U.S. Department of the Interior
Bureau of Land Management

ENVIRONMENTAL ASSESSMENT
DOI-BLM-AZ-C010-2014-0036-EA

Cerbat, Quail Springs, and Fort MacEwen Allotments Proposed Grazing Permit Renewal

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1 INTRODUCTION

1.1 Introduction

This Environmental Assessment (EA) discloses and analyzes the potential environmental consequences associated with proposed grazing permit renewals and range improvements for the Cerbat, Quail Springs, and Fort MacEwen (CQFM) grazing allotments which are located 20 miles northwest of Kingman, Arizona (Figure 1). The Bureau of Land Management (BLM) Kingman Field Office (KFO) manages portions of the allotments which also include private and Arizona State Land Department lands. The CQFM allotments are managed as a complex divided by U.S. Highway 93 and combined together into the West Unit and East Unit. CQFM covers approximately 131,700 acres with BLM managing 86,122 acres, Arizona State Land Department managing 4,731 acres, and 40,849 acres of private land – acreage values calculated by GIS. Each of these allotments is in the "Improve" (I) management category. Allotments in this category have the greatest potential for improving existing resource conditions and show the highest return on range improvement monies invested. Allotments in this category will have first priority for range improvements, monitoring and development of Allotment Management Plans (AMPs) (BLM 1980a, 1980b).

1.2 Allotment Summary

The following is a summary of the current situation for the CQFM allotments (Table 1).

Table 1. Current Situation Summary for Allotments

Public land acres in allotments	86,122 acres
Arizona State Land Department acres in allotments	4,731 acres
Private land acres in allotments	40,849
Kind of livestock	Cattle
Ephemeral or perennial	Perennial/Ephemeral
Plan area	Kingman Field Office
Current active use[1] in animal units (AUs)[2] and animal unit months (AUMs)[3]	578 AUs or 6,344 AUMs
Suspended use[4] (AUMs)	745 AUMs
Category[5]	Improve

[1] Active use means that portion of the grazing preference that is: (1) Available for livestock grazing use under a permit or lease based on livestock carrying capacity and resource conditions in an allotment: and (2) Not in suspension (43 CFR 4100.0-5).
[2] AU is an animal unit which is equivalent to one cow.
[3] AUM is the amount of forage necessary for the sustenance of one cow or its equivalent for a period of 1 month (43 CFR 4100.0-5).
[4] Suspended use means the temporary withholding from active use, through a decision issued by the authorized officer or by agreement, of part or all of the permitted use in a grazing permit or lease (43 CFR 4100.0-5).
[5] Category: All allotments are categorized as either improve, maintain, or custodial.

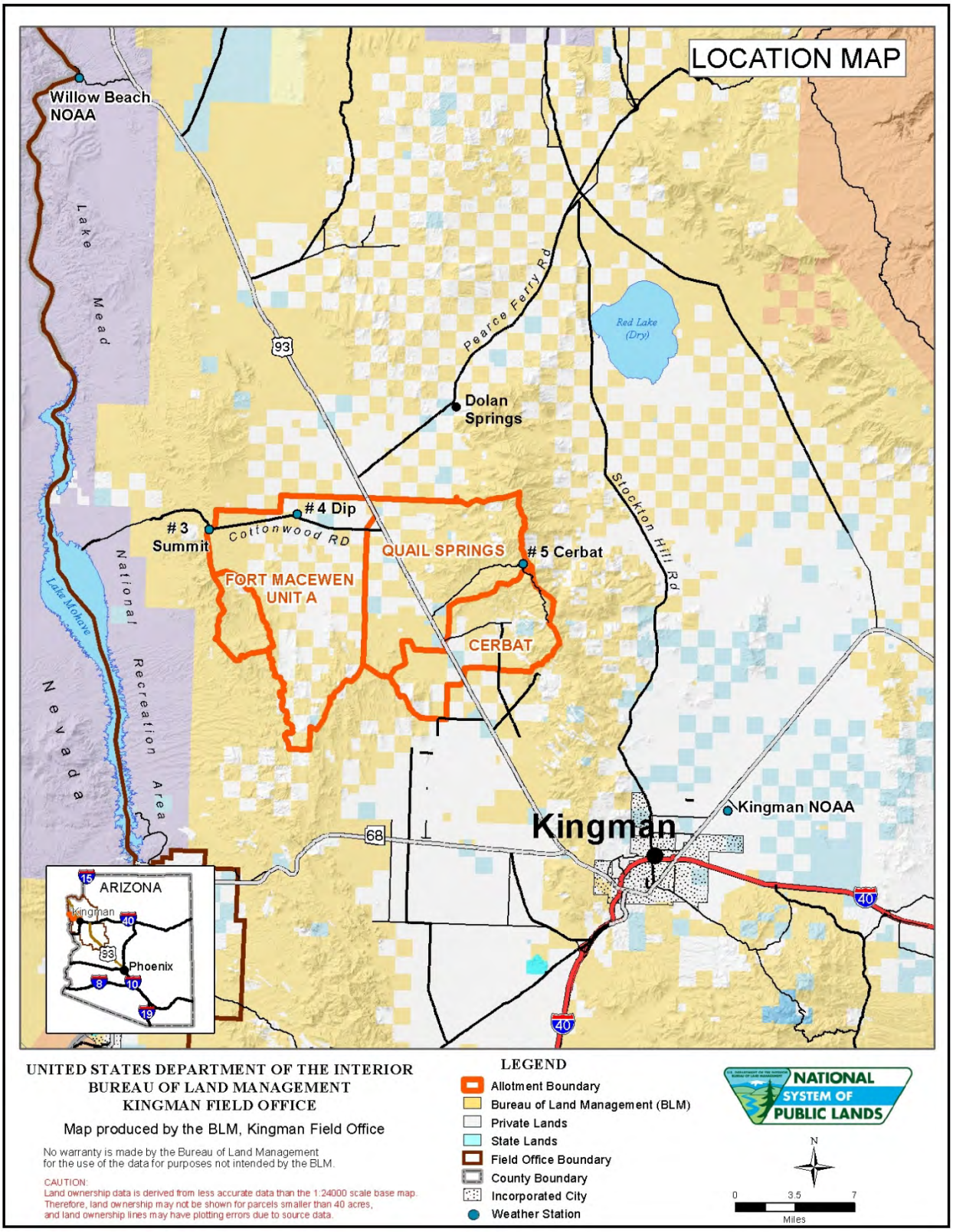

Figure 1: Location of Cerbat, Quail Springs, and Fort MacEwen Allotments

1.3 Purpose and Need for the Proposed Action

1.3.1 Background

The BLM is proposing to fully process the term grazing permits on the Cerbat (00020), Quail Springs (00062), and Fort MacEwen –Unit A (00034) (CQFM) allotments in accordance with all applicable laws, regulations, and policies. BLM renewed the permits with the same terms and conditions pursuant to Section 426 of Public Law 111-88, pending compliance with applicable laws and regulations for a 10-year term beginning October 1, 2009. Compliance with all applicable laws and regulations includes consultation, coordination and cooperation with affected individuals, interested publics, State, and Indian Tribes; completion of the applicable level of National Environmental Policy Act (NEPA) review; consultation with the United States Fish and Wildlife Service (USFWS) under Section 7 of the Endangered Species Act; and ensuring that allotments are achieving or making significant progress toward achievement of land health standards .

1.3.2 Purpose and Need

The purpose of this action is to provide for livestock grazing opportunities on public lands where consistent with meeting management objectives, including the *Arizona Standards for Rangeland Health and Guidelines for Grazing Administration* (Land Health Standards or Arizona S&Gs) (BLM 1997).

The need for this action is established by the Taylor Grazing Act (TGA), the Federal Land Policy and Management Act (FLPMA), and the *Kingman Resource Area Proposed Resource Management Plan* (RMP)/*Final Environmental Impact Statement* (BLM 1995), which require that the BLM respond to applications to fully process permits to graze livestock on public land. In detail, the analysis of the actions identified in the applications for grazing permit renewals and the alternative actions is needed to comply with the following planning documents.

KFO completed a rangeland health assessment titled *Cerbat, Quail Springs and Fort MacEwen Allotments Rangeland Health Evaluation* (BLM 2010). The assessment indicated that some conditions in the allotments are in need of management changes to meet rangeland health objectives and standards as defined by the Arizona S&Gs (BLM 1997). The study evaluated key areas and set Desired Plant Community (DPC) objectives. The Desired Plant Community (DPC) Objectives for each key area are carried forward in Appendix B of this document. 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 Kingman 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 KFO. The Kingman RMP allocated public lands within the CQFM Allotments as available for domestic livestock grazing. Where consistent with the goals and objectives of the RMP and Land Health Standards, allocation of forage for livestock use and the issuance of grazing permits to qualified applicants are provided for by the TGA and the FLPMA.

1.3.3 Decision to be Made

The Kingman 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 issue a determination of the significance of the environmental effects and whether an environmental impact statement (EIS) would be required. If the authorized officer determines that it is not necessary to

prepare an EIS, the EA will provide information for the authorized officer to make an informed decision whether to renew, renew with modifications, or not renew the permit and if renewed, which management actions, mitigation measures, and monitoring requirements will be prescribed for the CQFM allotments to ensure management objectives and Arizona Standards for Rangeland Health are achieved.

1.4 Conformance with Land Use Plan and Other BLM Plans

1.4.1 Kingman Resource Area RMP

Rangeland management decisions in the Kingman RMP which pertain to the Proposed Action include:

GM-01[6] Management of rangeland resources will be guided by the Cerbat/Black Mountains (1978) and Hualapai Aquarius (1981) grazing environmental impact statements and range program summaries (RMP, page 24). The objectives for the rangeland management program are listed in the Cerbat/Black Mountains (1978) and Hualapai Aquarius (1981) grazing environmental impact statements (RMP, Page 39).

GM-10 Manage 21 allotments in the Improve (I) category (RMP page 461).

GM-13 Improve wildlife habitat by providing more forage, cover, and water (RMP page 461 and objective from the Cerbat/Black Mountains (1978) grazing EIS Program Document page 1).

GM-14 Reduce soil erosion and increase water infiltration by increasing vegetative ground cover and litter (RMP page 461 and objective from the Cerbat/Black Mountains (1978) grazing EIS Program Document page 1).

GM-16 Sustain livestock production by providing more and better quality forage (RMP page 461 and objective from the Cerbat/Black Mountains (1978) grazing EIS Program Document page 1).

GM-18 The proposed Allotment Management Plans(AMP, as described in the EIS, will be reviewed and rewritten to provide for less complex and less costly plans based on site-specific conditions. This revision will be made in cooperation with the allottees, the Kingman Grazing Advisory Board, the State Land Department, the State Game Fish Department, and other concerned individuals and agencies. The AMPs will be dynamic documents, changing as necessary in response to the special conditions of each allotment (Program Document Page 2).

GM-20 Utilization of key species will be limited to 50 percent. Annual adjustments in stocking numbers may be made on the basis of actual use experience acquired in reaching the 50 percent utilization level of the current year's growth of key species within sample areas. If required, adjustments will be made in authorized grazing use during subsequent billing period (Program Document page 2).

LH-1. Standard 1: Upland Sites Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate and landform (ecological site).

LH-2. Standard 2: Riparian-Wetland Sites Riparian-wetland areas are in properly functioning

[6] RMP decisions are numbered and listed in a land use plan evaluation (BLM 2006).

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

LH-3 Standard 3. Productive and diverse upland and riparian-wetland communities of native species exist and are maintained.

1.4.2 Other BLM Plans

The allotments addressed in this EA are located within the planning area of three different activity level plans which established forage allocations and adjusted utilization limits. The *Black Mountain Ecosystem Management Plan* (BMEMP) (BLM 1996) allocated forage for big game, wild horses and burros, and livestock within a joint use area including part of the CQFM. The following goals and objectives apply to the public land in the joint use area within the CQFM Allotments.

Goals for the management of vegetation resources in the BMEMP include:

1. Ensure that the physiological needs of plants are met,
2. Increase the diversity of the native vegetative community,
3. Increase the abundance of highly palatable (and therefore heavily used) native species.

Objectives for management of vegetation resources in the BMEMP include:

1. Limit utilization within key areas (areas between 0.25 to 0.75 miles of permanent water sources) in the Black Mountain ecosystem over the life of the plan. Utilization limits or proper use factors for key plant species by big game, wild horses and burros, and livestock were set to meet the management objective as follows:
    - White bursage* 20%
    - Flattop buckwheat 15%
    - Big galleta 35%
    - Mormon tea 40%
    - Globe mallow 40%
    - Desert rock-pea 30%
    - Chuckwalla's delight 15%
    - Shrubby buckwheat 40%[7]
2. Forage was allocated in the BMEMP to 30 percent burros, 30 percent cattle and 40 percent big game for a total of 9,500 animal unit month (AUMs).[8]

The *Wabayuma Peak & Mount Tipton Wilderness Management Plan, Environmental Assessment, and Decision Record* (BLM 1995a) contains the following objective:

[7] See Appendix A for a list of the common and scientific plant names.
[8] The utilization limits set in the BMEMP apply to CQFM Key Areas 8, 11, 18, 20 and 21, located within the joint use area would be used as one of the criteria for determining if Standard 3 is met.

> Conduct routine inspection and maintenance of range improvements (fences, spring developments etc.), located within the wilderness area, using non-motorized and non-mechanized means. According to the plan, all other maintenance will require prior BLM approval and additional environmental assessment. Emergency repair to range improvements using motorized or mechanized equipment, shall require prior written approval by the BLM (pg. 25, BLM 1995a).

Cerbat-Music Mountains Habitat Management Plan (HMP) (BLM 1983):

> Improve mule deer habitat by relieving limiting habitat factors such as water, forage, or cover (BLM 1983, pg. 13).

1.5 Scoping and Issues

In response to an application for grazing, Kingman Field Office resource specialists wrote the *Cerbat, Quail Springs & Fort MacEwen Allotments Rangeland Health Evaluation* (BLM 2010) to determine whether Arizona S&Gs are being met.

The start of work on the CQFM allotment rangeland health evaluation was announced at a project coordination meeting on December 2, 2008 in the KFO. The evaluation was conducted by the Issue Identification (ID) Team of BLM resource specialists assisted by the Range Resource Team (RRT) appointed by the Arizona Resource Advisory Council. Results of the Rangeland Health Evaluation were used to formulate the Proposed Action and alternatives. The evaluation found that Arizona S&Gs standards were not being met at some key areas as plant frequency data indicates that trend is down or static for warm season grass species at some of the key areas across all three allotments. The evaluation concluded that current management practices will not allow for progress to be made towards achieving Standard 3. This was evident at various key areas across all three allotments. Actual use for all three allotments averaged about 44% (2,248 AUMs) of total permitted use for all 3 allotments over a 13 year period. At some key areas trend is down or static for warm season grass species. During development of issues for this EA, scoping meetings, field visits, and through public review of the CQFM Rangeland Health Evaluation the ID Team, other agencies, interested publics, and the grazing permittee suggested that potential causal factors for not meeting standards were persistent impacts from rangeland fire, drought, burros and existing grazing management. To remedy this condition, the team suggested that a change in grazing preference, stocking rate, utilization limits, and periodic rest during the growing seasons for cool and warm season plants in all three allotments could provide the opportunity for recruitment of perennial plants and grasses necessary to sustain healthy rangelands, wildlife habitat, and the ranch operation.

1.5.1 Consultation, Cooperation, and Coordination

A draft evaluation was sent out for public review and comment to individuals, organizations agencies. Comments were received from the grazing permittee, Mohave Livestock Association, Arizona Game and Fish Department (AZGFD) and Western Watersheds Project. Comments were reviewed by an ID Team and incorporated into the final evaluation report where applicable. This EA reflects the comments that were incorporated into the updated evaluation. A timeline of eighteen different meetings between the permittee, BLM and interested publics is found in the evaluation

A preliminary EA titled *Cerbat, Quail Springs, and Fort MacEwen Allotments Grazing Permit Renewal* numbered DOI-BLM-AZ-C010-2011-0017-EA was posted for public review on May 1, 2013 for a 24-day comment period ending on May 24, 2013. The KFO received nine public comment letters, including

from the permittee, members of the ranching community, the Mohave Livestock Association, Arizona Game and Fish Department, and Western Watersheds Project.

Comments from the ranching community supported the no action alternative which would not reduce the preference on the permit and follows the 1980 Allotment Management Plan which used the best pasture method grazing systemAZGFD supported the Proposed Action, but added that a contingency plan was needed to account for vegetation to recover after destructive natural events such as drought and fire. Western Watersheds Project specifically commented on the alternatives, stocking rate, and supported the no grazing alternative based on their analysis of data from the land health evaluation.

As a result of these comments and discussions between the ranching community and BLM managers, the Colorado River District, (CRD) District Manager approached the State Director and the Resource Advisory Committee (RAC) about forming a subcommittee to evaluate the EA and provide recommendations to the RAC. The subcommittee was formed in November 2013 by inviting applications from commenters to the EA and interested publics

The subcommittee included representatives of the environmental and business communities, local ranchers and agency representatives from Arizona Cattle Growers, Arizona Game and Fish Department, Mojave Livestock Association, and Natural Resource Conservation Service. The public and affected parties including the permittee were invited to all subcommittee meetings. The Designated Federal Official for the RAC subcommittee was Colorado River District Manager Roxie Trost. Official delegates for the subcommittee are found in Chapter 5 List of Preparers.

The RAC subcommittee was facilitated by professional third-party facilitators, Southwest Decision Resources, who were engaged through a BLM-University of Arizona Cooperative Ecosystem Studies Unit Assistance Agreement. Seven meetings occurred from December 17, 2013 to April 24, 2014. Agreements from those meetings were based on a consensus process with operational protocols agreed upon by all members. Documents from the process can be found on the subcommittee website: https://sites.google.com/site/kingmangrazingsubcommittee/

Subcommittee tasks included: 1) review the preliminary EA, 2) identify scoping issues and expand existing issues in the EA, 3) identify additional alternatives or expand existing alternatives in the EA, 4) provide consensus recommendations through the RAC to the BLM Designated Federal Official.

Through the collaborative process, the RAC subcommittee chose to develop a new Adaptive Management Alternative which provides flexibility for managing livestock and rangeland resources. Adaptive Management is a dynamic, iterative process, and a systematic approach for improving resource management by learning from management outcomes. Management decisions on stocking rate, pasture rotation, and added range infrastructure can be based on a series of thresholds or indicators. These indicators can be drawn from publically available sources (e.g., drought indices), monitoring data (e.g., utilization or ecological trend) and/or local management experience. As part of the collaborative process, the RAC subcommittee developed adaptive management scenarios, thresholds, and subsequent management actions for the CQFM Allotments.

1.5.2 Native American Consultation and Coordination

Kingman BLM and the Colorado River District entered into a Memorandum of Understanding (MOU) with Hualapai Tribe (BLM 2012). The MOU clarifies that consultation is not necessary for grazing permit

renewals and existing range improvements. Proposed range improvements do not require consultation unless located on an archaeological site or area of cultural significance.

1.5.3 Issues Identification

The ID Team carefully considered comments by BLM specialists, interested publics, the permittee and affected agencies in order to identify issues relevant to issuing a 10-year grazing permit. The issues were identified during team meetings and in the process of rangeland health evaluation development dated March 12, 2010 (BLM 2010).

