 3 Trend of Annual Precipitation-Wickenburg

Groundwater Basins

The project area lies in two groundwater basins: the Upper Hassayampa groundwater basin, and the Phoenix Active Management Area (AMA) groundwater basin. The following information is provided by the Arizona Department of Water Resources (AZDR 2014).

Low-intensity livestock grazing is the predominant land use in the Upper Hassayampa Basin. There are no surface water diversions or impoundments besides small stock ponds within the basin. Groundwater is the only source for public water supply, domestic, irrigation and industrial purposes.

The basin is drained by the Hassayampa River which flows from north to south. The river is intermittent over much of its course but has perennial flow in its upper reaches in the Bradshaw Mountains and where bedrock brings groundwater to the surface a few miles south of Wickenburg.

Groundwater is found primarily in the basin-fill sediments found in the southeast portion of the basin. The aquifer consists of gravel, sand, silt and clay and is capable of yielding several hundred gallons per minute.

Depth to groundwater varies across the basin, ranging from just a few feet below land surface along some stretches of the Hassayampa River to more than 1,000 feet below land surface in the center of the basin. Natural recharge for the basin is estimated to be 8,000 acre-feet per year while groundwater use is estimated to be 3,900 acre-feet per year.

The median well yield in the basin was 125 gallons per minute (gpm) reported on registration forms for 61 large (greater than 10-inch) diameter wells.

A portion of the Desert Hills Complex overlays the West Salt River Valley sub-basin, located in the northwestern section of the Phoenix AMA. The AMA is a complex groundwater basin that covers 5,464 square miles around the Phoenix metropolitan area. The principal feature of the AMA is the large amount of land in private ownership: agricultural use is far more limited than in the Upper Hassayampa basin. The primary source of groundwater is basin-fill sediments. Major surface water features include the Gila, Salt, Verde and Agua Fria Rivers and tributaries.

The AMAs, including Phoenix, contain relatively deep alluvial aquifers and significant volumes of water in storage. However, aquifer recharge rates are relatively low and pumping volumes large. The aquifers have been in an overdraft condition: within an AMA, overdraft is defined as a condition where groundwater is pumped in excess of safe-yield.

Well yields are generally greater than 1,000 gpm. Natural recharge in the Phoenix AMA is 24,100 acre-foot per year. Substantial water level rises were measured between 1991 to 1992 and 2002 to 2003 in a number of wells in the sub-basin. Increases of over 60 feet were reported in some areas due to a combination of cessation of farming and associated reduction in pumping, and direct use and recharge of CAP water.

Stream Flow Regime

Aerial images of Buzzard Roost Creek show a wide shallow bed of mostly alluvium, but occasional bedrock. Generally it appears to lack development such as pools, riffle, and definable floodplain terrace. Outcropping is also frequent on hill slopes. Valley topography is steep and the hill sides are devoid of tree cover. Some scatter patches of over story canopy line the channel, otherwise the channel is unshaded. Overstory vegetation is often associated with channel or lower hill slope outcrops. The divide is between 3,700 feet and 4200 feet. Photographs from the Buzzard east visitation site (2009, Figure 4) show a dry, incised channel (1 feet to 2 feet deep and a few feet wide) in mostly fine grain valley fill. Banks are occasionally steep and unstable. Basal vegetation and understory appeared detrimentally grazed. The channel bed is mostly sand size with scatter of loose angular cobbles.



Figure 4 Buzzard Roost Creek East Channel Bed

Allotment soils are skeletal and shallow over hard rock or well cemented conglomerates. Groundwater storage is likely limited to alluvial fill in major drainages where the water table situation could exist at least temporarily. Water not lost to evapotranspiration and percolating through bedrock would not be

available to surface flow except at relatively discrete locations where geologic structures such as formation contact or fault planes exist.

Perennial stream flow is generated most reliably by high elevation areas where cool temperatures promote a snowpack and/or there is sufficient precipitation, particularly during cooler seasons, to even briefly overcome effects of evapo-transpiration. In an arid environment such as the Complex, streams typically lose flow downstream in the lower precipitation and elevation zones, particularly as they pass into recent valley alluvium.