Area of Critical Environmental Concern (ACEC)

How will ACEC values of desert bighorn sheep, mule deer, and wild burros be affected by changes to grazing management within the BMEMP Area of Critical Environmental Concern by competition for forage?

Would changes to grazing management cause competition for forage, space and water within the Black Mountains Ecosystem Management ACEC designated to protect values of desert bighorn sheep, mule deer, and wild burros?

Climate Change

How would permit renewal of a livestock operation contribute to greenhouse emissions?

How can the grazing management plan best address the effects of climate change i.e. higher temperatures and drought on the production of key species?

Would a change to the stocking rate help reduce effects of climate change on the condition of the key species?

Cultural Resources

Would cultural resources be affected by livestock grazing either from direct trampling and/or the construction and maintenance of proposed range improvements?

Invasive Non-Native Species

What effect would the reduction of key species by livestock have on the spread of invasive and non-native plant species?

There is an assumption that when key species are grazed to the extent that vigor is poor, invasive plant species will increase in abundance. Is this happening on the allotment? What invasive species are present and how are they affecting the allotment? Will grazing management change the amount and types of invasive species?

Is there evidence to support the assumption that the threat of wildfire is reduced when cattle graze red brome?

Lands and Realty

Can the terms and conditions of the 1980 Allotment Management Plan still be implemented in areas where residential development is occurring such as in the Town of Chloride and Detrital Valley?

Would new fencing improvements help to keep cattle off Lake Mead National Recreation Area (LMNRA)?

Livestock Grazing Management

How would combining the allotments, resting/deferring the different pastures or changing livestock stocking rates affect the economics of the permittee's ranching operation (i.e. calf crops, calf weights at sale, total numbers of calves, total number of employees) and the local economy?

How can we ensure all three of these "I" (Improve) Category allotments have an upward trend?

If range improvements were maintained would, there be better control of livestock?

What can be done to mitigate impacts to range improvements from residential development and recreation use?

Would the implementation of the BMEMP objectives through the terms and conditions of the grazing permit, i.e. grazing decisions help improve habitat and rangeland health?

How would a change in the kind of livestock in the Quail Springs allotment to provide for 15 horses affect the permittee's grazing operation?

How would the development of new water facilities affect livestock grazing management?

How would the development of exclosures affect livestock grazing management?

Riparian

How would changes to grazing management affect riparian habitat at springs located in the allotments?

Vegetation

What effect would the proposed changes in utilization limits have on vegetation.

Would vegetative control sites, i.e. exclosures, near key areas, help to evaluate the effects of the proposed management actions?

How is yearlong grazing affecting the plant community's recovery from wildfire?

Are the vegetative objectives identified in the BMEMP plan being met?

How would resting/deferring the different pastures or adjusting livestock stocking rates affect the productivity of the key species?

Wild Horses and Burros

How would wild horses and burros in the Black Mountain Herd Management Area and the Cerbat Herd Area be affected by proposed changes in grazing management?

Wildfire

Could grazing management reduce the potential of wildfire by red brome? Red brome is a driver in good years.

How would the closure of pastures burned by wildfire affect grazing management and vegetation in these areas?

Wilderness

What type of access is allowed in wilderness for livestock management?

Would values for wilderness change as a result of changing livestock management?

Wildlife Including Special Status Species

How would wildlife, including special status species be affected by proposed changes in grazing management?

Would Sonoran desert tortoise, primarily found in the Twin Mills Pasture, be affected if this pasture is temporarily closed to grazing to allow native vegetation recovery after wildfire?

What species of wildlife including special status species and migratory birds would be affected by proposed changes in grazing management?

Would wildlife benefit from an improved grazing management plan that provides rest and deferment and accommodates climatic conditions such as drought?

Are there any federally listed species present in the allotments that would be affected by changes to grazing management?

Would resting the Twin Mills Pasture from livestock grazing benefit post-fire recovery of wildlife habitat?

Could fencing be repaired in order to manage cattle and keep waters operating in all pastures for wildlife even when cattle are excluded from the area?

Are all stock waters accessible to wildlife?

How would leaving range waters on public lands open to wildlife year round affect wildlife?

1.6 Relationships to Statutes, Regulations, or Other Plans

Table 2 lists statutes, regulations, policy and local area planning documents germane to the analysis area, Proposed Action and alternatives.

Table 2. Statutes, Regulations and Other Plans Relevant to Proposed Action

Proposed Action Element	Authority
Air Quality	Clean Air Act of 1970
Climate Change	Department of Interior Order No. 3225 "Evaluating Climate Change Impacts in Management Planning"
Cultural Resources	National Historic Preservation Act of 1966
Cultural Resources	Native American Graves Protection and Repatriation Act of 1990
Livestock Grazing	National Environmental Policy and Management Act of 1969
Livestock Grazing	Taylor Grazing Act of 1934 as amended
Livestock Grazing	Federal Land Policy and Management Act of 1976 as amended
Livestock Grazing	Public Rangelands Improvement Act of 1978
Livestock Grazing	Grazing regulations under 43 CFR 4100 and associated BLM Manual policy
Water Quality	Arizona Water Quality Standards, Revised Statute Title 49, Chapter II
Wild Horses and Burros	Wild Free-Roaming Horse and Burro Act of 1971
Wildlife	Endangered Species Act of 1973
Wildlife	Migratory Bird Treaty Act of 1918
Wildlife	Executive Order 13186 – Responsibilities of Federal Agencies to Protect Migratory Birds
Wildlife	Sonoran Desert Tortoise Interagency Management Plan
Wilderness	The Wilderness Act of 1974

2 PROPOSED ACTION AND ALTERNATIVES

The action alternatives were developed to address the need for changes in grazing management in order to address the need to achieve the land health standards. The current grazing system is described under the Alternative 3 No Action as a baseline for comparison to the action alternatives. Table 3 summarizes this comparison.

Table 3. Comparison Grazing Strategies of the Proposed Action (Alternative 1) to the Alternatives.

Alternative	Number of Livestock	Deferment	Moves	Proposed Range Improvements
Alternative 1 Proposed Action	Grazing Preference: 578 AU's (559 cattle and 15 horses) Initial Stocking Rate: 455 AUs	**Growing Season Deferment/ per 4 Years** **WEST UNIT** **Black Tank/Valley** 1 of 4 (no spring or summer deferment) 2 of 4 (spring deferment) 2 of 4 (summer deferment) (the above includes one back to back spring/summer rest in one year) **Sugarloaf** Same as Black Tank/Valley **Lost Cabin/Squaw Pocket** 1 of 4 (no spring or summer deferment except a late summer deferment during that year). 2 of 4 (spring deferment) 2 of 4 (summer deferment) (the above includes one back to back spring/summer deferment in one year) **Highway 93** Same as Squaw Pocket/Lost Cabin **Twin Mills** 4 of 4 years (spring and summer deferment, except during ephemeral years then grazing would occur in the spring).	2 per year	Reconstruct fences to ensure pasture integrity. Install new cattleguards. Proposes new wells with associated storage tanks and troughs. Construct exclosures. Reconstruct one riparian exclosure. Reconstruct one water pipeline.

Alternative	Number of Livestock	Deferment	Moves	Proposed Range Improvements
		Growing Season Deferment/ per 9 Years **EAST UNIT** **Upper Pasturesd*** 3 of 9 (spring deferment) 4 of 9 (summer deferment) 2 of 9 (no deferment/ or partial late summer deferment) **Lower Pastures*** 5 of 9 (spring deferment) 4 of 9 (summer deferment) 1of 9 (no deferment)		
Alternative 2 Reduced Preference Alternative	Grazing Preference: 237 AUs Initial Stocking Rate: 203 AUs (includes 10 horses for two months)	East Unit: 3 of 5 years spring and summer deferment West Unit: 2 of 3 years spring and summer deferment	3 per year	Reconstruct fences to ensure pasture integrity. Develop a water facility in East Unit Cerbat Pasture. Construct 3 exclosures. Reconstruct one riparian exclosure.
Alternative 3 No Change to Current Conditions	Grazing Preference: 578 AUs Initial Stocking Rate: 578 AUs	None, yearlong grazing continues	0	Construct and repair range improvements on BLM portion of allotments as authorized in 1980 AMP.
Alternative 4 No Grazing	0	N/A	N/A	None

*Upper Pastures = Cerbat, East Big Wash, Marble Canyon; Lower Pastures = House, Big Wash, Quail Springs

2.1 Alternative 1 Proposed Action Adaptive Management Alternative

Adaptive management provides a framework for collaboration and decision making among all parties involved in the CQFM Allotments. The Proposed Action was developed through the NEPA process and during RAC Grazing Subcommittee field trips and meetings held at the KFO during winter and spring of 2013-2014.

The Adaptive Management alternative consists of the following parts: 1) identification of goals and objectives; 2) renewal of the grazing permits following a rotational grazing plan that provides periodic

growing season rest for both the East and West Units; 3) construction of new range improvements needed to implement the grazing plan including water facilities, cattleguards, and fencing ; 4) construction of vegetation monitoring exclosures; 5) implementation of adaptive management and monitoring. For a more detailed description of Alternative 1 see Appendix C.

2.2 Alternative 2 Reduced Preference Alternative

The alternative is to reissue three 10-year permits in conformance with the Kingman RMP and related plans. The alternative replaces the 1980 Allotment Management Plan (BLM 1980a and 1980b). The management practices proposed under this alternative were designed to manage the three allotments for livestock grazing, provide for a diversity of wildlife and plant species, maintain functioning ecosystems, and maintain and/or improve ecological condition in order to meet standards of rangeland health.

Alternative 2 consists of three parts: renewal of the grazing permits, construction of new/maintenance of existing range improvements needed to implement the grazing plan, and construction of three exclosures to separate the effects of management, weather and other factors.

The CQFM Allotments would be managed as two units, one east and one west of U.S. Highway 93 (US-93; Appendix D Figure D-1). A detailed description of Alternative 2 is found in Appendix D.

2.3 Alternative 3 No Action –No Change to Current Terms and Conditions

An Allotment Management Plan (AMP) (Appendix C) was approved in 1980 which stated the permittee would implement a Best Pasture Grazing System from the Jornada Experimental Range Report No. 1 (Harbel and Nelson 1969) for CQFM. According to the system, BLM and the permittee would meet two times per year to decide which pastures should be rested during the year. The grazing system would be followed in accordance with the terms and conditions of the permit with the preference shown in Appendix E, Table E-1.

The permittee currently operates a cow/calf business on these allotments. The 1980 AMP has not been and currently is not followed. Generally cattle have been and are grazed in all pastures yearround. A detailed description of Alternative 3 is found in Appendix E.

2.4 Alternative 4 No Grazing Alternative

Under this alternative, the permits would be cancelled and livestock grazing would not be authorized for the CQFM Allotments. A process would be initiated in accordance with the 43 CFR 4100 regulations to suspend grazing for a length of time or eliminate grazing and make the allotment unavailable for grazing. The BLM could amend the Kingman RMP (BLM 1995) in accordance with 43 CFR parts 4100 and 1600 to eliminate grazing on these allotments. In accordance with 43 CFR 4110.3-3, permitted grazing use of the allotment would terminate.

2.5 Alternatives Considered but Eliminated From Detailed Analysis

The CQFM Rangeland Health Evaluation (BLM 2010) recommended several grazing management scenarios. One of the scenarios was carried forward into this document as Alternative 2 and three other scenarios were not carried forward because they were substantially similar in scope.

During discussions of the RAC subcommittee there was a grazing plan proposed for the East Management Unit. The proposal was to move cattle twice a year between the upper and lower pastures. The upper pastures are Cerbat, East Big Wash and Marble Canyon, and the lower pastures are House, Big

Wash, and Quail Springs. The planned grazing schedule for the upper pastures was November 15 to May 1 every year. The planned grazing schedule for the lower elevation pastures was May 1 to November 15 each year. This type of flip flop rotation would not provide any planned warm season deferment for the lower pastures and would not provide any planned cool season deferment for the upper pastures . With no planned warm season deferment for lower pastures and no planned cool season deferment, this proposal would not likely continue to meet the standards or move these plant communities toward meeting standards for rangeland health. Therefore a grazing plan was developed under the proposed action which will provide both cool and warm season deferment for all pastures .

3 AFFECTED ENVIRONMENT

This chapter describes the general project setting and addresses standard critical elements of the human environment (H-1790-1, Appendix 5 of the BLM NEPA Handbook, as amended) and several other resources elements commonly affected by livestock grazing. A detailed discussion of the resources present in the action area can be found in the *Cerbat, Quail Springs & Fort MacEwen Allotments Rangeland Health Evaluation* (BLM 2010).

3.1 General Project Setting

3.1.1 Landscape Setting

CQFM is 20 miles northwest of Kingman, Arizona (Figure 1). The three allotments cover an area of land ranging from the ridgeline and west side of the Cerbat Mountain Range to the ridgeline and east side of the Black Mountain Range. The landscape includes the fan terraces, drainages and low hills in Detrital Valley that lie between the two mountain ranges. The major land resource area is the Mohave Desert. Dominant aspect plants include creosote bush, white bursage, Joshua tree and Mohave yucca.

The main drainage in the Cerbat Allotment is Sacramento Wash which originates in the Cerbat Mountains and flows south into Sacramento Valley and ultimately to the Colorado River. Big Wash flows westward from the Cerbat Mountains into the uppermost reaches of Detrital Wash at the head of Detrital Valley. Detrital wash flows north through Detrital Valley and ultimately reaches Lake Mead.

3.1.2 Climate

The climate of the Mohave Desert region is generally warm, windy and dry with extreme highs near 120 degrees Fahrenheit (F) and extreme lows near 25 degrees F. Precipitation ranges from 3 inches on the valley floor to 12 inches on the higher peaks in the Black Mountains and 16 inches in the Cerbat Mountains. The climate is influenced by both winter Pacific frontal storms and summer orographic convective storms. Approximately 65 percent of the annual precipitation falls during the cooler months of October through April with approximately 35 percent of the annual precipitation falling during the months of May through September. This bi-modal rainfall pattern results in two distinct growing seasons which occur in the spring and summer.

From 1992 through 2008 warm season drought occurred in eleven out of seventeen years and cool season drought occurred in nine out of seventeen years. Warm-season drought condition occurred several years in a row starting in 1993-1996, 2001-2003, and 2007-2008. In the 1980s, seasonal droughts also occurred but were less, frequent four out of eleven years. The duration of drought was shorter as well, usually lasting only one or two years in a row.

3.2 Elements/Resources of the Human Environment

The BLM is required to consider many authorities when evaluating a Federal action. Those elements of the human environment that are subject to the requirements specified in statute, regulation, or executive order, and must be considered in all EAs (BLM 2008), have been considered by BLM resource specialists to determine whether they would be potentially affected by the Proposed Action. These elements are identified in Table 4, along with the rationale for determination on potential effects. If any element was determined to be potentially impacted, it was carried forward for detailed analysis in this EA; if an element is not present or would not be affected, it was not carried forward for analysis. Table 4 also contains other resources/concerns that have been considered in this EA. As with the elements of the

human environment, if these resources were determined to be potentially affected, they were carried forward for detailed analysis in this document.

Table 4. Elements/Resources of the Human Environment

NP = Not present in the area impacted by the Proposed Action
NI = Present, but not affected to a degree that detailed analysis is required
PI = Present with potential for impact – analyzed in detail in the EA
* = Supplemental Authorities To Be Considered as defined in H-1790-1 (page 139).

Resource/Critical Element	Presence	Rationale for Effect Determination
Air Quality*	NI	The Federal Clean Air Act of 1970 required the Environmental Protection Agency to establish National Ambient Air Quality Standards, which specify maximum levels for six criteria pollutants; carbon monoxide, nitrogen dioxide, ozone, particulate matter (PM) (up to 10 and up to 2.5 micrometers in size), sulfur dioxide, and lead. Mohave County is classified by EPA as an "attainment area" for PM-10 authorized under the Clean Air Act Amendments of 1977 and 1990. Livestock operations release fugitive dust and carbon monoxide associated with cattle trailing, vehicle use and range improvement projects. The current livestock operation is in conformance with the air quality standards because it lies within the Mohave County PM-10 attainment area. Therefore all alternatives would be in conformance. The Proposed Action, Alternative 2, and the no grazing alternative would potentially reduce particulate matter even further because perennial plant cover is expected to increase.
Areas of Critical Environmental Concern	PI	Carried forward for detailed analysis.
BLM Sensitive Plant Species	PI	Carried forward for detailed analysis.
Climate Change	NI	BLM must take action to protect the environment in order to respond to the changing climate in accordance with 523 DM 1. The U.S. Geological Survey has reviewed the latest science on greenhouse gas emissions and concluded that it is currently beyond the scope of existing science to identify a specific source of greenhouse gas emissions or sequestration (storage) and designate it as the cause of specific climate impacts at a specific location (May 14, 2008 Memorandum to the U.S. Fish and Wildlife Service). BLM nevertheless recognizes that climate change may result in impacts to plants and animals. According to EPA website: http://www.epa.gov/ruminant.html/faq.html, an adult cow emits 80-110 kgs of methane per year. EPA estimates that there are 100 million cattle in the U.S. that emit about 5.5 million metric tons of methane per year, which is about 20 percent of U.S. methane emissions. The number of cattle currently permitted for the CQFM allotments is 578 cows which represents 0.000084 percent of methane production by cows in the United States. Thus, the proposed alternatives will not substantially contribute to greenhouse gas emissions.
Cultural Resources*	NI	There are numerous cultural sites scattered at low to moderate density across these allotments. They consist of: prehistoric artifact scatters of ceramic and stone tool debitage, and rock art sites; historic sites related to mining; and remnants of historic Hualapai Indian home sites. The home sites no longer have standing architecture and no perennial water. The mining sites have sparse vegetation and no perennial water.

Resource/Critical Element	Presence	Rationale for Effect Determination
		According to Arizona BLM Handbook H-8110, Guidelines for Identifying Cultural Resources (BLM 1999), livestock grazing actions, such as permit renewals are generally exempt from cultural resources surveys, and range improvements are land disturbing activities that require site-specific survey. BLM conducted Class III cultural resource surveys at all proposed range improvement locations and exclosure, no cultural resources were found at any of the locations (BLM Archaeologist Tim Watkins, personal communication). Since the 1970s, Kingman archaeologists conducted a minimum of Class II surveys in existing grazing allotments focused on areas where cattle congregate, loafing areas and on cattle trails. Historic structures eligible to the National Register are fenced. It was determined that no impact would occur to cultural resources as a result of proposed range improvements or to existing sites within the allotments. A Class III cultural resources survey was conducted on March 25, 2013 and Cultural Resources Project Record BLM-AZ-310-13-08 is on file documenting the survey results.
Environmental Justice*	NI	No environmental justice effects were identified or expected to happen if any of the alternatives were to be implemented. Continued livestock grazing under any of the action alternatives would have no disproportionately high or adverse human health or other environmental effects on minority or low income segments of the population.
Farmlands (Prime or Unique)	NP	There are no prime or unique farmlands within the allotment.
Fish Habitat*	NP	No fish habitat is present on the allotment.
Floodplains*	NP	No actions are proposed that result in permanent fills, diversions, or placement of permanent facilities in floodplains or special flood hazard areas. Continued livestock grazing would not affect the function of the floodplains.
Forests and Rangeland*s	NI	No impact to forests as defined by the supplemental authority referring to the Healthy Forests Restoration Act of 2003.
Fuels / Fire Management	PI	Carried forward for detailed analysis.
Geology / Mineral Resources / Energy Production	NI	Continuing livestock grazing would not alter geological features or mineral resources.
Invasive, Non-native Species	PI	Carried forward for detailed analysis.
Lands / Access	PI	Carried forward for detailed analysis.
Livestock Grazing	PI	Carried forward for detailed analysis.
Native American Religious Concerns*	NI	No Native American Religious Concerns were identified during scoping .
Paleontology	NP	There are no paleontological resources identified within the alluvial deposits present within the allotment.
Recreation	PI	Carried forward for detailed analysis.

Resource/Critical Element	Presence	Rationale for Effect Determination
Socio-economic Values	PI	Carried forward for detailed analysis.
Soil Resources	PI	Carried forward for detailed analysis.
Threatened, Endangered or Candidate Plant and Animal Species*	PI	Carried forward for detailed analysis.
Vegetation	PI	Carried forward for detailed analysis.
Visual Resources	NI	The allotments contain areas designated as Visual Resource Management Classes II, III, and IV. Continuing livestock grazing as proposed would not affect visual resources; new range improvements proposed would not change the existing character of the landscape and would meet the VRM objectives.
Wastes (Hazardous or Solid)*	NP	No known hazardous or solid waste issues occur in the allotment.
Water Quality (Drinking-Ground)*	PI	Carried forward for detailed analysis.
Wetlands-Riparian Zones*	PI	There are no wetlands/riparian zones within the allotment.
Wild and Scenic Rivers*	NP	There are no wild and scenic rivers within the allotment.
Wild Horses and Burros	PI	Carried forward for detailed analysis.
Wilderness*	NI	Approximately 8,180 acres of the Mount Tipton Wilderness, designated by Congress in November 1990, is located in the eastern portion of the Quail Springs Allotment. This area was selected for its high degree of naturalness. Livestock grazing is an existing use within the Wilderness. The Mount Tipton Wilderness Management Plan (BLM 1995a) allows non-motorized and non-mechanized inspection and routine maintenance of range improvements such as fences and water developments at springs. The existing Wilderness values of naturalness, outstanding opportunities for solitude, and primitive and unconfined recreation would be retained under any of the alternatives.
Wilderness Characteristics	NP	No additional wilderness characteristics have been identified within the allotment.
Wildlife (including BLM Sensitive Species and Migratory Birds*)	PI	Carried forward for detailed analysis.

3.3 Resources Present and Brought Forward for Analysis

The following sections contain descriptions of elements determined to be present and potentially affected by the alternatives and carried forward for detailed analysis in this document. The description of the resources identified below provides the baseline for comparison of impacts described in Chapter 4.

3.3.1 Area of Critical Environmental Concern

Part of the Black Mountains Ecosystem Management Area of Critical Environmental Concern (ACEC), a block of 10,348 acres (Figure 2), occurs within the Fort MacEwen Allotment. The ACEC was established in the Kingman RMP (BLM 1996) to manage the diverse resources within its boundaries by balancing competing uses. The resources identified were: desert bighorn sheep, wild burro and habitat for the two-colored beard tongue habitat, outstanding scenic values; open space near major population centers; rare and outstanding cultural resources; mineral deposits; and livestock grazing. The direction for range and watershed management within the RMP is to manage livestock and burro grazing to achieve objectives for bighorn sheep, wild burro, deer and two-colored beard tongue desired plant community description; and classify allotments within 9 miles of bighorn sheep habitat for grazing by livestock as cattle only. Livestock grazing is an existing use within the ACEC.

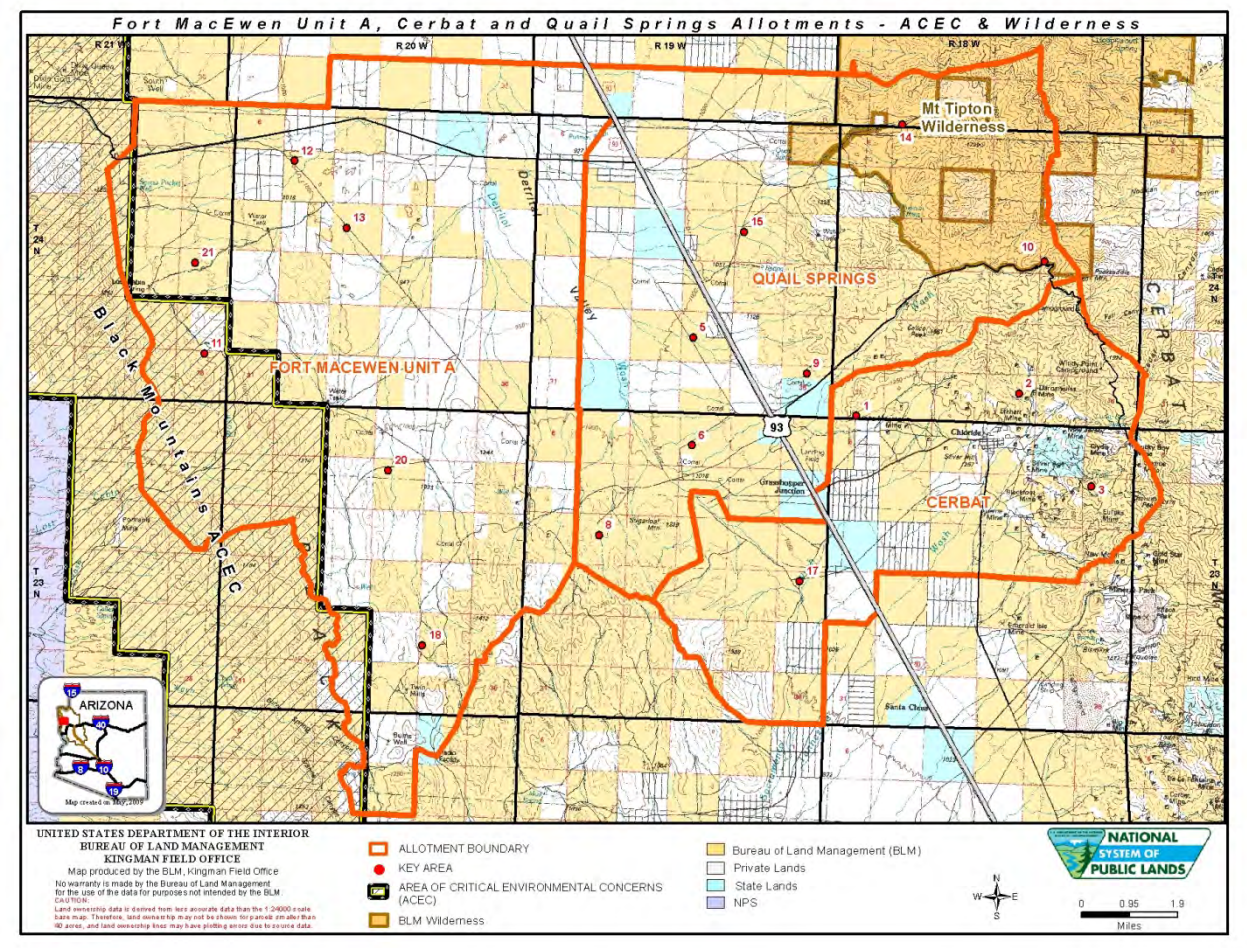

Figure 2 Location of Black Mountain Area of Critical Environmental Concern in Relation to the Allotments

3.3.2 Fuels/Fire Management

The CQFM allotments are located in the Mohave Desert where desert scrub is the dominant plant community. Desert scrub vegetation types are not fire-adapted and native species do not readily recover from the effects of wildfire. Fire is carried by exotic annual grasses which have invaded into the landscape. Exotic annual grasses such as red brome become fire hazards after wet winters. The grasses typically cure by mid-May, when the fire season typically begins.

The vegetation within the Fort MacEwen allotment in the Twin Mills and Valley Pastures were burned by wildfire, the Twin Mills fire, in July 2005, which burned 11,927 acres. Another fire called the Union Fire burned in June 2006 covering 8,380 acres (Figure 3). In the 1980s and 1990s, several other smaller scale fires occurred in the Fort MacEwen and Quail Springs allotments. Red brome was the primary fuel which carried these fires; other annual grasses and forbs contributed, as well. No hazardous fuel reduction or fuels management projects are proposed for these allotments.

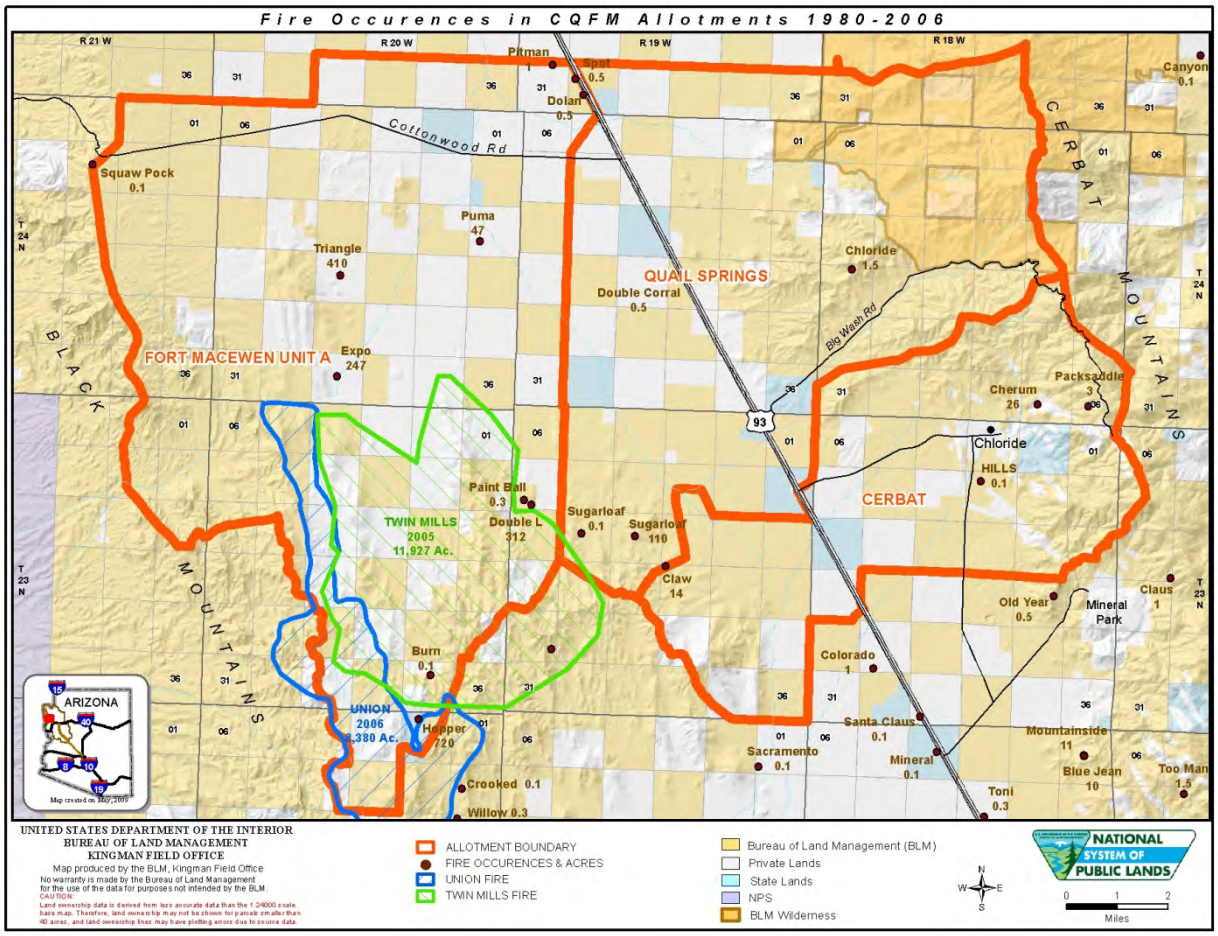

Figure 3. Wildfire Occurrence in the CQFM Allotments

3.3.3 Invasive, Non-native Species

A number of invasive, non-native species are present in the allotments some of which have been in Arizona for more than 50 years and are common throughout the state and Mohave County. BLM employees and a recent invasive species survey documented along U.S. Highway 93 (ADOT 2009)

indicate the most common invasive species are cheatgrass, red brome grass, Sahara mustard, puncture vine, Malta starthistle, and Mediterranean grass.

The presence of cheatgrass and red brome across these allotments is variable depending upon the amount and seasonal distribution of rainfall. In years with favorable precipitation, these grasses are widespread across the desert floor. In low rainfall years they are restricted to the base of desert shrubs. Cheatgrass and red brome are not listed on the Arizona Noxious Weed List, but both are considered very invasive non-native grass species (Arizona Wildlands Invasive Plant Working Group 2005). They are grazed by cattle when the plants are immature, prior to producing seed and curing out.

Sahara mustard and Malta starthistle are spreading northward along the highway corridor and are found primarily along the U.S. Highway 93 roadside. Puncturevine is found primarily in the residential areas dispersed throughout the allotments within the valleys. The seed is spread by vehicle tires and it germinates in disturbed areas such as parking lots and along roadsides. Mediterranean grass is widespread throughout the desert southwest.

3.3.4 Livestock Grazing Management

A grazing permit is issued for livestock forage produced on the public lands and is allotted on an AUM basis. Livestock are to be grazed on public lands in accordance with the terms and conditions of the BLM issued grazing permit including numbers, established season of use, etc. The livestock operator assumes grazing management responsibility with the intent to maintain or improve existing resources. The BLM retains the right to manage the public lands for multiple uses and to make periodic inspections to ensure that inappropriate grazing does not occur.

The BLM does not control private lands within the allotments. The permit holder may own or lease private lands for grazing. If private land is used during different periods, it is the permittee's responsibility to keep livestock off the public land during non-grazing periods.

Acreage of land ownership within each allotment is shown in Table 5. Permitted Use for the Cerbat Allotment is 1,953 AUMs; 2,614 AUMs for Quail Springs Allotment; and 1,796 AUMs on the Fort MacEwen Allotment. There are also 726 AUMs on this allotment which were suspended for administrative reasons. An AUM means the amount of forage necessary for the subsistence of one cow or its equivalent for a period of one month (43 CFR 4100.1-5).

Table 5. Land Ownership by Allotment

Ownership	Cerbat	Quail Springs	Fort MacEwen	Total
Federal	18,602 acres	32,538 acres	34,982 acres	86,122
State	1,262 acres	2,573 acres	896 acres	4,731
Private	5,979 acres	9,317 acres	25,553 acres	40,849
Total	25,843 acres	44,428 acres	61,431 acres	131,702

The CQFM allotments are categorized as perennial ephemeral "improve" (I) allotments. This category identifies allotments with management and resource concerns; and these allotments are managed more intensively and monitored more frequently. Allotments in this category are the highest priority for monitoring and investment in improvements. As a result of their categorization as improve allotments, all

three have AMPs in place. The Cerbat, Quail Springs and Fort MacEwen AMP was approved September 30, 1980. The three allotments are grazed together as two units – one east of US-93 and one west of the highway.

Every year some of the pastures are lightly stocked to reduce grazing pressure. The actual/licensed use is shown in Table 6 but it does not reflect the light stocking rate by pastures because actual use was given by allotment not pasture. All AUMs shown before 2001 are based upon licensed use. Actual use reporting did not start until 2001, and actual use was reported by allotment not by pasture. Actual use of the permitted AUMs on the Cerbat Allotment has varied from 7 to 100 percent between 1998 and 2008. Actual use within the Quail Springs Allotment has varied from 0 to 92 percent between 1998 and 2008. Actual use within the Fort MacEwen Allotment has varied from 0 to greater than 100 percent, due to additional cattle being placed on ephemeral forage

Table 6. Actual/Licensed Use from 1998 to 2010 for the CQFM Allotments

Year	Cerbat AUMs	Quail Springs AUMs	Fort MacEwen AUMs
1998	1953	2397	1437
1999	518	1757	2489 (of this 712 AUMs are Eph)*
2000	1150	632	3729 (of this 1952 AUMS are Eph*)
2001	679	367	626
2002	132	0**	0**
2003	371	522	828
2004	211	340	667
2005	335	162	1242
2006	391	297	759
2007	391	1782	3588 (of this 1811 AUMs are Eph*)
2008	502	1836	1766
2009	338	991	1766
2010	670	2106	1769

*(+Eph) Means additional cattle were turned out based upon additional ephemeral forage.
**Non-use reflects seasonally dry periods, drought years or other factors.

3.3.5 Lands and Realty

Land ownership within the CQFM Allotments is a mixture of Federal, State and private land. Of the private land, some is controlled by the permittee and other parcels are not under control of the permittee. The pattern of land ownership is shown in Table 5 above and in Figure 1. Some of the private parcels are fenced from cattle grazing. Fencing is listed in the 1980 AMP for proposed and existing range improvements. Change to the fencing design is warranted to accommodate population growth exhibited by new housing developments and changing demographics of land ownership within the allotment.

3.3.6 Recreation

Two developed campgrounds – Windy Point and Packsaddle – and the Cherum Peak Trail are located within the allotments. The remainder of the area in the allotments, excluding wilderness, is open to dispersed recreation uses and to OHV use on existing roads, trails and navigable washes. Livestock grazing and recreation are both existing uses that fit within the multiple use mandate of FLPMA.

3.3.7 Riparian

There are 22 riparian zones located on public and private lands associated with springs which were evaluated by BLM for proper functioning condition to determine if Land Health Standard 2 was being met (BLM 2010). Springs have the potential to develop and maintain riparian vegetation. Of the 22 springs, 13 were classified as perennial, 8 are ephemeral, and 1 spring is no longer active. There are no lotic (flowing) riparian wetland areas within these allotments.

Figure 4. Barksdale Spring is in the Cerbat Allotment, Standard 2 is Met

Table 7 shows the nine perennial springs located on public land for which BLM has jurisdiction. Standard 2 was met at Barksdale Spring, Lucky Boy Spring, the Falls Springs-Upper, and James Spring. Standard 2 was not met at the Falls Springs-Lower, Swicker Spring, and Big Wash Spring. BLM has no jurisdiction over the 13 springs located on private land.

Table 7. List of Perennial Springs on Public Land and Whether Standard 2 Was Met or Not Met

Standard 2 – Riparian and Wetland Sites			
Spring Name	**Met**	**Not Met**	**N/A**
Barksdale Spring	X		
Lucky Boy Spring	X		
Upper Falls Spring	X		
Lower Falls Spring		X	
Swicker Spring		X	
Big Wash Spring		X	
James Spring	X		
Copper Age Spring*			X
Lost Cabin Spring*			X

*Copper Age Spring: This spring has no riparian development potential. It is located within a mine adit that has caved in. The water, if present, is in the mine and accessible only to small animals that can crawl into the caved in area.

*Lost Cabin Spring: This spring no longer active on the surface or in the subsurface and is not considered perennial or ephemeral.