Buckhorn Springs emanates near or on a contact between geologic rock layers of overlying dacites and much older phyllites. Similarly the riparian reach of Buzzard Roost Creek east follows almost exactly the contact between granodiorite and phyllite units. The phyllite is a metamorphosed fine grain sedimentary rock, typically shale or similar texture. Characteristics usually include very thin bedding planes or foliation and strong cleavage on the bedding plane but little or minute fracturing perpendicular to bedding. Water percolating downward through thin soils and more previous bedrock—such as the volcanic dacite and perhaps the granodiorites, might tend to travel in a more lateral direction, parallel to slope when encountering the phyllite. Some water may therefore daylight where the contact between the different rock formations are exposed, or are close to the surface. As well, granites typically present a somewhat impermeable layer to downward percolating water, depending on degree of fracturing. The Buzzard Creek west site, while mapped entirely with granodiorites, aerial imagery shows a large amount of bedrock in the channel. Site photographs also show the flowing reach as a bedrock channel.

The riparian, perennial portion of Buckhorn Spring channel is over exposed bedrock, and about 0.7 miles in length downstream from the spring (BLM field notes 1992-2012). The lower portion does not actively flow except during or immediately after large storm events. This lower portion is within alluvium of sand and cobbles.

Continuous recording stream gages are scarce in the region and are usually found in major valleys. There are two gages nearby the project area that may be used to gain some understanding of the timing and distribution of steam flow from various elevations (USGS 2013). Cottonwood Creek about five miles southeast of the Buckhorn Mountains has a upper ridge elevation of 3,500 feet, and Boulder Creek about 12 miles east of the project area, has a divide of 7,150 feet within the Prescott National Forest near Crown King. The gages themselves are approximately at the same elevation, Cottonwood Creek at 1,660 feet and Boulder Creek gage at 1,890 feet. Trend of both valleys is approximately northwest to southeast.

Average annual precipitation across the Boulder Creek watershed is 27.6 inches as calculated from the PRISM data; for the Cottonwood Creek watershed the value is 18.04 inches. Typically Cottonwood Creek is dry May to July and longer if the monsoon is weak or absent. Boulder Creek because of higher elevation headwaters and correspondingly higher precipitation usually maintains flow throughout the year, though only a fraction of a cubic foot per second during the summer months. There is an occasional reversal between the two sites as the monsoon peaks are stronger proportionally for the lower elevation Cottonwood watershed, probably the result of high intensity rainfall that creates some overland flow because of relatively less vegetation cover of the lower elevations.

Environmental Consequences

Alternative A – Proposed Action

No new water improvements are proposed. The Hackberry Pasture windmill on the Buckhorn allotment is in good condition, as are the two pumps on the Desert Hills allotment. The rate at which a windmill

pumps water is dependent upon wind speed, pump efficiency, and depth of the well. A pump rate of 10 gpm to 35 gpm is an average range for efficient livestock watering windmills; however, windmills operate intermittently, reducing the total amount of water lifted over time.

Groundwater conditions in the Upper Hassayampa basin are stable, while the Phoenix AMA is experiencing overdraft conditions, particularly around the Phoenix metropolitan area. Water developments on the Desert Hills Complex are unlikely to have a measurable impact on the groundwater aquifers or surface water flows in Buzzard Roost Creek.

Conditions for meeting standards for rangeland health are being met in most points excepting instances of productivity and diversity of riparian plant community in Buzzard Roost Creek, which lacked seedlings of over story species. There would be no degradation in these conditions under the Proposed Action and it is expected that riparian vegetation condition in Buzzard Roost Creek would improve with the relocation of mineral supplements from drainage areas.

Without long term data, issues about perennial flow in Buzzard Creek east cannot be fully answered, but it is probable that the site does not have capacity for reliable flow through the summer months. Upper catchment areas in the project area are probably too low in elevation to provide reliable perennial flow to Buzzard Creek east, at least in early summer months. Existing features to impound surface water or pump groundwater would remain unchanged so conditions of flow in the long term are expected to remain the same, dictated largely by year to year precipitation totals and strength of monsoon rains. Riparian plant species along Buzzard Creek are indicative of at least occasional high water table and/or seasonal flow in the channel. Surface flow regime in Buzzard Creek is expected to remain unchanged from the long term under prevailing demands, subject largely to conditions of upper catchment precipitation.

Alternative B – No Action

Under this alternative there would be no short term change in the present conditions including number of permitted livestock. There would be no range improvement project to enclose Buckhorn Spring riparian area for seasonal use, and mineral supplements may not be placed at least 1/8 mile distant from riparian reaches to alleviate grazing pressure on riparian vegetation. No improvements in riparian vegetation condition would be expected and over the long term it is possible that these conditions would degrade further. At the present two of three riparian reaches do not achieve standards for vegetation productivity and diversity.

Hydrologic function of the uplands and therefore the vast majority of the allotment area are determined to achieve standards. No change would be expected in this condition.

The flow regime of Buzzard Creek is determined unreliably perennial, and dictated largely by upper catchment precipitation. Normal maintenance of surface flow impoundments and groundwater pumping equipment is expected.

Alternative C – Active Herding

This alternative would be the same as Alternative A the Proposed Action, with the exception that no fence would be constructed to enclose the Buckhorn Spring riparian area. However, seasonal use restriction on livestock would remain. The season of use would be the winter months November 1 until the start of the following growing season to allow regrowth of riparian vegetation. Instead of using a fence to keep cattle out of the riparian area, cattle would be actively herded during the restricted months. All the effects of this alternative would remain the same as Alternative A. In the event that active herding is not effective,

determined by monitoring for a period of three years, then an enclosure fence would be built around the Buckhorn Springs riparian area.

Other features of the Proposed Action would remain: placement of mineral supplements at least 1/4 miles from water sources and 1/8 mile from major drainages, which should lead to some improvement in riparian productivity and diversity (standard 3) in the Buzzard Creek riparian reaches which are currently not achieving this standard.

Alternative D – No Grazing

Under this alternative the allotment would be closed to grazing for ten years. Because it has been determined that upland vegetation and hydrologic function achieves standards for the eco-sites of the allotments, there may not be an overt change in runoff response. Vegetation recovery would result in at least an increase in precipitation interception, by both canopy and basal vegetation, so that runoff yield, particularly from the high intensity monsoon rains would lessen if by an immeasurably amount.

Riparian vegetation in the three identified riparian reaches would be improved, and it would be expected in an observable and measurable manner. At the present 2 of the 3 reaches do not meet standard 3 for vegetation productivity and diversity—due to a lack of seedlings of over story species browse by livestock. An enclosure fence would not be required for the Buckhorn Spring Riparian area.

Flow regime for Buzzard Creek would remain largely unchanged. It is determined that the low elevation of its catchment prevents reliable perennial flow. This condition would not be ameliorated by no grazing, and in fact for reasons provided above, robust vegetation regrowth may reduce stream flow yield, even if again by a very small margin. Current infrastructure for water impoundment and groundwater pumping would not be used or maintained (reconstruction would otherwise be necessary for the Evans reservoir as it does not currently hold water). Improvement in stream flow yield may occur to the extent that reconstruction in impoundment features may affect volume storage.

Wildlife Resources

This section provides site-specific analysis of potential impacts to wildlife resources and addresses the following issues:

Issue 9: *How would riparian area fencing affect wildlife use of the riparian area?*

Issue 10: *What is the status of Gila Topminnow and Desert Pupfish in Buckhorn Spring? How does livestock grazing affect these species?*

Affected Environment

Wildlife species that occur within the Desert Hills 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.

The Desert Hills Complex is located within the State of Arizona Game and Fish Department management unit 20B. Javelina (*Pecari tajacu*) and desert mule deer (*Odocoileus hemionus*) are two big game species that utilize the Desert Hills 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, and desert globemallow.

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.

Across all ecological sites, current vegetative species composition and structure provides cover and forage to support a diverse wildlife community. Abundant trees and shrubs 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.

Table 5 Bureau of Land Management Phoenix District Sensitive Species List (USDI 2010), Including Species Names, Unique Habitats, and Presence of Suitable Habitats that May Occur within the Desert Hills Complex

BLM Sensitive Species	Phoenix District Presence	Unique Habitat	Suitable Habitat within Analysis Area
Amphibians			
Lowland leopard frog (<i>Lithobates yavapaiensis</i>)	v	Wetlands	No wetlands within allotments
Birds			
American peregrine falcon (<i>Falco peregrinus anatum</i>) (USFWS delisted)	v	Cliffs	No cliff habitat within allotments
Desert purple martin (<i>Progne subis hesperia</i>)	v	Saguaro cacti	Yes, potential habitat within allotments
Ferruginous hawk (breeding population only) (<i>Buteo regalis</i>)	v	Healthy grasslands	Yes, potential habitat within allotments
Gilded flicker (<i>Colaptes chrysoides</i>)	v	Saguaro cacti	Yes, potential habitat within allotments
Golden eagle (<i>Aquila chrysaetos</i>)	v	Significant cliffs, large undeveloped areas	Yes, potential transitory habitat but no known nesting areas
Le Conte's Thrasher (<i>Toxostoma lecontei</i>)	v	Remote creosote scrub	Yes, potential habitat within allotments
Western burrowing owl (<i>Athene cunicularia hypugaea</i>)	v	Grasslands, undeveloped valley bottoms	Yes, potential habitat within allotments
Fish			