Figure 5. Lucky Boy Spring in the Cerbat Allotment, Standard 2 is Met

Standard 2, Riparian-Wetland Sites does not apply to the six ephemeral springs that were inventoried on public land nor is this standard applicable to Lost Cabin Spring and Copper Age Spring. These springs either are dry or intermittently produce such a small amount of water that they have no potential to support riparian vegetation.

3.3.8 Socioeconomics

The permittee operates a cow calf operation is permitted for 578 AUs but has averaged 203 AUs per year between 1998 and 2010 (Table 6). Depending on the condition and number of cattle for any given year the permittee reports a 70 percent calf crop.

In a letter to BLM, Mohave County Livestock Association (April 15, 2010) suggested the CQFM allotments at 578 AUs would add $4,566,200 over 10 years to the local economy.

The permittee pays grazing fees of which 12.5 percent are returned to the Mohave County grazing board each year in accordance with the Taylor Grazing Act. Another 50 percent of these fees are returned to BLM for the construction and maintenance of range improvements in accordance with the Federal Land Management and Policy Act. Depending on the price of the AUMS and the number of AUMs utilized for that year Mohave County grazing board on average receives $30,000 each year for all ranches combined including the Arizona Strip. BLM receives approximately $70-80,000 each year for range improvements. Over the last seven years the permittee averaged $4,900 in grazing fees annually. This means $588 would go to the grazing board and $2,450 would come back to BLM for range improvements.

In the management of the grazing permit, the permittee hires approximately three year round employees to manage livestock waters and administer the business. He may employ additional labor of one or more individuals on a seasonal basis.

The sale of calves at stockyard by the permittee benefits the financial needs of the permittee and provides capital to purchase goods and services for continuation of the grazing operation and personal needs.

3.3.9 Soils

The soils and ecological sites on the CQFM Allotments have been mapped, correlated, and approved to National Cooperative Soil Survey Order III soil survey standards (Soil Survey Manual, Soil Taxonomy, National Survey Handbook). This information is published in the Soil Survey of Mohave County, Arizona, Central Part 2005 by the Natural Resource Conservation Service (NRCS). More in depth soil information for these allotments can be found on the NRCS website in the soil survey report of Mohave County Arizona Central Part, 2005. Corresponding details on ecological site information, correlated to soil map unit information, is also found on the NRCS website.

To determine the functional status of the three rangeland heath attributes (soil/site stability, hydrologic function, and biotic integrity) the ID Team reviews the ratings of the 17 indicators on site by site basis and makes the interpretation into a collective rating. Based on the rating, it is determined if more information is needed or if the site requires management action (Pellant et al. 2005). The Rangeland Health Evaluation (BLM 2010) found that Standard 1, Upland Health, was met at all Key Areas. The upland soils were found to exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate, and landform (ecological site). Assessment results from all key areas indicate a “none to slight” departure from the attributes measured. The ID Team evaluated the ratings of the 17 indicators on a site by site basis and made a collective rating of none to slight which is the least departure from normal.

The open space between higher plants is not generally bare of life. Highly specialized organisms can make up a surface community that may include cyanobacteria, green algae, lichens, mosses, microfungi and other bacteria. Soils with these organisms are often referred to as cryptogamic soils and create what is referred to as biological crusts.

In general, cyanobacteria and microfungal filaments weave through the top few millimeters of soil and aid in holding loose particles together forming a biological crust which stabilizes and protects soil surfaces. The biological crusts aid moisture retention, “fix” nitrogen, and may discourage the annual growth of annual weeds. Below the surface, the soil flora grows various rhizomes, hyphae and filaments that further bind the soil together. No mapping of the allotments was conducted for biological crusts during the rangeland health evaluation. However, biological soil crusts are observed throughout the allotments in locations away from waters and where soils are meeting Standard 1.

3.3.10 Vegetation (Upland)

Management of the allotments is based on a selection of key species for each allotment. Appendix A lists plant species for the area. In the CQFM allotments, the more common key species are: big galleta, black grama, bush muhly, sideoats grama, Mormon tea, and twin-berry. The key plant species are listed in Appendix B and are defined as: 1) forage species of sufficient abundance and palatability to justify its use as an indicator to the degree of use of associated species; and 2) those species, because of their importance, must be considered in the management program (BLM 1996a, Smith et.al. 2005). Proper management of these key species provides for the physiological requirements of most of the other desirable species on the allotments. Appendix B is composed of tables for each key area in the allotments which depict the desired plant community (DPC) objectives for the Proposed Action and alternatives. These objectives are based on the ecological site descriptions of species composition and compared to species present at the key areas and historical data. DPC objectives are used as an indicator of ecosystem function and rangeland health.

Allotment monitoring data indicate that resource conditions on the allotments are not currently meeting all applicable standards for rangeland health because DPC objectives for vegetation components at key areas are not being met in some locations. The CQFM Rangeland Health Evaluation (BLM 2010) developed a data summary for each of the three Arizona Standards. Standard 3 evaluates whether vegetation objectives are being met. Table 8 and Figure 6 show that for 17 key areas, objectives are not being met for six key areas. For a detailed discussion on why objectives are met or not met, refer to the conclusion section of the CQFM evaluation (BLM 2010).

Xeroriparian or desert washes occur throughout CQFM. These washes are linear, infrequently flooded sites that have surface water for only brief periods often just for a few hours in a year. The perennial plant community consists of a mix of catclaw acacia, grey thorn, mesquite, wolfberry, cheeseweed, and wooly-fruited bursage.

Table 8. Rangeland Health Data Summary*

Allotment (Pasture)	Key Area	Ecological Site	Standard 1	Standard 3	Trend**
Cerbat	1	Sandy Loam Upland *10-13" p.z.*	Met	Met	Upward
Cerbat	2	Granitic Hills *10-13" p.z.*	Met	Met	Static to downward
Cerbat	3	Granitic Hills *10-13" p.z.*	Met	Not met, making significant progress	Static to upward
Cerbat	17	Clay Loam Upland *10-13" p.z.*	Met	Met	Downward
Quail Springs	5	Clay Loam Upland *10-13" p.z.*	Met	Not met	Downward
Quail Springs	6	Clay Loam Upland *10-13" p.z.*	Met	Met	Static
Quail Springs (Joint Use Area)	8	Basalt Hills *10-13" p.z.*	Met	Met	Static
Quail Springs	9	Sandy Loam Upland *10-13" p.z.*	Met	Met	Static
Quail Springs (East Big Wash Pasture)	10	Granitic Hills *10-13" p.z.*	Met	Not met	Downward
Quail Springs (Marble Canyon Pasture)	14	Granitic Hills *10-13" p.z.*	Met	Not met	Static to downward
Quail Springs (Quail Springs Pasture)	15	Sandy Loam Upland *10-13" p.z.*	Met	Met	Downward
Fort MacEwen Unit A (Lost Cabin Pasture, Joint Use Area)	11	Basalt Hills 6-*10" p.z.*	Met	Met	Static
Fort MacEwen Unit A (Squaw Pocket Pasture)	12	Sandy Loam Upland *10-13" p.z.*	Met	Not met	Static to downward
Fort MacEwen Unit A (Valley Pasture)	13	Sandy Loam Upland *10-13" p.z.*	Met	Met	Static

Allotment (Pasture)	Key Area	Ecological Site	Standard 1	Standard 3	Trend**
Fort MacEwen Unit A (Twin Mills Pasture, Joint Use Area)	18	Basalt Hills *10-13" p.z.*	Met	Not met	Static
Fort MacEwen Unit A (Twin Mills Pasture, Joint Use Area)	20	Limy Hills *10-13" p.z.*	Met	Not met	Static
Fort MacEwen Unit A (aka: Lost Cabin Spring, Squaw Pocket Pasture, Joint Use Area)	21	Sandy Loam Upland *10-13" p.z.*	Met	Not met, making significant progress	Upward

* Standard 2 (Riparian-Wetland Sites) assessments are not conducted at key areas as these areas are not riparian and therefore not listed in Table 8 but listed in Table 7.
**Based on the trend noted in the Rangeland Health Evaluation.

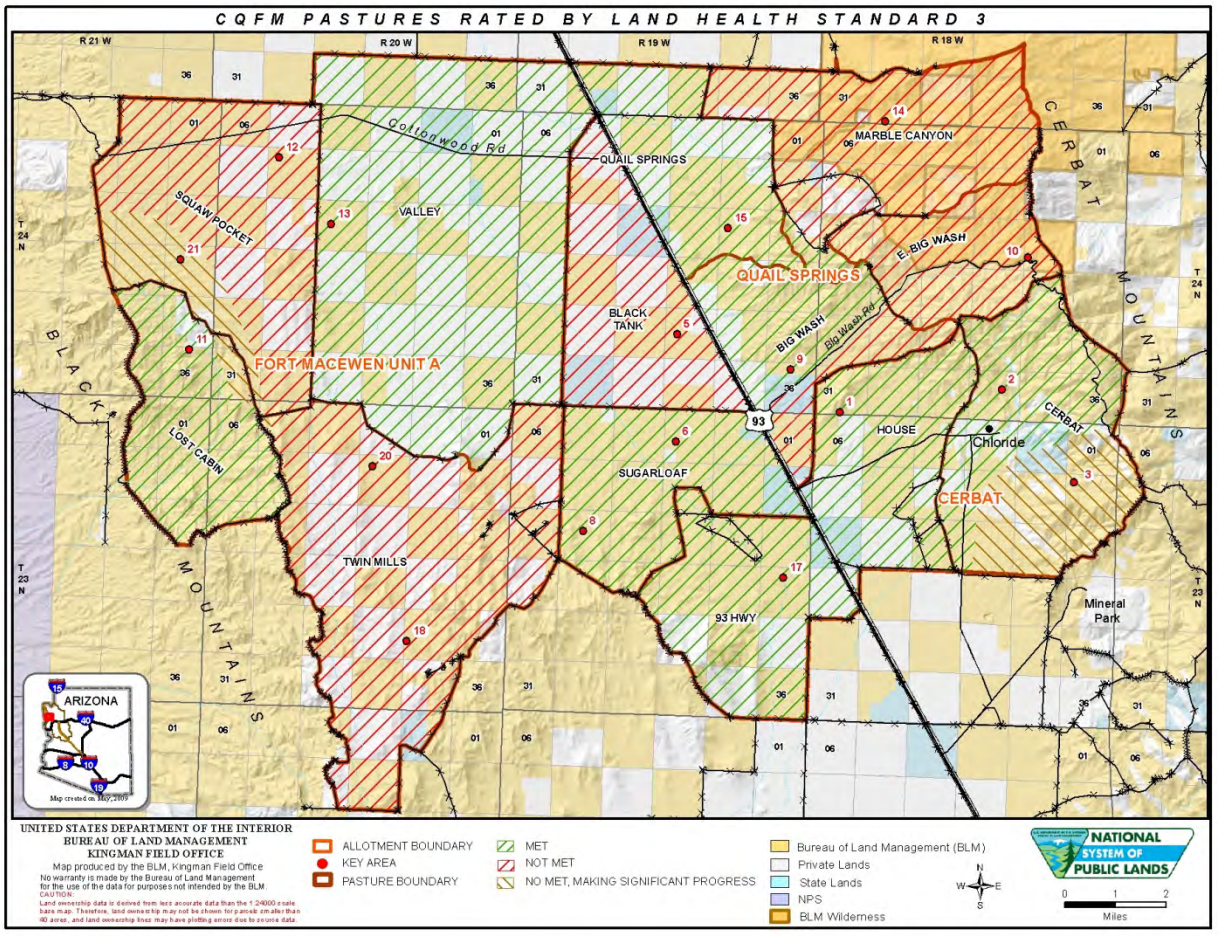

Figure 6. Map of Pastures Rated by Standard 3 at Key Areas

3.3.11 Water Quality (Drinking and Ground)

The main drainage in the Cerbat Allotment is Sacramento Wash, which originates in the Cerbat Mountains and flows south into Sacramento Valley and ultimately to the Colorado River. Big Wash flows

westward from the Cerbat Mountains into the uppermost reaches of Detrital Wash at the head of Detrital Valley. Detrital Wash flows north through Detrital Valley and ultimately reaches Lake Mead. During rainfall events large enough to cause surface flooding, surface water flows through washes. Groundwater flows in the same direction as surface water in each of the two basins. U.S. Geological Survey studied the groundwater occurrence and water level changes in the Sacramento and Detrital Valleys using recorded data from 1943 through 2006 (Anning, D.W. et al. 2007). The report indicates ground-water has remained steady or slowly increased for recorded wells within the CQFM allotment area. Conversely, ground-water has declined near the urban areas of Kingman and Golden Valley, outside of the allotment boundaries.

There is lentic (non-flowing) surface water within the allotments on public land at nine springs. There is no lotic (flowing) water within the allotments. The amount of water produced by each spring is variable depending upon ground-water conditions such as rock substrate and position within the aquifer. BLM is not required to test water quality at the surface water springs. The KFO RMP (BLM 1995) recognizes non-point source pollution as a factor which could affect water quality from various sources including from livestock grazing. This can be mitigated through appropriate grazing management.

3.3.12 Wild Horses and Burros

Wild horses and burros are protected and managed by the BLM in accordance with the Wild Free Roaming Horse and Burro Act, 1971, as amended. The goal of the Wild Horse and Burro Program is to manage for healthy herds and healthy rangelands.

The Black Mountain Herd Management Area (HMA) was designated in the early 1980s and is the largest in Arizona. The HMA includes the entire range of the Black Mountains encompassing approximately 1.1 million acres of land. Portions of the Cerbat, Quail Springs and Fort MacEwen allotments west of US-93 lie within the HMA. BLM conducted an aerial population estimate for burros in the HMA in 2010 and the population estimate was approximately 407 adults and 136 juveniles. The population estimate is for the entire HMA, but, through GPS, estimates can be made by individual allotments. However, this is a one point in time estimate, as wild horses and burros move in and out of individual allotments in search of different habitat needs.

Burros are medium sized ungulates that can use a variety of terrain including flat areas as well as the steep, more rugged terrain usually associated with bighorn sheep. Typically, burros are opportunistic grazers and can efficiently use coarse, lower quality forage (BLM 1996 and Burden 2012). The estimated appropriate management level (AML) in the Black Mountain is 478 wild burros (BLM 1996) based on a population metric determined by an analysis of monitoring data such as grazing use, vegetative production, trend in range condition, actual use, and other factors. Forage is allocated to burros in AUMs. One burro is 0.5 AUs, or two burros for one month equals 1 AUM.

The Cerbat Herd Area (HA), located in the Cerbat Mountains, is approximately 18 miles long and 12 miles wide tapering to a width of 4 miles at the northern end and encompasses approximately 83,000 acres. Portions of the Quail Springs and Cerbat allotments east of US-93 lie within the HA.

Horses can use a variety of terrain and are primarily grazers, preferring grasses and forbs to browse. Like wild burros, horses also have the ability to be highly selective feeders. In areas where utilization is heavy, horses have the ability to crop the vegetation closely (Stoddart et.al. 1975). Horses compete with livestock for forage and are less limited on the passage rate of food fragments through the digestive tract compared to cattle. Currently, there is no AML set for the Cerbat HA. Information is limited on the true extent of the

herd's home range, and their behavioral aspects. Population estimates have been limited with the most recent being in 2001. This survey resulted in an estimate of 70 wild horses across the entire HA. Current population levels are based on ground sightings from local residents in the area, ranchers and BLM personnel. Current population numbers for wild horses within CQFM is estimated to be 5 horses. BLM does not conduct any removals because the herd seems to self-maintain.

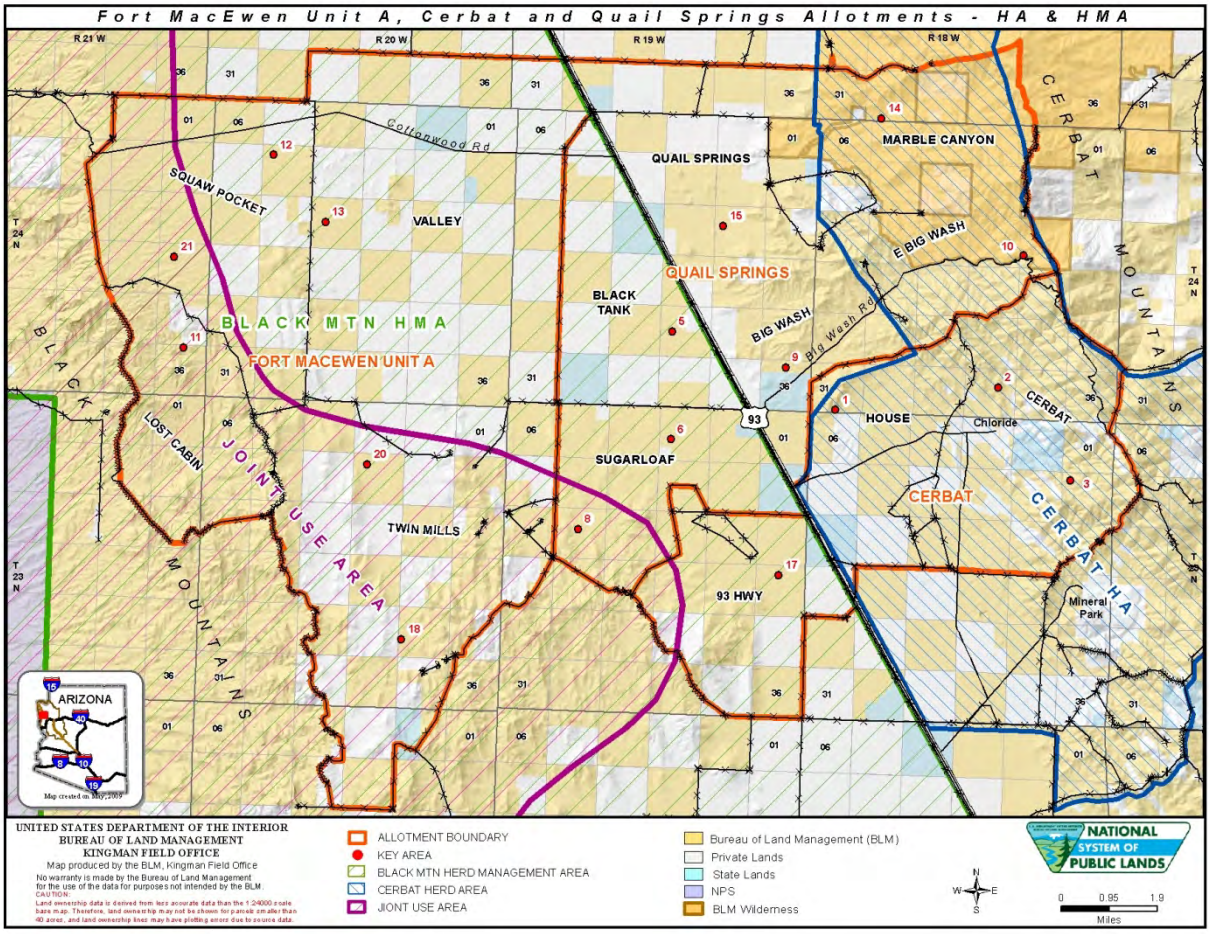

Figure 7. Cerbat Herd Area and the Black Mountain Herd Management Area

3.3.13 Wildlife including Special Status Species and Migratory Birds

Wildlife in the CQFM allotments considered in this EA includes federally listed and candidate species, BLM sensitive, general wildlife species, and migratory birds.