BLM Sensitive Species	Phoenix District Presence	Unique Habitat	Suitable Habitat within Analysis Area
Longfin dace <i>Agosia chrysogaster</i>	v	Aquatic	Yes, potential habitat in Buckhorn Allotment
Mammals			
California leaf-nosed bat (<i>Macrotus californicus</i>)	v	Caves, mines	No habitat present in allotments
Cave myotis (<i>Myotis velifer</i>)	v	Caves, mines	No habitat present in allotments
Townsend's big-eared bat (<i>Corynorhinus (=Plecotus) townsendii</i>)	v	Caves, mines	No habitat present in allotments
Reptiles			
Sonora mud turtle (<i>Kinosternon sonoriense sonoriense</i>)	v	Riparian	Yes, potential habitat in Buckhorn Allotment

v: known to occur

h: probable occurrence

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. Birds found within the allotment are typical of arid desert grassland habitat such as rufous-winged sparrow, chipping sparrow, and western scrub-jay.

In 2008 the USFWS released a report titled “Birds of Conservation Concern” in which they listed species of concern by Bird Conservation Regions (BCR) (USFWS 2008). That report helps focus conservation efforts on the species that need it. The Desert Hills Complex lies within BCR 33 (Sonoran and Mojave Deserts U.S. portion only).

Federally Listed, Proposed, and Candidate Species

Two Federal ESA species are addressed in this analysis: the Sonoran desert tortoise (*Gopherus morafkai* a candidate species for Federal listing, and the Gila topminnow (*Poeciliopsis occidentalis occidentalis*), which is listed as endangered by the USFWS.

No other Federal threatened or endangered species have been recorded on the Desert Hills Complex. Neither the western yellow-billed cuckoo, (*Coccyzus americanus occidentalis*), a Federal proposed threatened species, nor the endangered southwestern willow flycatcher (*Empidonax traillii extimus*), have been documented in the Complex. Both species were addressed in the Biological Assessment/Biological Opinion (BO) (22410-05-F-0785, USFWS 2006a) developed for the Bradshaw-Harquahala RMP EIS. This assessment concluded that livestock grazing on the allotments within five miles of the Hassayampa may affect, but is not likely to adversely affect, the southwestern willow flycatcher.

Desert pupfish do not occur within the action area. There are no plans at this time to release Desert pupfish into any waters on the Desert Hills Complex.⁶

Desert Tortoise: Sonoran desert tortoises occupy much of the upland areas in the Desert Hills Complex. The 5,911 acres of public lands in the Desert Hills allotment are classified as Category II desert tortoise habitat. The Desert Hills lease contains approximately 160 acres of Category III habitat and the remaining 10,172 acres are classified as Category II tortoise habitat.

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.

The Bradshaw-Harquahala RMP states that Category II desert tortoise habitat will be managed to retain all natural shelter sites and to be unfragmented. In Category 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. These requirements, where applicable, have been incorporated into the DPC objectives for each key area.

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%). Important forage consumed by Sonoran Desert tortoise includes tobosagrass, big galleta grasses, and both perennial and annual grasses and forbs (Van Devender, et al. 2002). These forage species are available for Sonoran desert tortoise throughout the complex.

Gila Topminnow: Gila topminnow occupies habitat at Buckhorn Spring, on the Buckhorn allotment. BO 22410-2006-F-0006 addresses the effect of livestock grazing on Gila topminnow at Buckhorn Spring (USFWS 2006b). Livestock are excluded from the Buckhorn Spring area with a combination of pipe rail and barbed wire fence. The BO determined that livestock grazing is not likely to jeopardize the continued existence of the Gila topminnow, stating “Even with occasional compromise of the enclosure, the twice annual inspection and maintenance is expected to allow the newly established Gila topminnow ... population to persist into the foreseeable future in the presence of continued livestock grazing under existing management” (USFWS 2006b, p. 8).

Environmental Consequences

Alternative A – Proposed Action

Presently, land health standards for upland vegetation 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 through restrictions on supplement placement and construction of pasture fencing.

Improving livestock distribution through pasture fencing and restrictions on mineral placement would allow upland vegetation to maintain vigor, productivity, species composition, and cover over the current situation. 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.

⁶ Personal communication, Codey Carter, Hassayampa FO, November 18, 2013.

The construction of riparian fencing in the Buzzard Roost Creek drainage to limit livestock season of use would allow riparian vegetation recruitment, trending the key areas toward meeting Standard 3. This would improve cover and forage availability for wildlife, particularly riparian-obligate migratory birds. The fence would be built in accordance with BLM Manual 1741 (BLM 1989) fencing specifications to restrict livestock but not impede wildlife passage. The fence construction would be expected to increase wildlife use of the riparian area during livestock exclusion periods as the vegetation improves and disturbance effects are minimized.

Buckhorn Spring would remain permanently closed to livestock: therefore, there would be no livestock grazing effects to wildlife species use of the area, including the Gila topminnow.

Livestock grazing would not affect the roosting sites of pale Townsend's big-eared or other bats. Nesting sites for peregrine falcons or golden eagles would not be affected by livestock grazing as these sites are located in cliff faces that are inaccessible to livestock. There are expected to be no impacts to the southwestern willow flycatcher or its potential habitat.

Routine maintenance of water sources (springs 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.

Alternative B – No Action

For upland areas, the No Action alternative would not provide the additional benefits to key wildlife forage species expected under the Proposed Action. Land health standards and DPC objectives would continue to be met at most key areas, but there would be no improvement in the perennial grass component at Desert Hills Key Areas 3 and 6. Overall, livestock distribution would not be expected to change.

Continued yearlong livestock use of the riparian areas in Buzzard Roost Creek drainage would not allow rest to recover overstory and forage vegetation. There would be no trend toward meeting Standard 3 and the area would not provide suitable habitat for riparian-obligate species such as migratory birds. 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 developments compared to the Proposed Action.

General livestock grazing disturbance and displacement effects to wildlife would be the similar as under the Proposed Action. There would be no disturbance related to fence construction.

Alternative C – Active Herding

The effects of using active herding and adaptive management to exclude livestock from the riparian areas would be similar to Alternative A. Although depending on efficacy, vegetation cover and forage recovery may take longer to improve than would be achieved with the immediate exclusion provided by fencing. Eliminating the fence installation would eliminate any construction-related disturbance effects, but as with the Proposed Action, wildlife use of the riparian area could increase during livestock exclusion periods as the vegetation improves and disturbance effects are minimized.

All other livestock effects would be similar to the Proposed Action.

Alternative D – No Grazing

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 in the allotment over time, which would reduce habitat available for amphibian species. Livestock disturbance/displacement effects would not occur, benefiting ground-nesting migratory birds and other wildlife individuals. Overall, Alternative D would be expected to have a beneficial effect on wildlife individuals, but it is not likely to have a measurable effect on wildlife populations within the project area.

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 57,548-acre Desert Hills 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 Desert Hills Complex, including travel, recreation, mineral development, grazing, and others. Specific actions that are occurring, or are likely to occur in the reasonably foreseeable and contribute to cumulative effects include:

Livestock Grazing

The Desert Hills Complex has been an active grazing allotment for decades, and livestock grazing has occurred in some form in the allotment area 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 any downward trends in upland vegetation resource conditions on the Complex. A downward trend may occur in riparian areas if current grazing practices continue. The action alternatives analyzed in this EA are designed to address riparian conditions at Buzzard Roost Creek. Under the No Grazing scenario, improvement in resource conditions are expected to be mild to moderate over the long-term as soil, vegetative conditions, and riparian areas 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. The potential trail expansion is limited in scope and a dedicated administrative use. Recreation use would be concentrated to those facilities. The Wickenburg Travel Management Plan would potentially decrease soil displacement, compaction and erosion related to off-highway vehicles by controlling access.

Developments

No new or proposed developments or projects were identified within the project area. A number of existing right-of-ways (ROWs), including roads, pipelines, and public utilities, intersect portions of the Desert Hills 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.

Hydrology

The complex encompasses the entirety or most of watersheds from upper headwaters to major confluences. In particular this includes Buzzard Roost Creek and Buckhorn Springs, which are the riparian areas for this EA. The Proposed Action continues the practice of grazing at roughly the same livestock numbers as the previous few decades and no changes are proposed to the existing water developments. There are no other recent, concurrent or foreseeable management decisions with distinct yet similar direct or indirect effects that would cumulate spatially or temporally with the Proposed Action.

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. Yavapai 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 Desert Hills Complex found that conditions on the allotment are meeting rangeland health standards for vegetation cover (Standard 3) and

for soil conditions (Standard 1) (BLM 2013). 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 this allotment.

Areas of Critical Environmental Concern – Not Present

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

Cultural Resources

Cultural and heritage resources within the Hassayampa Field Office area 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 Class I Literature Search and a Class III intensive archaeological survey in 2014.

The Class I cultural resources literature search of the Desert Hills Complex, focused along the location of the proposed fence line, revealed no previously identified cultural resource sites within the fence line or within 10 meter (32 feet) of either side. The class I search also indicated that no cultural resources surveys have been conducted within the allotment adjacent to the proposed fence line.