3.3.13.1 Federally Listed Species

A biological evaluation(BE) was completed for the CQFM allotments (BLM 2010a). The BE used the county list for Mohave County from the 2010 USFWS website. There is no suitable or critical habitat in the allotments for the Mexican spotted owl; southwestern willow flycatcher; Yuma clapper rail; Hualapai Mexican vole; Gila topminnow; or desert pupfish. Therefore there would be "no effect" to any of these species. The biological evaluation reported that CQFM is within the nonessential experimental range of the California condor however there would be no effect to this species from implementation of the Proposed Action (BLM 2010a) or alternatives. Because there was a determination of no affect for these species impacts will not be further analyzed.

3.3.13.2 Candidate and BLM Sensitive Species

In addition to the federally listed species there are a number of candidate and BLM sensitive animal species that occur or may occur within the CQFM Allotments (Table 9). Information on occurrence and habitat needs for many of these species is limited as sensitive species are usually rare within at least a portion of their range.

Table 9. Special Status Species That Occur or Have Potential Habitat in the Allotments.

Species	Federally Listed Species	Candidate Species	BLM Sensitive	Known to occur in allotments	Potential habitat in allotments
American peregrine falcon (*Falco peregrines*)			X	X	
Golden Eagle *(Aquila chrysaetos)*			X	X	
Western burrowing owl (*Athene cunicularia hypugaea*)			X	X	
California condor (*Gymnogyps californianus*)	X				X
Le Conte's Thrasher (*Toxostoma lecontei)*			X		X
Allen's big-eared bat (*Idionycteris phyllotis*)			X	X	
Fringed myotis (Myotis thysanodes)			X	X	
Arizona myotis (*Myotis occultus*)			X		
California leaf-nosed bat (*Macrotus californicus*)			X	X	
Cave myotis (*Myotis velifer*)			X	X	
Spotted bat (*Euderma maculatum*)			X		X
Townsend's big-eared bat (*Corynorhinus townsendii*)			X	X	
Greater Mastiff Bat (*Eumops perotis californicus*)			X		X
Sonoran Desert tortoise (*Gopherus agassizii*)		X	X	X	
Two-colored beard tongue (*Penstemon bicolor)*			X	X	

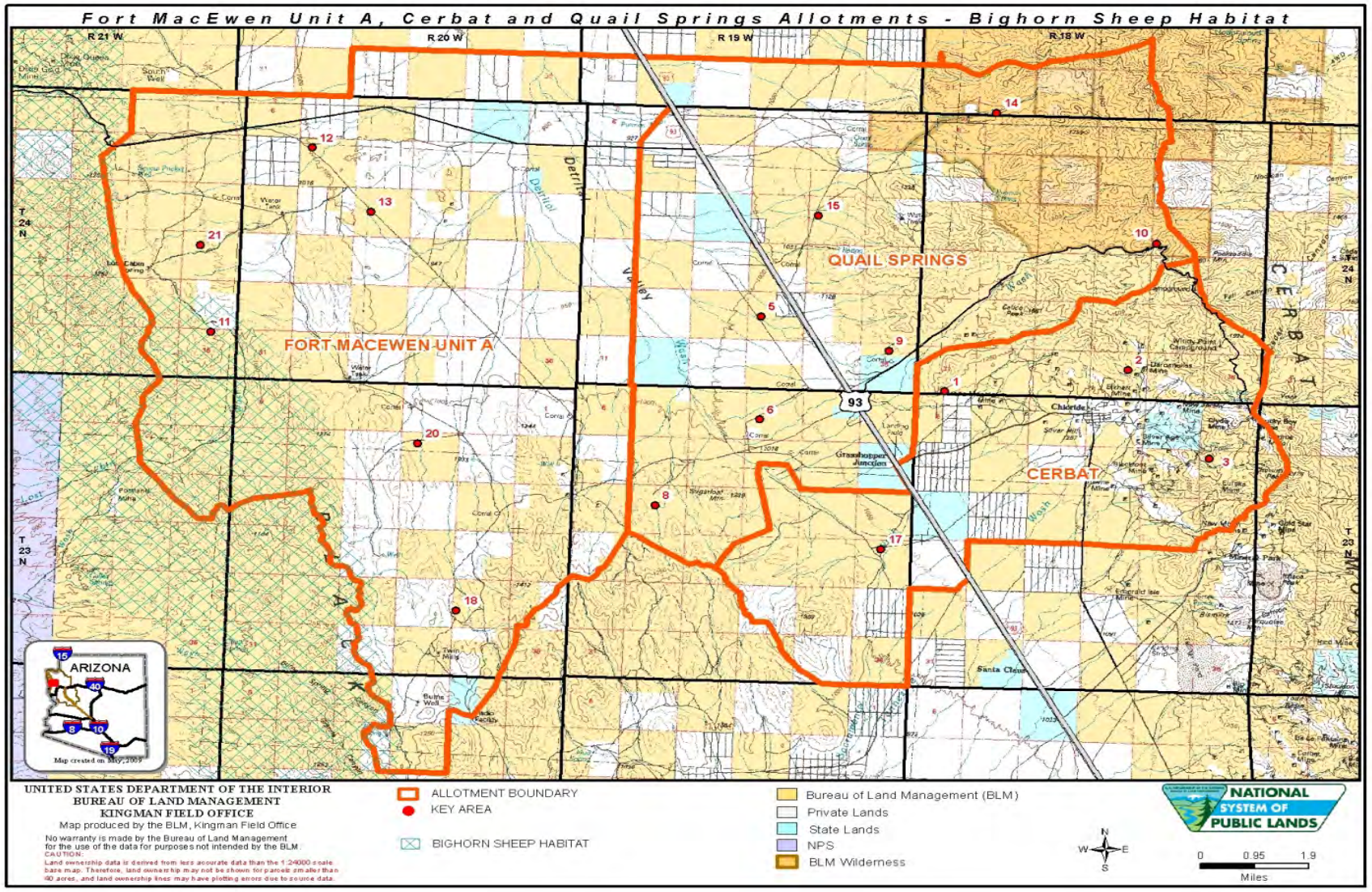

Figure 8. Desert bighorn sheep habitat in the Fort MacEwen Allotment.

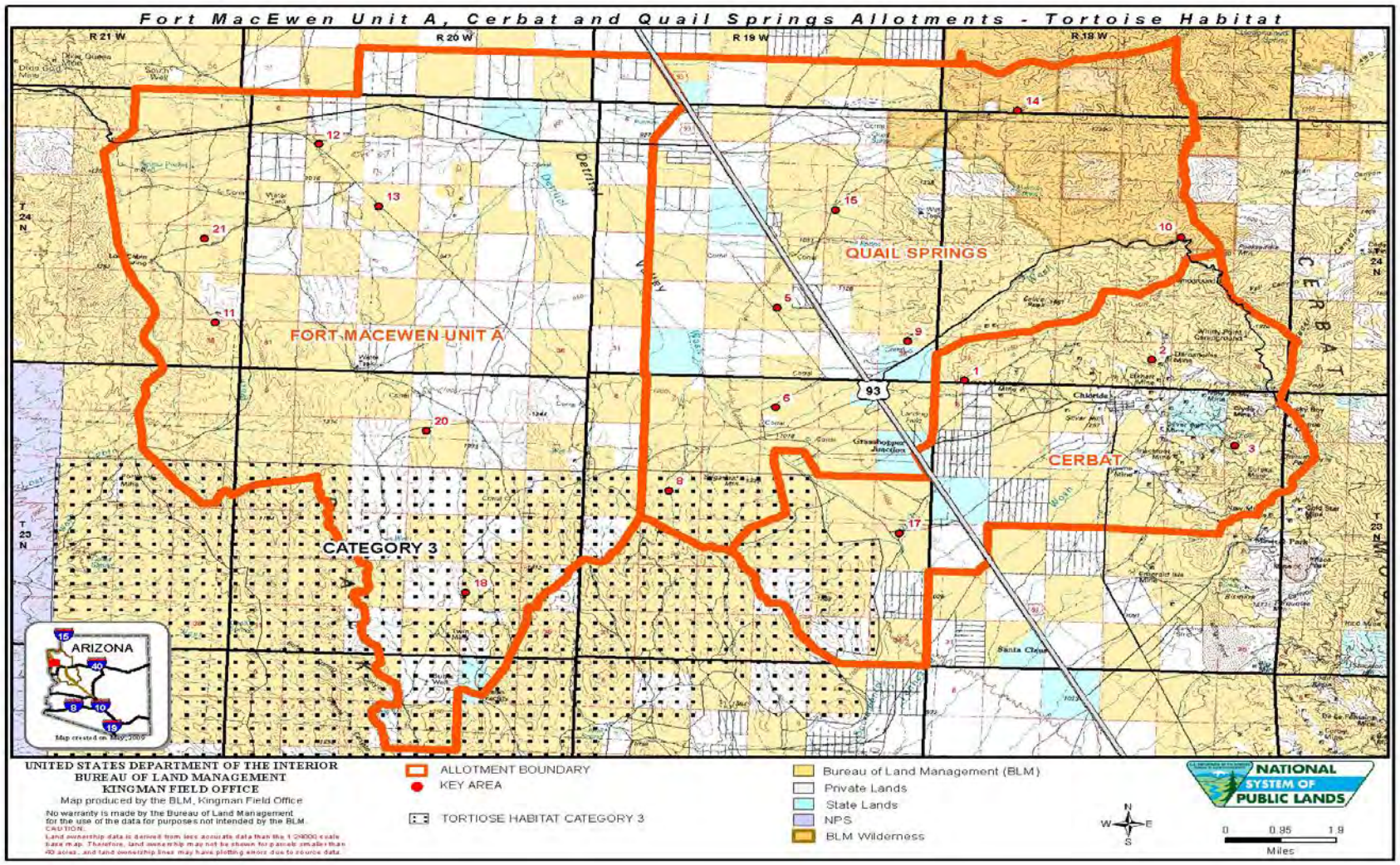

Figure 9. Sonoran Desert tortoise habitat in the Allotments.

Golden eagle: This species is found nesting and foraging within CQFM. It forages primarily on rabbits and other small mammals. It will nest in any of the habitats within the allotments where topography features include tall cliffs. Nesting areas are located nearby areas that contain large open areas for foraging. Within CQFM the Cerbat Mountains as well as the Black Mountains provide nesting and foraging features for this species.

Le Conte's thrasher: This species is uncommon and usually very localized in distribution. It has been documented in lower Detrital Valley and habitat for this bird is found within CQFM (Corman and Wise-Gervais 2005). It is found in open creosote bush, and scattered mesquite habitats (Monson and Phillips 1981). In Detrital Valley this bird selects richer more diverse pockets of habitat. These pockets have clumped plants of taller greythorn, wolfberry, catclaw, and cholla and is where this species chooses to nest (pers. comm. Hibbard, 2013).

Peregrine falcon: Historically, the peregrine falcon ranged throughout North America and much of the rest of the world. Shooting, taking of eggs and young, poisoning and habitat destruction all contributed to the decline of peregrine falcons from much of their historic range. Peregrines in CQFM would nest on high, remote cliff ledges and forage in adjacent mountains and valleys. The peregrine falcon was delisted from the Federal endangered species list in 1999.

Western burrowing owl: Habitat for the western burrowing owl is found in all allotments within CQFM. Nesting owls have been found on the Fort MacEwen and Cerbat Allotments. This grassland specialist occurs primarily in open areas with short vegetation and bare ground in desert, grassland, and shrub-steppe environments. Burrowing owls are dependent on the presence of mammals such as kangaroo rats and ground squirrels, whose burrows are used for nesting and roosting.

Bats: A number of sensitive bat species may be present on the allotments (see Table 9). Brief habitat descriptions are presented for these species.

Allen's big-eared bat: This species is known to forage and may roost in CQFM (Brown and Berry 2005). This bat roosts in abandoned mine shafts most often in ponderosa pine, pinyon juniper Mexican woodland, and riparian areas of sycamores, cottonwoods and willows. This species is often found near boulder piles, cliffs, rocky outcroppings, or lava flows.

Arizona myotis: This species is generally observed at higher elevations usually in ponderosa pine and oak-pine woodland near water. It is found along permanent water or in riparian forests in some desert areas. In Arizona this is usually in association with mixed conifer forests, including ponderosa pine/grassland, ponderosa pine/Gambel's oak, and aspen/ponderosa pine forests. The East Unit in the Cerbat Mountains may provide habitat for this species.

California leaf-nosed bat: This species is known to roost in CQFM. Its preferred habitats are caves, mines, and rock shelters, mostly in lower elevation Sonoran desert scrub. Roost sites are usually located near foraging areas. This species likes desert scrub areas, roosts by day in caves, and in abandoned mines and tunnels.

Cave myotis: This species prefers cave habitat, but will choose other roosting areas if a suitable roosting cave is not available. These alternate areas can include mines, rock crevices, abandoned buildings, barns

and under bridges. They are found primarily at lower elevations (the Sonoran and Transition life zones) of the southwest, in areas dominated by creosote bush, paloverde, brittlebush, and cactus.

Fringed myotis: This species typically roosts above 4000 foot elevation in tightly packed groups in rock crevices, caves, mines, large snags, under exfoliating bark, and in buildings. These sites may be day or night roosts. It may hibernate at lower elevations. It eats mostly small beetles and some moths that it forages from low desert scrub up to pine forest plant communities (AZGFD 2013). This species is known to roost in CQFM (Brown and Berry 2005).

Greater western mastiff bat: This bat is a year-round resident in Arizona where it ranges in elevations from 240–8,475 feet. It forages from the air or on the ground for insects such as moths, crickets, grasshoppers, beetles, bees, wasps, and ants. It forages over extensive areas of desert scrub at least 15 miles from the nearest likely roosting sites. It is found roosting in rugged rocky canyons with abundant crevices (AZGFD 2013). It has been documented in the Black Mountain south of CQFM allotments however suitable roosting and foraging habitat is present in CQFM.

Spotted bat: This species is dependent on large isolated cliffs for roosting. It may forage in pinyon and juniper areas forests in the Cerbat Allotment.

Townsend's big-eared bat: This species is associated with areas containing caves and cave-like structures for roosting habitat. Generally, they are found in the dry uplands throughout the West, including Arizona desert scrub, oak woodlands, oak-pine forests, and pinyon-juniper forests. This species is known to roost in CQFM.

Sonoran Desert tortoise: Habitat for the desert tortoise, a federal candidate species is present on roughly 18,900 acres in the Twin Mills Pasture, Sugarloaf and Highway 93 pastures (Figure 9) which is about 4 percent of the total 479,357 acres of Category 3 tortoise habitat in the Black Mountains. The northern parts of the West Unit's pastures have not been surveyed for desert tortoise. The Sonoran population of the desert tortoise (*Gopherus agassizi*) is a candidate for listing under the Endangered Species Act but the listing is precluded by higher priority actions (Federal Register, Vol. 75, No. 239, December 14, 2010). The desert tortoises in the project area primarily inhabit rocky hillsides and gravelly desert washes below 3,530 feet. Tortoises in the Black Mountains are classified as Sonoran, although recent genetic research shows they are more related to the Mohave tortoise (McLuckie et al.1995). Research into morphologic and behavior characteristics suggests there may be a gradation between Sonoran and Mohave populations in the Black Mountain ecosystem. Tortoise consume a wide variety of plants however, the preferred forage plants for tortoise include a variety of perennial and annual grasses, forbs, vines, mallows, and shrubby buckwheat (Van Devender 2002, and Arizona Interagency Desert Tortoise Team 1996). Three-awn, bush muhly, big galleta, globemallow, and shrubby buckwheat, which are key forage species for livestock in the Fort MacEwen Allotment, are also important forage species for desert tortoise (Van Devender 2002).

Two-colored beardtongue: The two-colored beard tongue (*Penstemon bicolor roseus*) a BLM sensitive species occurs on the Fort MacEwen allotment. This species is found from southern Nevada to northwestern Arizona and California. Within Arizona this species occurs in Mohave County in the Black Mountains and near Wilson Ridge. Habitat consists of gravel washes and disturbed roadsides, to outwash

fans and plains. This species grows in creosote bush-desert scrub and desert wash plant communities, but is uncommon.

3.3.13.3 Migratory Birds

In April 2010, BLM and USFWS entered into an MOU to promote the conservation of migratory birds, as required in EO 13186. These species are protected by law and it is important to maintain habitat for these species so migratory patterns are not disrupted. Habitat for the following birds of conservation concern is found in CQFM: Le Conte's thrasher, Bendire's thrasher, curve-billed thrasher, hooded oriole, peregrine falcon, prairie falcon, burrowing owl, and Costa's hummingbird (U.S. Fish and Wildlife Service 2008). 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. Additional protection is provided by the Neotropical Migratory Bird Conservation Act of 2000 (16 USC 80). Migratory birds occur within the Kingman Field Office area, many of which are known to use the habitat types present within these allotments.

3.3.13.4 General Wildlife

Habitat for multiple animal species occurs within these allotments. Species found include animals typical of the Mohave Desert such as Merriam's kangaroo rat, black-tailed jackrabbit, gray fox, kit fox, bobcat, coyote, speckled rattlesnake, chuckwalla, cactus wren, black-throated sparrow, golden eagle, and prairie falcon. Small upland game species include Gambel's quail, mourning dove, white-winged dove, and desert cottontail. Big game species include desert bighorn sheep, mule deer, and mountain lion.

The Black Mountains support the largest, contiguous desert bighorn sheep population in the world (AZGFD 2007). The range of desert bighorn sheep and livestock overlap on the Fort MacEwen allotment in the Black Mountains. Based on GIS map data, there are an estimated 8,600 acres of sheep habitat in the Black Mountains within the western edge of the Fort MacEwen allotment which comprises about 3 percent of the total bighorn habitat area of 258,079 acres (Figure 8). This species prefer a habitat of steep, rocky terrain for escape from predators, bedding, and lambing. It is found within the Mohave Desert scrub plant communities. They graze and browse of a wide variety of plant species of which grasses and forbs are preferred. When this food is not available they feed on a variety of other plants, including cacti.

4 ENVIRONMENTAL CONSEQUENCES

4.1 Potential Direct and Indirect Effects

This section describes the environmental consequences of those resources/concerns identified in Chapter 3 as present and potentially affected. Resources not present, and resources present and not affected are listed and described in Chapter 3 and if present not affected a rationale is provided.

Areas of Critical Environmental Concern

Fuels/Fire Management

Invasive Non-native Species

Lands and Realty

Livestock Grazing Management

Recreation

Riparian

Socioeconomics

Soils

Vegetation

Wild Horses and Burros

Wildlife, including Special Status Species and Migratory Birds

Water Quality (drinking or groundwater)

4.1.1 Area of Critical Environmental Concern

General impacts from Alternatives 1, 2, and 3

A portion of the Lost Cabin/Squaw Pocket Pasture, comprised of 10,348 acres, is located within the Black Mountain Ecosystem ACEC. Over the evaluation period it was found that objectives for the BMEMP are being met as well as Standards 1 and 3. This means the site is producing desirable forage, cover, and soil protection in the amounts that are typically found within these types of ecological sites. This suggests that habitat values such as forage quality and quantity are adequate to sustain bighorn, mule deer, livestock, and wild burros. What this means for ACEC values, is that a "healthy" rangeland is more likely to provide the necessary food and cover to sustain the species that live there. It is expected that these values would be maintained or improve under the Proposed Action and any of the alternatives. Water availability under all alternatives in the ACEC would remain unchanged and thus adequate water for all species would continue to be present.