The class III survey was conducted along the route of the proposed fence line. The pedestrian survey was conducted along the marked centerline of the proposed fence line and included 10m (32 feet) on each side. As a result of the Class III cultural a single previously unidentified cultural resource site was identified. The site consisted of a historic habitation site location with remnants of concrete foundations. The proposed fence path was modified so that the site would not be impacted by fence construction. With the avoidance of the newly identified site, no cultural resources would be affected by the installation of the proposed fence line.

The impacts of the BLM's livestock grazing program on cultural resources have been considered in a series of planning documents, including the 2012 *Lower Sonoran Resource Management Plan (BLM)*. According to those analyses, livestock grazing is an historic use of the land that has "no effect" on National Register properties for the purpose of Section 106 compliance.

As a result of the survey and the modification of the fence line, no actions contemplated in this EA would impact cultural resources on the Complex. Therefore, this topic was dismissed from detailed analysis in this EA.

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 approximately 7 miles of pasture fence and slightly less than 2 miles of riparian exclosure fencing, which would involve manual installation methods and the use of pack animals. Vehicles may be used along existing routes only. While energy would be expended, the effects to energy conservation are negligible. Therefore, the topic is dismissed from further analysis.

Environmental Justice – Present, Not Impacted

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.

Minerals – Present, Not Impacted

Rangeland management is not expected to affect mineral and energy resources.

Paleontological Resources – Not Present

There are no known paleontological resources located in the allotment and soil compositions present are not the types that tend to support them. 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 Desert Hills Complex falls within the Hassayampa Management Unit. The San Domingo Wash Recreation Management Zone is within the allotments. 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. A route inventory for this project area exists and is believed to be complete. New recreation roads or trails may have been created without authorization since the time of route inventory in 1999 to 2001.

Visual Resources – Present, Not Impacted

Under the RMP, the Desert Hills 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. 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. The proposed action would authorize construction of pasture and riparian fence; however, this would not change the character of the existing landscape. 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 burros are present on the Complex, but no herd management area is associated with the project area. Burro utilization was noted on the Desert Hills lease but was not identified as a causal factor for non-achievement of Land Health Standards.

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 – Not Present

No designated wilderness or wilderness study areas are present within the project area.

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 2013 Desert Hills Complex RHE. External scoping was conducted via letter sent to the Consultation, Coordination, and Cooperation list. Recipients were asked to comment on the draft RHE as well as the Proposed Action presented in this EA. The scoping period ran from July 12 through July 22nd, 2013. Two external scoping comments were received. Scoping comments are summarized in Appendix B.

List of Preparers

This list presents the individuals who contributed to the technical content of this EA. Some of the individuals below prepared or reviewed specific sections, or provided input to the content and production of this document.

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Acronyms

AMA	Active Management Area
AUM	Animal Unit Months
BCR	Bird Conservation Region
BLM	Bureau of Land Management
CFR	Code of Federal Regulations
CEQ	Council on Environmental Quality
DPC	Desired Plant Community
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ESD	Ecological Site Description
FAR	Functional-At Risk
FO	Field Office
GIS	Geographic Information Systems
GPM	Gallons Per Minute
IDT	Interdisciplinary Planning Team
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NRCS	National Resource Conservation Service
PFC	Proper Functioning Condition
PM	Particulate Matter
RHE	Rangeland Health Evaluation
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
VRM	Visual Resource Management

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

Response to Public Scoping Comments Related to the Proposed Action and Environmental Analysis

Table 7 Response to public scoping comments

Number	Commenter	Comment	Disposition (BLM Comments)
1	Glasgow	In regards to Buzzard Roost creek area, do not believe fencing the area will be necessary or effective.	See Chapter 2 of EA. Two alternatives (Alternatives A and C) propose actions for controlling livestock seasonal use in Buzzard Roost Creek. Chapter 3 analyzes impacts to riparian areas from proposed fencing and active management actions.
2	Glasgow	Concerned about trespass cattle within the Buckhorn	Proposed fencing in riparian is designed to reduce likelihood of boundary fence trespass.
3	Glasgow	Believe moving supplement and salt away from water in key areas will solve issues in Buzzard Roost Creek.	Alternatives A and C would restrict supplement placement to 1/4 mile from water sources and 1/8 mile from drainages. This action is analyzed in Chapter 3 of the EA.
1	Western Watersheds Project (WWP)	WWP mission includes improving habitat conditions for species like the Sonoran desert tortoise and the areas previously occupied by longfin dace and native frog species. We hope the forthcoming EA will include a full and fair analysis of the merits to these species and their habitats of removing livestock grazing entirely.	See Chapter 3 – Wildlife Resources. This section analyzes potential impacts to wildlife from the alternatives. The analysis does not consider effects to wildlife species that are not present, and have no potential habitat, within the project area.
2	WWP	WWP’s most recent visit to the allotment for the purposes of wildlife viewing and wildflower photography occurred in 2011 and abundant dead and dying jojoba were observed proximate to key areas DH#2 and DH#5. The die-back of jojoba affects the availability of forage for livestock and puts pressure on other palatable species. The forthcoming EA should evaluate the current conditions and the carrying capacity of the allotment in light of these broad changes in the live shrub cover.	The one-time site visit observations and subsequent conclusions reached by WWP cannot be substantiated by BLM field personnel. The BLM conducted a stocking rate analysis (see Chapter 2 of EA) to inform carrying capacity.