The proposed fencing would eliminate cattle drift onto LMNRA and would confine cattle to the Lost Cabin Squaw Pocket pastures, portions of which are within the ACEC. This would increase grazing pressure within this pasture when cattle are present.

Bighorn and deer are known to avoid livestock (Bissonette and Steinkamp 1996, McIntosh and Krausman 1982, Wallace and Krausman 1987). For deer this may be related to forage resources, lack of cover, or behavioral avoidance. Competition for space would be partially mitigated by species habitat use preferences. It is expected that livestock would primarily use the lower, less rugged areas of the pastures in the ACEC while deer and bighorn would primarily use the more rugged areas. Two-colored beard tongue, a rare plant found in the ACEC, is not a preferred forage species for cattle and grazing on this species would be uncommon.

4.1.1.1 Alternative 1 Proposed Action Adaptive Management Alternative

During most years, this portion of the ACEC would be grazed primarily during the cool season when

shrubs comprise the primary source of forage. Livestock grazing is one of the values identified for the ACEC. Adaptive Management would be used as a tool to analyze range condition when the pastures are stocked, and changes could be made if utilization limits and other monitoring indicators show a change in management is needed to protect ACEC values.

4.1.1.2 Alternative 2 Reduced Preference Alternative

Impacts to the ACEC from Alternative 2 would be similar as for the Proposed Action. The proposed grazing management system in Alternative 2 would seasonally concentrate livestock in the ACEC increasing the density of ungulates (cattle, bighorn and deer) during these times. Deferment and lower permitted use would reduce pressure on vegetation and lessen the duration of time cattle are in each pasture.

4.1.1.3 Alternative 3 No Action

It is expected that Key Area 11 would continue to meet Standards 1 and 3. Habitat for bighorn wild burros, cattle, and two-colored beard tongue would continue to be sustained because there would be no change in livestock grazing management and the current management has resulted in meeting the standards in the ACEC.

4.1.1.4 Alternative 4 No Grazing

The ACEC value of livestock grazing identified in the Kingman RMP (BLM 1995) would be removed but all other values would remain. Habitat for bighorn and wild burros would be enhanced as these species would be the only ungulates using the ACEC, and competition with livestock for forage and space would be eliminated.

4.1.2 Fire/Fuels Management

4.1.2.1 Alternative 1 Proposed Action Adaptive Management Alternative

Temporary fencing would be allowed which would confine cattle to small areas in order to target red brome removal during wet winters when it is palatable. Adaptive management would provide the necessary tools and flexibility to seasonally reduce fire potential through reducing red brome by focused grazing.

Maintaining the desired plant community, as prescribed in the Proposed Action, may help to reduce the spread of annual exotic grasses which are the primary fuel source for wildfire. The United States Department of Agriculture (USDA 2008) found that cheatgrass increases with the removal of native perennial herbaceous grasses and forbs which can occur as a result of overgrazing. The impacts of cattle grazing on fire intensity and frequency and fuels management is unclear for the Mohave Desert where annual exotic grasses are present in varying amounts depending on seasonal rainfall. The grazing of cattle has been considered as a tool to reduce annual grasses in small pastures where targeted grazing can be focused.

4.1.2.2 Alternative 2 Reduced Preference Alternative

Proposed range improvements, deferment, rest, and rotation could have an effect on fire or fuels management. Temporarily closing Twin Mills Pasture until objectives are met would have a negligible effect on fire or fuels management. Cattle would graze on annual grasses, but grazing would not reduce

the risk of fire following a wet winter unles it was focused grazing. It is assumed that native vegetation cover which is currently not at a level to meet objectives would begin to increase without grazing pressure. This could change the fire frequency in the Twin Mills Pasture, but it is unclear whether the effects would be observable in the short term.

4.1.2.3 Alternative 3 No Action

The effects on Fire/Fuels Management by the No Action Alternative would be similar to Alternative 1 Proposed Action. However, under the No Action Alternative, annual grasses would continue to spread while key plant species are expected to decrease in pastures that are not meeting objectives. This could ultimately cause a buildup of fuels because there would be more open space for the non-native annuals to grow.

4.1.2.4 Alternative 4 No Grazing

An assumption could be made that no grazing would potentially increase the intensity of fires in the area. However, large fires in CQFM have burned under yearlong grazing up to three years following El Nino winters. Thus, no grazing would probably have minimal to no impact on fire frequency and size. After three years following wet winters the red brome breaks down, fuel continuity is interrupted, and fire hazard is reduced whether there are cattle present or not. The impacts would be similar to the Proposed Action as key species are expected to increase and there would be less open space for exotics.

4.1.3 Invasive Non-Native Species

General impacts of invasive non-native species

All of the invasive species described in Chapter 3 can be spread by animals such as livestock, wild burros, mule deer, and bighorn as the seeds can become attached to hair and be transported. Cheatgrass, red brome, and Mediterranean grass are present in varying amounts depending on the amount and timing of annual rainfall. Malta starthistle is able to persist on the highway right-of-way because of the increase in water runoff from the road and might invade spring sources because of the greater moisture availability in these areas. It was not found at the sources on CQFM; however, it has been found at springs further north. Sahara mustard is found along the roadsides on CQFM and may spread to sandy soils in wet winters on the rangelands. In southwestern Arizona, during wet winters Sahara mustard is spreading by wind onto rangelands in areas where cattle have not been present for 20-30 years. In CQFM puncturevine appears to be restricted to areas highly disturbed by humans. It has not been found around the livestock facilities on these allotments. It is apparent that the spread of these species will not be totally prevented, but if the DPC is kept intact it is more difficult for invasive species to take hold and dominate this area.

4.1.3.1 Alternative 1 Proposed Action Adaptive Management Alternative

Adaptive management would provide the necessary tools and flexibility to seasonally reduce red brome by focused grazing.

Maintaining the DPC, as prescribed in the Proposed Action, is necessary to reduce the spread of undesirable plant species. Composition and cover of desired forage species is expected to maintain or improve under the Proposed Action and would potentially reduce open space between perennial plants where invasive annual grasses and forbs can grow. Cheatgrass increases with the removal of native perennial herbaceous grasses and forbs, which can occur as a result of fire and overgrazing (USDA 2008). This is due in part because cheatgrass can out-compete remaining native plants in accessing soil water and

nutrients. It has been found that proper range practices can help prevent the spread of these plant species (Sheley 1995).

4.1.3.2 Alternative 2 Reduced Preference Alternative

Impacts would be the similar as for the Proposed Action. However, this alternative does not provide the flexibility and monitoring strategy that would promote more responsive actions to be taken if invasive species are found within the allotment that need to be treated.

4.1.3.3 Alternative 3 No Action Alternative

Rest periods, under this alternative, are inadequate to provide for recovery and/or reproduction of key forage plant species. In key areas where Standard 3 health standards are not being met, it is expected that invasive non-native species would increase as a result of year round grazing. The lack of rest and continuous grazing pressure has reduced the occurrence of key plant species (BLM 2010) in some key areas on CQFM. When native species start to decline, it opens up space for invasive annual grasses and forbs to invade.

4.1.3.4 Alternative 4 No Grazing Alternative

Removal of livestock would not eliminate the presence of invasive-non-native species on the allotments as some (red brome) are already common throughout the area. Removal of grazing by domestic livestock does not automatically lead to the disappearance of cheatgrass (Young and Evans 1978). Wild burros, bighorn, and mule deer would continue to be vectors for the spread of invasive plants. The removal of grazing is expected to result in an increase in the frequency, cover, recruitment and composition of key perennial plant species which would allow for the attainment of DPC objectives over a shorter period of time. Those areas that have not crossed the thresh hold for improvement would improve thereby limiting the open space between perennial plants where invasive annual grasses and forbs can grow without competition.

4.1.4 Lands and Realty

4.1.4.1 Alternative 1 Proposed Action Adaptive Management Alternative

The proposed range improvements of fencing, cattleguards, and maintenance of existing fences would reduce impacts to landowners that are living on 40 acre and smaller parcels within the allotments by reducing the amount of fencing that landowners would encounter along roads and vehicle ways such as washes. Many of the existing fences cross private lands and some block access points (across washes). This alternative would reduce the amount of pasture fences that need to be maintained, make crossing fences by the public easier with the installation of cattleguards, and help to alleviate the issue of landowners cutting fences and leaving gates open.

4.1.4.1 Alternative 2 Reduced Preference Alternative

Impacts are similar to the Proposed Action because range improvements that would effect access or be encountered by land owners would be similar. The potential for adding cattleguards under an adaptive management strategy is not addressed in this alternative, therefore the permittee would potentially be impacted by gates being left open or stolen because means for adapting to the situation are not provided for under this alternative.

4.1.4.2 Alternative 3 No Action

The 1980 AMP is not implementable under the current condition because of conflicts between the private landowners and the permittee. The range improvements which separate the pastures described in 1980 cannot be maintained as planned. Private land dispersed throughout the pastures which is not under control of the permittee has been developed into 40-acre residential areas. Small communities or private developments may not be fenced, and fences near or surrounding these areas are often cut by landowners. This may result in landscape degradation because cattle cannot be managed in accordance with the AMP and are subsequently allowed to continuously graze all areas without rest.

4.1.4.3 Alternative 4 No Grazing

If the land use plan is amended to make CQFM unavailable for grazing, the permittee would potentially remove the range improvements and/or be compensated by the BLM for the range improvements. The removal of range improvements would eliminate landowner conflicts associated with the restriction of access by the fences. With no livestock present the landowners would not have to fence their properties to keep cattle out.

4.1.5 Livestock Grazing Management

4.1.5.1 Alternative 1 Proposed Action Adaptive Management Alternative

Short Term Impacts (1 to 2 years)

In the first year, the cost of reducing the stocking rate (gather costs) should be offset by the sale of these animals. Assuming the permittee is running full numbers in year one, the reduction in livestock would be 123 head. A 1 bull to 15 cow ratio equates to 8 bulls, and a 75 percent calf crop equates to 86 cow/calf pairs and 29 open cows. At the current prices the permittee should get $1600 per pair, $1000 each for open cow and $2000 for each bull; the gross from the sale of these animals is estimated to be $182,600. In the second year the loss of calves for sale, due to the reduced stocking rate, could be as much as $900 per calf (Overson 2014). This was estimated from the reduced stocking rate of 115 cows at a 75 percent calf crop could cost the permittee approximately $80,000. The proposed change to authorize 15 horses on the grazing permit for the Quail Springs allotment should reduce the cost of feeding horses by as much as $60 per day. In a year, this could save the permittee more than $21,900 and over two years approximately $43,800. This means a gross income of approximately $146,000 over the first two years.

Long Term Impacts (2 to 10 years)

Over the course of 10 years, the reduction in horse feeding costs could save the permittee more than $219,000. This would allow the permittee to develop a more useful and valuable herd of range horses. Horses accustomed to grazing on rangelands are better able to navigate and are more stable on rough terrain. Over the same 10 years, the yearly loss in revenue of $80,000 from the reduced calf crop is estimated to be $800,000. Under the adaptive management plan, there could be years in which the permittee is authorized to run more than the 455 and therefore offsetting some of these costs.

Under an adaptive management plan, the permittee should be able to have a sustainable livestock operation with similar or better economic returns with lower stocking rates, lower utilization limits in the Joint Use Area, and with the plan for pasture rest through grazing deferment. All of the above should improve range condition over time, and this in turn should improve condition class and or overall health of the herd. The permittee would be required to monitor his allotment and livestock in the Proposed

Action. Fuel and labor costs would potentially be reduced or offset by managing a much smaller area at any one time. The permittee would be better able to keep track of his cattle because they would not be spread out over all of the pastures at the same time. He may be able to run fewer bulls as the bulls would have less area to search for cows. Therefore, we anticipate an increase in calf crop from 75 percent to 85 over the next ten years. Calving could become more synchronized under this alternative, which means the calving period would be reduced from year round to a few months out of the year. This means when the permittee goes to gather calves in the fall most calves would be ready for branding and culling at once. When the calves go to market they would be of more uniform sizes, weights and larger caves should bring more pounds across the scale and better price upon selling.

Meeting or trending towards DPC objectives would improve forage quality and production and ultimately result in more and higher quality forage for cattle. Healthy productive cows means a higher calf crop, which in turn would result in higher economic returns.

4.1.5.2 Alternative 2 Reduced Preference Alternative

Short Term Impacts (1 to 2 years)
In the first year, the cost of reducing the stocking rate to the permittee should be offset by the sale of these animals. Assuming the permittee is running full numbers in year one, the reduction in livestock would be 375 head. A 1 bull to 15 cow ratio equates to 25 bulls, and 75 percent calf crop equates to 263 pairs and 87 open cows. At the current prices, the permittee should get $1600 per pair, $1000 each for open cow and $2000 for each bull; the gross from the selling of these animals should be approximately $540,000. In the second year the cost from each calf lost could be as much as $900 per calf (Overson 2014). This was estimated from the reduced stocking rate of 350 cows using a 75% calf crop, which is estimated to cost the permittee $236,000. The proposed change to authorize 10 horses on the grazing permit for the Quail Springs allotment should reduce the cost of feeding horses by as much as $40 per day. In a year's time this could save the permittee more than $14,600.00 and over $29,000 in two years. This means a gross income of $333,000 over the first two years.

Long Term Impacts (2 to 10 years)

Over the course of 10 years the yearly loss in revenue of $236,000 from reduced calf crop could be as high as $2,360,000. The permittee would incur more costs because the deferred grazing rotation system is one more move a year. This would require the permittee to move livestock three times throughout the year compared to the Proposed Action and No Action alternatives where cattle are handled and moved twice year. This additional herd move, employing 4 cowboys, horses, trucks/trailers, etc., could cost the permittee about $1000 per day. Therefore, if the move takes one month to complete, it could cost as much as $30,000. In addition every move put stress on the herd itself and a loss of about 4 percent or $40 per cow over the course of a month (Overson 2014). This stress to the herd from the additional move could cost the permittee as much as $18,200. The proposed change in kind of livestock to authorize 10 horses on the grazing permit for the Quail Springs allotment should reduce the cost of feeding the horses by as much as $40 per day. In a period of 10 years this could save the permittee more than $146,000.

Over time as the plant community meets DPC objectives and becomes more productive, the permittee should be able to have a sustainable livestock operation with similar or better economic returns with lower stocking rates, lower utilization limits, and with the plan for pasture rest through grazing deferment.

The permittee would be required to monitor his allotment and livestock in the proposed action. Fuel and labor costs would potentially be reduced or offset by managing a much smaller area at any one time. The permittee would be better able to keep track of his cattle because they would not be spread out all the pastures at the same time. He may be able to run fewer bulls as the bulls would have less area to search for cows. Therefore, we anticipate an increase in calf crop from 75 percent to 85 over the next ten years. Calving could become more synchronized under this alternative, which means the calving period would be reduced from year round to a few months out of the year. This means when the permittee goes to gather calves in the fall most calves would be ready for branding and culling at once. When the calves go to market they would be of more uniform sizes, weights and larger caves should bring more pounds across the scale and better price upon selling.

Once a forage bank is developed under the deferred rotation system, cattle should be able to maintain weight and breed back each spring and therefore potentially increase the calf crop percentage and calf weaning weights. Holechek et al. 1999 found that calf crops and weaning weights were greater on conservatively stocked pastures. The rotation system could result in improved plant vigor and productivity which could provide higher amount and better quality forage for livestock and potentially result in heavier calves. Heavier calf weights would result in more economic gain for the permittee. Residual vegetation and increased plant vigor and productivity may reduce the need for destocking during drought years. Holechek et al. 1999 found that exposure to risk from drought and low cattle prices was reduced and the probability of improved forage production was higher when the vegetation is conservatively used. Thomas et al. 2007 found that grazing at light use (25% to 30%) avoids herd liquidation in short term drought.

Under this alternative, cattle would be handled more (more moves) and become more used to being handled resulting in gentler cattle for handling and branding and thus less stress for the cattle and their handlers. It has been found that cattle become habituated to being moved and experience less stress over time. It has been found that when cattle become familiar to the move sequence they will often move themselves once the gates are opened.

Holechek et al. (2003) recommends that grazing intensity in areas of the Southwest where annual precipitation is less than 12 inches, should be between 25 percent and 35 percent. Utilization limits and seasons of use would provide a sustainable forage base for livestock grazing. An average forage utilization of 40 percent has been shown to benefit plant production and resilience (Valentine 1970, Van Poollen, et al. 1979). The reduction in utilization should increase plant vigor and seed production of various grasses, forbs, and shrubs in all pastures which would increase available forage and animal productivity. It is expected that the diversity of palatable plants would be maintained or improved under the proposed action. According to Meen (2000) available crude protein in plants decreases as plants are re-grazed, therefore, lower utilization levels and seasonal rotation should provide livestock and wildlife with more available crude protein.

The proposed fence realignment and extension and cattleguards would allow for improved livestock control on the allotment. Installation of the cattleguards would reduce the likelihood of gates being left open and fences cut by the public. Closing the Twin Mills Pasture to cattle grazing until the DPC objectives are met would affect the permittee's livestock grazing operation by temporarily reducing the amount of acreage available for grazing. Limiting grazing use in the Cerbat Pasture to fall and winter until

a perennial watering facility for livestock is developed in this pasture would not affect the permittee because over the last 13 years he has only used the Cerbat Pasture in the fall and winter because of the lack of water during the spring and summer months. However, the removal of the AUMS from the areas he cannot use would temporarily reduce his cow herd. Development of a perennial watering facility would eliminate this issue in the Cerbat Pasture. Removal of the Cerbat and Twin Mills Pastures would simplify livestock grazing management as there would be less acreage to manage.

The grazing permittee would incur costs associated with the maintenance of existing range improvements include repairing the west boundary fence of the Lost Cabin Squaw Pocket Pasture and the west and south boundary fences of the Twin Mills Pasture. The permittee would need to repair the Lost Cabin Squaw Pocket fences within one year of the date of the permit renewal or they would be closed to grazing. If these pastures are closed there would be a reduction in acreage available for livestock grazing and a subsequent suspension of preference for the AUMs within that pasture. It should be noted that the Twin Mills Pasture fence on the northwest edge adjacent to the Lost Cabin Squaw Pocket fences also requires fence repair in order to keep cattle out of the Twin Mills pasture and to prevent cattle from entering the LMNRA.

Approximately 30 acres of grazing land and therefore forage for livestock grazing would be removed as a result of the construction of the three 10 acre exclosures.

Ultimately, implementation of the Proposed Action would allow range conditions for the three allotments, currently in the “Improve” Category, to begin an upward trend for Standard 3 over the life of the 10-year permit.