3	WWP	<p>The absence of cryptograms across the key areas of the complex should be examined in the forthcoming EA. RHE at 32. Desert Hills Key Area #2 is the only site with cryptograms present; it is not the only key area located on the ecological site Granitic Hills 10"-13" PZ. Key Areas DH #3 and DH #5 on the same ecological site do not have cryptograms. <u>Their absence should be analyzed and discussed</u> in the forthcoming EA. The importance of these soil crusts cannot be overstated in sequestering carbon, retaining water, limiting infestations of nonnative plants, etc</p>	<p>See Chapter 3 of EA, Soil Resources. Issue #6 responds to this comment.</p>
6	WWP	<p>The RHE doesn't mention and the data don't reveal anything about non-native or invasive species infestations on the Complex. The agency's observations and monitoring should be disclosed in the forthcoming EA. The flammability of any non-native species should be considered, and the extent to which livestock play a role in the distribution and invasion by these species should be analyzed under any action alternative.</p>	<p>See Chapter 3 of EA, Invasive Plants. Issue # 5 responds to this comment.</p>
7	WWP	<p>The BLM's use of the 1996 Technical Reference to establish grazing classes varies distinctly from the best available science which recommends that grazing not exceed 40 percent. <i>See, e.g.</i> Holechek 1988.</p>	<p>The BLM conformed to the current (1996) Technical Reference to establish grazing class. The 1988 Holechek paper served as the basis for the stocking rate analysis presented in Chapter 2 of this EA.</p>
8	WWP	<p>Indeed, the technical reference cited by the RHE specifically states that "Moderate use does not imply proper use." Interagency Technical Reference at 123. In 2011, use levels exceeded 40 percent on two of the three key areas measured that year (DH KA#1, DH KA#2). In other monitoring events, utilization neared the typical 40 percent limit. <u>This suggests that the stocking rate may be too high</u>, and if the permittee used the full authorized use on the allotment, it would harm the vegetation resources.</p>	<p>See Chapter 2 of EA. The BLM conducted a stocking rate analysis to determine if utilization fell within the desired range given current stocking rates. The analysis demonstrated that utilization fell within the desired range under current stocking rates, which are at full preference.</p>

9	WWP	The forthcoming EA should evaluate whether any of the livestock infrastructure on the allotment is contributing to the drying of Buzzard Roost Creek East. RHE at 39. The RHE discusses a lowered water table due to “climatic or other factors,” but the agency should analyze and disclose the hydrologic connectivity between this watercourse and any pumping or diversions that are associated with the livestock operation.	See Chapter 3 of EA, Hydrology and Water Resources. Issue #8 responds to this comment. The issue of how rangeland water infrastructure could impact the hydrologic function of Buzzard Roost Creek East is addressed in the impact analysis.
10	WWP	A hydrologist should provide an explanation of why this formerly perennial reach (Buzzard Roost Creek) is now dry and whether, under a range of alternatives that includes ending livestock grazing on the allotment or in portions of the allotment, this creek could be functionally restored.	See comment above.
11	WWP	Is the entirety of riparian habitat excluded to livestock?	The Affected Environment section of the EA will discuss the current effectiveness of the enclosure on the riparian habitat.
12	WWP	Are there also xeroriparian areas that should be assessed for their potential to support riparian obligate communities if water wasn't being pumped or diverted for livestock use?	All areas that meet the criteria for riparian (as defined by BLM Handbook H-1737-9) have been inventoried. The removal of livestock waters and the potential impacts of lack of water pumping is analyzed in Chapter 3 of the EA, Hydrology and Water Resources. Issue #9 responds to this comment.
13	WWP	The Biological Opinion of 2006 (referenced in the RHE at 11) regarding Gila topminnow in Buckhorn Spring also discusses desert pupfish release. What is the status or condition of the desert pupfish population in Buckhorn Creek? Did this introduction happen and was it successful? Why or why not? Given the implications of livestock grazing on the spread and success of these species, the forthcoming EA should disclose the complete history of these special status species on the allotments.	Desert pupfish is not present in Buckhorn Spring, and the proposed stocking of desert pupfish never occurred due to the lack of appropriate habitat. Issue #10 responds to concerns about the Gila topminnow, and Chapter 3, Wildlife Resources, provides analysis of the effects to Gila topminnow.