4.1.5.3 Alternative 3 No Action Alternative

This alternative would maintain the current level of livestock grazing authorized for the permittee, which would provide some degree of stability for the permittee’s livestock operation. Permit renewal under this alternative would likely result in a continuation of Standard 3 not being met at some of the key areas. The operation may become unsustainable as frequency of key species at key areas not meeting standards continue to decline. This would result in a reduction of productivity of the key species, therefore less forage to sustain the livestock operation. The No Action Alternative could result in lower calf weights, uneven calf sizes, lower breed back percentages, and an inability to manage pastures because fences are unmaintained. The permittees risk associated with drought would go up as the need to destock more often would increase. Destocking during a drought means cattle may be sold at lower prices because the market would be flooded with cattle from other ranches that are destocking. Once the permittee would be able to restock the prices to purchase a mother cow would be much higher as others would also be trying to do the same thing.

There would be no change in kind of livestock in the Quail Springs allotment from 1 AU to 10 horses for two months. The permittee would have higher horse feeding costs and horses not as adapted to travelling through rough terrain. Not constructing the proposed fence realignment and extension and installing the cattle guard would make the control of livestock difficult as cattle can get out of the allotments onto the Lake Mead National Recreation Area without these improvements. It is possible that the public would continue to leave the gate open where the cattleguard is proposed and possibly cut fence to gain easier access.

The three 10 acre exclosures would not be constructed under this alternative; therefore, 30 acres of grazing land and forage for livestock grazing would not be removed from grazing.

The permittee range improvement costs would be higher under this alternative as the Terms and Conditions of the 1980 AMP would be followed, and the permittee would be required to construct the range improvements identified in the AMP to be in compliance with the plan.

4.1.5.4 Alternative 4 No Grazing Alternative

If the no grazing alternative is chosen, the renewal of the 10 year permit for the CQFM allotments would not be authorized. The Kingman RMP could be amended to permanently remove the allotments from grazing. The amendment would be posted in the Federal Register. The permittee would discontinue his cow/calf business, and the allotments would not be available to transfer preference to another permittee. There would be no income to the community from the cattle operation.

4.1.6 Recreation

4.1.6.1 Alternative 1 Proposed Action Adaptive Management Alternative

Under the Proposed Action, there would be fewer fences because pastures would be combined into units that are more efficient for movement of cattle and implementing the deferment, rest, and rotation schedule. Therefore, recreational users would encounter fewer fences that may restrict access. Cattle would be present in each pasture only part of the year; thus, allowing those who prefer to recreate in areas without cattle can do so. There would still be opportunity to view cattle at other times of the year as cattle are rotated through the pastures. Standard 2 would be met at Big Wash Spring as it would be excluded from livestock grazing and recreation. Seasonal deferment of cattle may allow Swicker and Lower Falls Spring enough time to recover from livestock grazing during the rest periods. Hunting and nature viewing opportunities would improve at these two springs as full development of vegetation i.e. wildlife habitat would occur under this alternative

4.1.6.1 Alternative 2 Reduced Preference Alternative

Impacts to recreation would be similar to Alternative 1.

4.1.6.2 Alternative 3 No Action

Recreational users would continue to experience fences and cattleguards that may restrict access. Cattle would be present in all areas most of the time for visitors to view which could be positive or negative. Hunters would be able to continue to hunt at springs and livestock waters. The capacity and value of recreation could decline because rangeland health factors, such as perennial plant frequency and cover in key areas, are not meeting Standard 3, and those in a downward trend are expected to continue declining. Key areas not meeting Standard 3 but static are not expected to improve and potentially may decline, as well. Degradation of riparian areas used by livestock and not meeting Standard 2 would remain degraded. This would decrease the opportunity for nature observation in these areas because vegetation is excessively used by cattle.

4.1.6.3 Alternative 4 No Grazing

Recreation access would improve as proposed range improvements and existing range improvements in the 1980 AMP would not be built or maintained, resulting in fewer fences where recreational users access public land within the allotments. Visitors would not see cattle which could be positive or negative.

Hunters would still be able to access springs for hunting. Livestock waters would be removed, and therefore, big game and big game hunting may be reduced or eliminated around those locations. The rangeland health, such as perennial plant cover, is expected to improve which would consequently enhance visitor experience of nature observation. Standard 2 would be met at Big Wash Spring and Swicker and Lower Falls Springs as livestock grazing would cease and full development of vegetation, i.e. wildlife habitat, would occur under this alternative.

4.1.7 Riparian

General impacts of livestock grazing on riparian vegetation

Riparian hot-season use

Livestock spend more time in riparian habitats in the late summer when temperatures are the highest (Parsons, Momont, Delcurto, McInnis, & Porath, 2003). Because upland grasses are often dry and temperatures are warmer during the summer months, livestock make disproportionate use of riparian areas, and riparian herbaceous vegetation is preferred (Powell, Cameron, & Newman, 2000), (Bailey & Brown, 2011). Impacts to riparian vegetation during the hot season would be disproportionate to the uplands. In semi-arid rangelands, where forage growth is limited primarily by precipitation, ensuring that riparian area grazing does not occur during the critical late summer period may be more beneficial than rotational systems that defer livestock use throughout the grazing season (Bailey & Brown, 2011). A fall system of grazing would be beneficial for the improvement of the riparian areas when stream bank temperatures are cool enough to discourage animals from congregating in the riparian areas (Bellows, 2003).

Livestock grazing in riparian habitat can reduce vegetation and modify stream banks causing erosion (Kauffman, Krueger, & Vavra, 1984). Vegetation loss, both from grazing and erosion, decreases shading, which results in higher water temperatures. Vegetation loss also reduces forage and cover for wildlife in riparian habitats. Trees, shrubs, and herbaceous vegetation form multi-layered complex habitats in riparian areas that provide a wide range of niches for aquatic and terrestrial wildlife species. The loss of any component of a riparian area can reduce cover and forage for some wildlife species. Riparian habitats are ephemeral in nature and portions are removed by flood events. However, as long as the vegetation has the opportunity to establish, grow, and reproduce on a regular basis, it can maintain these complex riparian habitats. Grazing riparian habitats every year for extended periods during the hot season typically results in overutilization of herbaceous and woody vegetation, which reduces the vigor and reproductive capability of existing plants and inhibits the establishment of seedlings.

4.1.7.1 Alternative 1 Proposed Action Adaptive Management Alternative

Under this alternative, riparian habitat would receive periodic deferment during the summer when livestock are most likely to congregate in riparian habitats. This would allow development of riparian habitat during those years. Maintenance of PFC of the springs that are currently at PFC would continue. However, when livestock are in pastures with riparian habitats the livestock would be more concentrated then under the current situation which could increase utilization and trampling of riparian vegetation. Use limits would remain the same as the current situation, but the stocking rate would be lowered by approximately 123 animals. Regular deferment during the growing season and the resulting increase in vigor and reproductive capability may outweigh the increase in utilization and trampling that would occur

by concentrating cattle in pastures. Swicker Spring and Lower Falls Spring may make progress towards PFC.

Riparian habitat would improve at Big Wash Spring once the existing fence around the spring is repaired. The 100 foot by 50 foot fence would exclude livestock from the spring source and allow riparian vegetation to expand and reach its full potential of growth.

It is assumed that by meeting or maintaining DPC objectives, and lowering the stocking rate along with scheduled rest periods the xeroriparian areas would be maintained.

4.1.7.2 Alternative 2 Reduced Preference Alternative

Riparian habitat would improve under this alternative after the existing fence around Big Wash Spring is repaired. The 100 foot by 50 foot fence would exclude livestock from the spring source and allow riparian vegetation to expand and reach its full potential of growth. In southeastern Arizona, density of herbaceous vegetation increased four to six fold following the removal of cattle (Krueper et al. 2003). This would enable progress towards meeting Standard 2 at Big Wash Spring. It is expected that Standard 2 would be met within 3 years at Big Wash Spring.

Reducing the number of cows and implementing a grazing rotation system on the allotments would accelerate recovery of the Swicker and Lower Falls Springs. Springs that are currently meeting Standard 2 would continue to meet this standard. Rotational grazing can be useful in improving riparian areas if grazing is kept at light or moderate levels (Krausman et al. 2011). Soil disturbance and associated sediment would decrease because cows would not have the opportunity to linger in these areas for long periods of time. Wild horses would also trample and graze at spring sites; however, there are only an estimated five horses. Riparian conditions would improve as trampling and associated fine sediment would decrease while riparian vegetation density would increase over several years. Over the long term (five plus years), riparian vegetation would reestablish, filling in areas of bare ground, stabilizing banks, and increasing shade. Monitoring by BLM employees would determine the efficacy of the grazing system and would identify future management changes, if needed.

It is assumed that by meeting or maintaining DPC objectives, lowering use limits on key species, and lowering the stocking rate along with scheduled rest periods the xeroriparian areas would be maintained or improved.

4.1.7.3 Alternative 3 No Action Alternative

Riparian habitat around Big Wash Spring would improve under this alternative after the existing fence around the spring is repaired. The 100 foot by 50 foot fence would exclude livestock from the spring source and allow riparian vegetation to expand and reach its full potential of growth. This would enable progress towards meeting Standard 2 at Big Wash Spring. It is expected that Standard 2 would be met within 3 years at Big Wash Spring.

Swicker and Lower Falls springs would continue to be used by livestock and associated bank disturbance, fine sediment, compaction, and bare ground would continue. Therefore this alternative, the current situation, would continue to cause this area to not meet Standard 2 (Riparian/Wetlands).

Not meeting DPC objectives at some key areas, higher use limits and stocking rates without any scheduled rest period would continue to affect the vigor and reproductive capability of key species that are found in desert washes or xeroriparian areas. Catclaw and mesquite trees would be grazed year round, and their seedpods would be always grazed when ripe in the summer.

4.1.7.4 Alternative 4 No Grazing Alternative

Removing all cattle from the allotments would lead to improvement in the condition of springs and associated riparian areas on the allotments. However, the estimated five wild horses would still have access to all unfenced springs. Riparian habitat conditions in the allotments would improve and riparian vegetation density would increase as trampling and associated fine sediment would decrease. Compaction of riparian areas from livestock grazing would be reduced, improving ground water storage and recharge. Over the long term (five plus years), riparian vegetation would reestablish, filling in areas of bare ground, stabilizing banks, and increasing shade. It is anticipated that all riparian areas that are currently at PFC would remain properly functioning and that those riparian areas currently not at PFC would achieve properly functioning condition under this alternative.

4.1.8 Socioeconomics

4.1.8.1 Alternative 1 Proposed Action Adaptive Management Alternative

Grazing fees could increase or decrease depending on adaptive management. The contribution of fees to the county grazing board and to the BLM would vary depending upon how many cows the permittee grazes.

The ability to hire temporary employees could increase or be reduced based on changes in management due to implementing adaptive management. In the management of the grazing permit, the permittee hires approximately four year round employees to manage livestock waters and administer the business. He may employ additional labor which typically consists of one or more individuals on a seasonal basis.

In a letter to BLM, Mohave County Livestock Association (April 15, 2010) suggested the CQFM allotments at 578 AUs would add $4,566,200 over 10 years to the local economy. This equates to $790 per cow per year. With a lesser stocking rate of 455 cows initially, the impact to the local economy is 123 fewer cattle or 21% less. Under adaptive management, this contribution could change each year.

4.1.8.2 Alternative 2 Reduced Preference Alternative

Grazing fees would decrease under this alternative, and the contribution of fees to the county grazing board and to the BLM would subsequently decrease. The ability to hire temporary employees would also be reduced based on a lower stocking rate.

Based on the letter from Mohave County Livestock Association (April 15, 2010) and the reduction to 203 AUs, the impact to the local economy would be $296,250 each year.

4.1.8.3 Alternative 3 No Action

Impacts of the No Action alternative to socioeconomics would be similar as for the Proposed Action. However there would be a larger number of AUMs permitted. The income to Mohave County could be proportionally higher than for Alternative 1 because the initial stocking rate would be 578 AUs. With no change in livestock management, the impact to the community would remain similar to the current

impacts.

4.1.8.4 Alternative 4 No Grazing

Should livestock grazing no longer occur on the CQFM allotment, the Mohave County revenues from grazing fees would be reduced. The permittee would have to purchase or rent pasture to support his livestock. Employment associated with the management of the grazing permit would be foregone.

4.1.9 Soils

4.1.9.1 Alternative 1 Proposed Action Adaptive Management Alternative

The Rangeland Health Evaluation (BLM 2010) findings show that Standard 1 for soils is being met on all of the allotments. Under this alternative, livestock grazing on the CQFM Allotments would continue to have a localized, negative effect on soils associated with congregation areas such as watering sites and corrals through soil compaction caused by the concentration of livestock in small localized areas. Soil compaction results in accelerated erosion by allowing rapid run-off of water because of the lack of filtration, and it impedes seed germination. Seasonal rotation of pasture use and control of animal movement with installation and maintenance of fencing would allow some areas of compacted soils to improve (de-compact) slightly during periods of non-use. The vast majority of soils in the allotments would continue to achieve the soils standard.

Grazing animals can apply compressional and shear forces to the soil. The crust response to these disturbances is highly variable. Moisture and burial are two important factors relating to the degree of impact. With course textured sandy soils, moist crusts are better able to withstand disturbances than dry soils.

4.1.9.2 Alternative 2 Reduced Preference Alternative

The impacts on soils under this alternative would be similar to the Proposed Action.

4.1.9.3 Alternative 3 No Action

Impacts of the No Action alternative would be greater than the Proposed Action because livestock would be allowed to graze in all areas simultaneously with no areas receiving yearlong rest, which is essential for crusting and stabilization for soil surfaces.

4.1.9.4 Alternative 4 No Grazing

Soils in the CQFM would be allowed to rest and would continue to meet Standard 1.

4.1.10 Vegetation

Range plants are entirely dependent on green leaf tissue for their survival and when leaves are removed from plants their food production capacity is reduced (Holechek et al. 2000).

Livestock grazing has the potential to impact many aspects of the plant community including abundance, vigor, and reproductive capabilities of palatable forage plants. These impacts vary with timing, intensity, and frequency of use by livestock. Holechek et al. (2001) suggest that utilization levels between 25% and 40% in the desert southwest would be sufficient to maintain forage production but recommend 25-35% use limits in the Mojave Desert. Additionally, they recommend a 30-40% use limit for pinyon juniper woodlands. They clarify that ranges in good condition with flat topography and good water distribution

can withstand the higher end of this range while ranges in poor conditions or grazed during the active growing season or with rugged topography or poor water distribution should receive the lower use limit (Holechek et al. 2001). A single year of heavy use, even with favorable precipitation, has been shown to reduce forage production in subsequent years (Holechek et al. 2001). Canfield (1939) conducted extensive clipping research on black grama. Black grama has the greatest portion of its leaves on above ground live stems. These stems do not die back but remain alive year round. He found that persistent grazing by cattle, during and even at the end of the grazing season, of all stems of black grama down to 2 inches or less will essentially destroy a black grama stand in a period of 10 years. Forage yield would be reduced by one-half in three or four years, and almost to zero in eight or nine years. Close cropping of this species (2-inch height or less) wipes out all reproduction from seed, stolons, and lateral spread of the grass.

Research has demonstrated that properly managed livestock grazing is designed to have minimal impacts to rangeland resources. Conservative grazing (30% to 35%) is a reliable way to increase forage production and improve vegetative composition on degraded rangelands (Holechek et.al. 1999). Holechek et al. (2003) found that trend improved under conservative grazing intensities of about 25 to 35 % use of key forage species even with drought occurring during part of the study period. Plants can withstand removal of a part of their current year's growth and still achieve normal growth the following year.

Conservative stocking rates in the form of reserve forage or grass banks are well established strategies for contending with economic and drought risk (Thurow and Taylor 1999). The extra herbage left from under grazing in the wet years will help plants recover from drought and may build feed reserves (Holechek et al. 1999). Stoddart et al. (1975), Hutchings and Stewart (1953), and Heady et al. (1975) suggest that rangelands stocking rates be lowered than average forage production to account for variable forage production during drought and to prevent or reduce harm to vegetation. Hutchings and Stewart (1953) and Heady et al. (1975) suggest that stocking at maximum capacity will result in overgrazing up to one half the years. Hutchings and Stewart (1953) suggest that rangelands be routinely stocked at 75% of grazing capacity to account for drought.

Valentine (1964) concluded that when improving black grama rangelands a 30 to 35% use limit was a sound management approach. He found that moderate grazing use (35%) produced 70% more forage than proper (50% use) and more than double heavy grazing (60% use). Paulsen and Ares (1962) recommend managing for a 30% use level and ensuring that no more than 40% of the black grama is removed in any year. Navarro et al. (2002) found after 48 years of conservative use (34%) on BLM desert rangelands in New Mexico that livestock grazing was sustainable.

Active-growing-season use

Grazing upland habitats during the active growing season can have multiple impacts on the vegetation. Many grass species are most susceptible to grazing between the early boot stage when they are beginning to develop seed stalks until seed maturity (Hoechek 2000). Livestock use during the active growing season has been shown to reduce the vigor and reproductive capability of several desert grass species (Canfield 1939). Closely clipped black grama required more water to break dormancy and broke dormancy later in the season than adjacent unclipped black grama plants (Canfield 1939).

Deferment

Deferment, as used in this document, involves the delay of grazing in a pasture during one or more

seasons, usually the growing seasons of spring and summer. Summer deferment is during the months of July, August, through mid-September, spring deferment is mid-March to mid-May. Warm season and cool season growth are the two types of growth strategies that plants exhibit on CQFM. Seasonal deferment (cool/spring and/or warm/summer) allows upland vegetation to complete its annual growth and reproduction cycle with minimal disturbance from livestock. Some species (big galleta) are opportunistic and will grow in either spring or summer if environmental conditions are conducive to growth. Deferment allows forage plants to gain vigor and reproduce (Holechek et al 2001). With deferment perennial grasses and forbs are able to replenish and develop their root system and energy storage, set seed, develop rhizomes, stolons, and stolon sets. Deferment can be used to reduce grazing pressure from either cool or warm season plant species depending on what time of year it is implemented. Deferment during the active growing season allows upland vegetation to complete its annual growth and reproduction cycle without disturbance from livestock. Perennial grasses and forbs are able to replenish and develop their root system and energy storage. Seedlings are able to become established and develop an adequate root system to survive dry periods. Deferment allows perennial grasses and forbs to regain vigor that is lost from grazing during the active growing season in previous years. Plants with high vigor can break dormancy earlier, get taller, and produce more seed than plants with low vigor.

Fall winter use

Key forage species can typically withstand higher use when dormant than when actively growing (Holechek et al. 2001). By fall, cool season grasses have typically completed most or all of their growth for the year and are beginning to become dormant, and light to moderate grazing has little effect on the vigor of the plant. However, removal of all standing crop, even from dormant grasses reduces, production the following year (Holechek et al. 2001). Additionally hot season desert grasses like black grama, bush muhly, and big galleta retain living tissue in their stems and stolons through the winter and removal of these stems can reduce the reproductive capability and production in the following year.

Cattle are primarily grazers and focus primarily on grasses; however, when grasses go dormant and their protein content is reduced cattle will supplement the dry grass by increasing their consumption of shrubs that still have high protein content in new stems. Because shrubs maintain high protein levels in the winter, cattle graze on them more heavily at this time. Periodic winter deferment allows shrubs to maintain more new leader growth and better maintain their vigor and reproductive capability.