14	WWP	The RHE reports that Buzzard Roost Creek West was rated at just slightly PFC. RHE at 38. The technical recommendation to remove livestock from Buzzard's Roost creek from March 1 to November 1 each year is a good start, but the agency should fully analyze the feasibility of this enclosure, including the cost and the impacts to wildlife of additional fencing on the allotments. RHE at 50.	See Chapter 3 of the EA. The impacts associated with a fence-based enclosure are analyzed in the EA. The EA discloses potential impacts to wildlife and riparian vegetation.
15	WWP	The forthcoming EA should also explain the scientific justification for the remaining season of use given the changing climatic conditions that prompt earlier spring green-up.	See Chapter 2. The alternatives include a flexible season of use component in order to ensure that grazing occurs during the dormant period (and required communication).
16	WWP	The forthcoming EA should disclose the impacts to non-BLM riparian areas on the Desert Hills allotment and Desert Hills Lease. RHE at 9. The effects to these riparian areas should be considered cumulative impacts of the actions of BLM-authorized grazing, especially if there are not fences separating the federal from non-federal property.	There are no non-BLM riparian areas within the Desert Hills allotment and Desert Hills lease.
17	WWP	The forthcoming EA should describe how the RHE's conclusions about rangeland health conform to the habitat requirements of Sonoran desert tortoise.	Habitat requirements for desert tortoise are listed in section 2.3 of the RHE. DPC objectives are designed to meet these requirements, as limited by the potential of the ecological site, as required under the Bradshaw-Harquahala RMP The EA discloses potential impacts to desert tortoise and habitat in Chapter 3, Wildlife Resources.
18	WWP	Based on the DPC objectives, it would seem that only DH KA#4 is not habitat for desert tortoise, but more information about the species distribution on the allotments should be included in the forthcoming EA.	Figure 6 in the Appendix to the RHE has been updated to include a map of desert tortoise habitat within the complex..
19	WWP	It is also not clear that BLM's Desert Hills allotment can support uniform use; the RHE recommends that livestock distribution to the northern areas of the allotment should be increased. RHE at 49.	The RHE has been edited to state "distribution to the northern areas of the allotment should be improved. " The EA Proposed Action alternative includes installation of pasture fencing to encourage livestock distribution. Impacts of these devices on distribution are disclosed in Chapter 3 of this EA.

20	WWP	The RHE also states, “Pasture fencing diving [sic] the grazing allotment would facilitate improved livestock distribution.” Id. Any pasture fencing or infrastructure proposals should be included in the grazing permit renewal EA, since these are contingent actions affecting each other.	The EA Proposed Action alternative includes installation of pasture fencing to encourage livestock distribution. Impacts of these devices on distribution are disclosed in Chapter 3 of this EA.
21	WWP	The southern portions of the allotment contain numerous acres of nothing but cholla, which is suggestive of overuse by livestock and a lack of current capacity for grazing. This should be fully assessed in the forthcoming EA.	This comment suggests a cause-effect relationship between livestock grazing and upland vegetation that the BLM cannot confirm. The EA discloses the impacts of livestock grazing on upland vegetation.
22	WWP	The forthcoming EA should include an alternative that permits livestock use in accordance with actual use, such as the average recent stocking level and the actual season of use rotations implemented by the permittee. RHE at 13.	See Chapter 2 of the EA. An Actual Use alternative was considered and dismissed by the IDT during EA alternatives development.
23	WWP	The “informal rotational grazing system” isn’t supported with authorizations that intend for use on the allotments to be yearlong. If the permittee is running a larger herd for shorter periods on any part of the allotments, this should be fully considered under a “current management” alternative and an assessment of monitoring results should be provided that corresponds to actual use.	The permittee does not exceed the permitted livestock numbers or run increased herd size for shorter duration. Livestock are moved based on forage and water availability in the same manner that livestock would be moved between pastures and remaining within the terms and conditions of the permits and leases.