Rest

Rest involves not grazing a pasture or allotment for an entire year and provides more time for plants to recover from past grazing influences compared to deferment (Holechek et. al. 2001, pp. 247-249). Like deferment, rest allows upland vegetation to complete its annual growth and reproduction cycle without disturbance from livestock, but rest also ensures that adequate cover remains through the fall and winter. Additionally, rest ensures two consecutive growing seasons of rest (spring and summer) from grazing allowing plants to take advantage of both growth periods and leaves soil cover through the fall and winter.

Drought Management

Based on a review of the weekly Drought Monitor maps from January 2000 to June 2014, the CQFM area has only experienced normal or above normal conditions approximately 23% of the time while being

abnormally dry or worse approximately 77% of the time and experiencing moderate or worse drought approximately 52% of the time. Normal or above normal conditions are typically achieved as a result of winter moisture but occasionally as a result of summer monsoon moisture and only once in 14.5 years has there been normal or above normal conditions associated with consecutive winter and summer moisture. (http://droughtmonitor.unl.edu/MapsAndData/MapArchive.aspx)

As seen in the data above, drought conditions are common in the CQFM area and must be taken into account when preparing a grazing schedule. Livestock operators must plan for drought as a normal part of the range-livestock business (Howery 1999). The primary goal in drought management should be to protect range plants before and during drought so that they can recover quickly after a drought (Howery 1999). To do this the University of Arizona Cooperative extension recommends stocking below the average long term carrying capacity in normal years and to reduce stocking levels during a drought to balance with the forage supply (Howery 1999). Plants that are healthy with good vigor produce more forage during a drought and recover more quickly after a drought than plants with low vigor (Holochek et al. 2000, Howery 1999).

Generally the scientific literature advocates conservative stocking before, during, and after droughts which involves 30% to 40% use of the current year's growth (Holechek et al 2000).
Holechek et al. (2000) suggests several drought management principles:

1. Adequate forage must be left to provide reserve for the inevitable periods of drought.
2. Healthy vigorous perennial grasses with a good root system can maintain production longer in a drought and recover more quickly once rainfall occurs.
3. Light rains are more effective if some litter and plant residue remains.
4. Realizing that drought is inevitable, a drought plan should be developed. Flexibility in forage use, livestock, numbers, livestock classes, marketing strategies, and so on, result in better management decisions.
5. During a recognized drought top priority should be on range recovery once the drought breaks.

Howery (1999) in a University of Arizona Extension publication suggests several options for livestock management before, during, and after droughts:

1. Set a conservative stocking rate.
2. Grazing systems should be planned to give periodic deferment or rest, and to set aside ungrazed areas to be used during drought emergencies.
3. Monitor and maintain plant vigor.
4. Monitor utilization of key forage species
5. Use emergency forage that has been set aside for drought conditions
6. Once a drought it recognized, reduce the herd as soon as possible so it is in balance with the forage supply.
7. Rest pastures for an entire growing season or more following severe droughts. Complete rest is the most effective and fastest way to achieve range recovery.
8. Use pastures only when key forage species are dormant for one or more growing seasons.
9. Defer grazing until after key forage species have matured and produced mature seed.

Two-colored Beardtongue: Two-colored beard tongue is unlikely to be eaten by cattle as it is not a preferred forage plant for cattle and use by livestock has not been observed and would be uncommon. Livestock grazing has the potential to affect the two-colored beard tongue by trampling and disturbance of habitat. However, given the dispersed nature of the plant on CQFM trampling by livestock would be uncommon under all alternatives.

4.1.10.1 Alternative 1 Proposed Action Adaptive Management Alternative

Periodic deferment in all pastures during both the spring and summer growing seasons would allow key forage plants the opportunity to grow, set seed, and replenish root reserves (growing seasons rest as recommended by Canfield 1939, Holechek 2000, and Holechek et al. 2001).

The proposed utilization triggers are higher than is recommended for the maintenance or improvement of desert rangelands (Holechek et al. 1999, Holechek et al. 2003, Navarro et al. 2002, Paulsen and Ares 1962, and Valentine 1964) and would not be expected to improve conditions if those utilization limits are met on a yearly basis. The vigor that key forage species are able to gain from deferment could be affected by grazing at the higher proposed utilization levels. If key forage species are grazed at the proposed hard trigger level each year they would be less able to survive drought and be slower to recover after drought.

Adaptive management responses would reduce grazing pressure on vegetation during severe drought conditions by lowering cattle numbers and dispersing the cattle across the allotment resulting in lighter utilization on the drought stressed plants.

With adaptive management if monitoring indicates a change is needed the stocking rate, season of use, or utilization limits could be changed to allow the plant community to maintain or improve. The proposed stocking rate and accompanying rotational grazing plan would result in more spring and summer growing season deferment than has happened under the current situation of year round grazing and is expected to improve vigor in key forage species; however, the proposed use limits may slow the response.

A field review of fire effects within the Twin Mills pasture was conducted in June 2014. The valley bottoms (0 to 15% slopes) had burned at very high temperatures and only about 5 % of the original plant community remained. The few forage species found in the valley bottoms have not recovered. This is due in part from heavy grazing pressure and animals (cows and burros) trailing to and from water developments which are located in the same areas. This grazing schedule should help shorten the recovery period of all the plant communities in this pasture by allowing growing season deferment every year. Recovery of Twin Mills Pasture would occur more quickly than the current situation of year round use but slower than Alternative 2 which provides complete, year round rest. Vegetation in the valley bottoms would benefit from winter grazing only by inhibiting cattle from loafing around waters due to the colder temperature this time of year.

Developing new waters would improve livestock distribution and reduce grazing pressure on vegetation throughout the pastures. The reduction in grazing pressure assumes that the stocking rate would be in balance with forage production. If the stocking rate is too high and cattle access new areas that are currently ungrazed, this would potentially cause overuse in these previously unused or lightly used areas. Grazed areas around livestock waters are typically loafing areas for cattle. Use typically is heavy in these

areas in a one-half to one mile radius surrounding each watering point. If the stocking rate is too high most palatable plants would decrease in abundance through time. The total acreage on these allotments affected by additional loafing areas would increase if the stocking rate is too high. Under proper stocking and distribution, and deferment, it is expected that the loafing areas would be reduced to ¼ mile or less around any new or existing watering points.

4.1.10.2 Alternative 2 Reduced Preference Alternative

The deferred grazing system proposed for these allotments, under this alternative, would provide for the physiological needs of the key species; the scheduled rest periods would maintain the vigor and productivity of the key species and other vegetation. It is expected that the diversity of palatable plants would be maintained or improved. The grazing system would mitigate grazing impacts on vegetation by adjusting the timing of use (growing seasons rest as recommended by Canfield 1939, Holechek 2000, and Holechek et al. 2001), reducing use limits (conservative limits of 35%, as recommended by Holechek et al. 1999, Holechek et al. 2003, Navarro et al. 2002, Paulsen and Ares 1962, and Valentine 1964) on key species, lowering stocking rates (as recommended by Heady et al. 1975, Holechek et al. 1999, Hutchings and Stewart 1953, Stoddart et al.1975, and Thurow and Taylor 1999) and disallowing additional ephemeral grazing.

It is expected that the DPC and BMEMP objectives would be maintained or reached under this alternative. Moving the livestock three times, as proposed in this alternative, would provide scheduled deferment during the spring and summer growing seasons for grasses, shrubs, and forbs, thus, improving key species vigor and cover and aid in seedling establishment to maintain diversity thus supporting the rangeland's ability to function and support sustainable grazing use.

Closing the Twin Mills pasture to livestock grazing, allowing for complete rest, would speed up the plant community post-fire recovery process (Howery 1999), allowing the perennial vegetation a full opportunity to reach full growth, set seed, and reproduce. It is expected that key species frequency, cover, and composition would increase with the closure. DPC objectives for this pasture are more likely to be achieved under this alternative compared to the No Action or Proposed Action alternatives.

Development of the Cerbat Pasture Well would create a new area of impact within one-half to one mile surrounding the well. Impacts from this well are similar to those described above for the Proposed Action (Section 4.1.10.1). The deferred rotation system proposed under this alternative would help to mitigate the effects of a new water by providing spring and summer growing season rest two years out of three.

Figure 10. Key area # 18 in the Joint Use Area of the Twin Mills Pasture, Standard 3 is Not Met

The construction of the three exclosures would provide a control area to compare grazed and ungrazed areas within the pastures where they are located. This is helpful when analyzing the data collected to determine if the standards are being met.

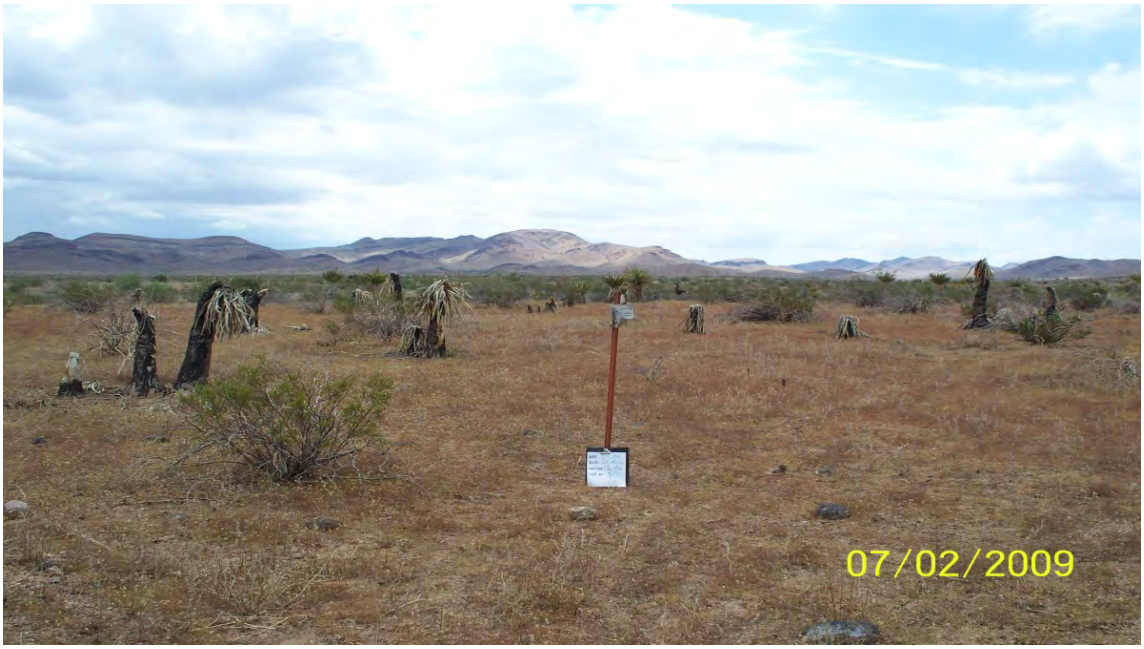

Figure 11. Key area # 20 in the Joint Use Area of the Twin Mills Pasture, Standard 3 is Not Met

If future monitoring indicates any areas within the allotments are not making progress towards achievement of Standard 3 then changes to the grazing practices would be made.

4.1.10.3 Alternative 3 No Action Alternative

Yearlong livestock grazing practices can directly affect vegetation by reducing plant vigor, reducing reproductive capabilities, decreasing or eliminating desirable forage species, causing loss of or injury to individual plants from trampling, particularly near water developments, and increasing soil instability and erosion. The current yearlong grazing management has resulted in Standard 3 not being met at several of the key areas and long-term downward changes in the frequency of key species occurred at several key areas. This downward trend is expected to continue if livestock use consistently exceeds conservative use levels, livestock repeatedly (year after year) use key species during the same growing seasons, and seed head removal and stolon removal of key species which inhibits reproduction. Continuing the excessive removal of leaves, seed heads, and stolons affects the ability of plants to produce carbohydrates, reproduce, and therefore, sustain themselves during normal rainfall years and especially during drought years. This could eventually further reduce range carrying capacity. Currently under the No Action Alternative most plants are grazed yearlong and trend is down at many of the key areas for key species, plant vigor is low, productivity is low, and reproduction appears to be negatively affected as few seed heads, stolons, tillers, and seedlings of palatable plants can be found. Trend is expected to continue downward to static under current management practices. Cover and composition of key species is not expected to increase and may decrease in those areas experiencing a downward trend. It is also expected that the diversity of palatable plants would not be maintained. The DPC Objectives at some of the key areas would not be met.

Keeping the Twin Mills Pasture open to yearlong livestock grazing and not adjusting livestock use levels is expected to impede the plant community recovery process. Not constructing exclosures would not give the BLM an opportunity to compare grazed and ungrazed areas within the pastures where they are located. Data would then be more difficult to analyze to determine if the standards are being met.

4.1.10.4 Alternative 4 No Grazing

Under the No Grazing Alternative, livestock grazing on these allotments would cease. Individual plant populations including key species within commonly grazed plant communities would have an opportunity to complete all phenological growth stages. No vegetation would be trampled or removed by cattle. Standing biomass levels would increase. Impacts to the ecological function of these plant communities would be confined to natural disturbances (e.g., fire, insect damage, spread of invasive species and drought) and other non-anthropogenic induced effects. The speed of recovery in areas not meeting objectives would depend on amount and location of seed sources, current distribution and abundance of key species, and seasonal distribution and quantity of annual rainfall. However, as Howery (1999) points out, complete rest is the most effective and fastest way to achieve range recovery following drought. It is more likely desired plant community objectives would be reached at a faster rate. Trend in plant frequency is expected to turn upward, and composition and cover of key species is expected to increase. The diversity of palatable plants is expected to be maintained or improved under this alternative.

Under this alternative, the three exclosures would not be constructed; however, data to determine if standards are being met would still be collected at the key areas. Not constructing the three exclosures, as in the Proposed Action, would not give the BLM an opportunity to compare the vegetation inside and outside of the exclosures. The pastures would still be grazed by wildlife, wild horses, and wild burros. Data would then be more difficult to analyze to determine if the standards are being met.

4.1.11 Water Quality and Quantity (Drinking and Ground)

4.1.11.1 Alternative 1 Proposed Action Adaptive Management Alternative

Under the Proposed Action, there would be no change to the quantity of water pumped from wells or consumed by livestock from springs as opposed to the No Action Alternative. Site visits to the allotments (during rangeland health evaluations) did not indicate that current livestock use is altering water quality. Thus, no effect to ground-water quality is expected from the Proposed Action. The proposed wells would not change groundwater levels in the aquifer.

An existing fence would be repaired or replaced at Big Wash Spring to exclude livestock from the spring source. Because wildlife would continue to have access to the spring, the change in water quality, if any, is unknown.

4.1.11.2 Alternative 2 Reduced Preference Alternative

Impacts to water quality and quantity, under this alternative, would be similar to the Proposed Action.

4.1.11.3 Alternative 3 No Action

Ground-water in the area of the allotments is remaining stable or increasing slightly (Anning et al. 2007). Livestock grazing has been ongoing in the allotments, and therefore, depletion of ground-water as a result of livestock grazing in the Sacramento and Detrital Valleys would not occur.

Under the No Action Alternative, existing range improvements would be maintained which would not cause a reduction to water quality or quantity of ground-water.

4.1.11.4 Alternative 4 No Grazing

There would be no change to water quality from the No Grazing Alternative. Cattle would not be grazing on the allotment, however, wild horses, wild burros, and wildlife would still graze and use water on the allotments.

4.1.12 Wild Horses and Burros

General

Under the Proposed Action and Alternative 2, it is anticipated that forage available (both type and amount) for wild horses and burros would increase and plants would be healthier within the allotments in the Black Mountain HMA and Cerbat HA. Implementing the proposed grazing systems on these allotments to achieve DPC objectives would allow for less competition for food and water between livestock and wild horses or burros around key areas. A grazing system would result in improving the ecological condition of the allotments (see “Vegetation” discussion), thus increasing forage. Compared to the No Action Alternative, impacts to wild horses and burros would be lessened by a grazing system that rests pastures and reduces livestock AUMs, which would result in reduced areas of moderate to heavy cattle grazing within the HMA. The BMEMP allocates 30 percent of forage to burros within the Joint Use Area. If forage for burros increases, burros would be healthier, their recruitment rate could increase, and there would be less competition with livestock for water and forage. With greater forage availability, burros may travel less and use specific areas more intensively.

Proposed fencing on the west side of Highway 93 may limit or alter movement patterns, and reduce drift

of burros from NPS lands to BLM lands and between allotments. Currently, approximately 50 percent of the pastures are delineated with natural boundaries which burros seem to be able to move across. No studies have been conducted on burro movements between allotments utilizing natural boundaries in the Black Mountains. If burros are unable to traverse the natural boundaries this may allow for easer management by the BLM by confining them to certain areas or an allotment by fencing. However, confining them to a smaller area may compromise herd viability and inbreeding could occur.

4.1.12.1 Alternative 1 Proposed Action Adaptive Management Alternative

Adaptive management and response provides flexibility in the grazing system and stocking rate. This is an important consideration because the wild burro population present in portions of the allotments could fluctuate and adaptive management would be a useful tool to change livestock grazing in response to changing wild burro and horse herds. The wild horse and burro populations could be reduced if BLM obtains funding and authority to conduct gathers. However, if gathers are not performed, the wild horse and burro herds could continue to grow. The adaptive management approach provides flexible options in livestock management to accommodate for changes in environmental conditions such as fluctuations in the wild horse and burro population.

By renewing the 10 year grazing permit, direct competition for forage between cattle and burros or horses would continue. However, the management practices proposed under this alternative are designed to manage livestock grazing to provide for a diversity of wildlife and plant species, maintain ecological functioning systems, and maintain and/or improve ecological condition.

Under this action, if cattle rotations are controlled by water, burros may fall subject to the same movements as cattle. This could force more burros into areas that are only occasionally used (Black Tank and Valley pastures) for longer periods of time as well as limit their movement across the HMA.

Under CFR 43 4710.5(b), “All public lands inhabited by wild horses or burros shall be closed to grazing under permit or lease by domestic horses and burros”. The fifteen horses would be permitted in the Quail Springs and Big Wash Pastures of the Quail Springs Allotment which is not part of the Cerbat HA. As long as the fences are in good working condition the mixing of domestic horses with wild horses would be unlikely. Keeping the fences in working order should not be a problem because they are located on public lands or private lands controlled by the permittee. If domestic horses get into the HA the authorized officer may establish conditions for the removal of the domestic horses from public lands adjacent to or within the herd area to prevent undue harassment of the wild horses or burros (CFR 43 4710.6). The permittee may also be subject to unauthorized use if the domestic horses are found within the HA.

4.1.12.2 Alternative 2 Reduced Preference Alternative

Under Alternative 2, impacts would be similar to Alternative 1. The ten horses would be permitted for up to two months in the Quail Springs Pasture of the Quail Springs Allotment which is not part of the Cerbat HA. As long as the fences are in good working condition, the mixing of domestic horses with wild horses would be unlikely.

With the rotation system proposed, resting of pastures would allow the BLM to eliminate use by cattle for up to one year and allow BLM to collect burro specific utilization data in those pastures.

Alternative 2 provides less flexibility in the grazing system and stocking rate. The wild burro population could be reduced if BLM conducts a gather. However, if gathers are not performed, the herd could continue to grow. This alternative provides fewer options in adjustments to livestock management to accommodate fluctuations in wild horse and burro population.

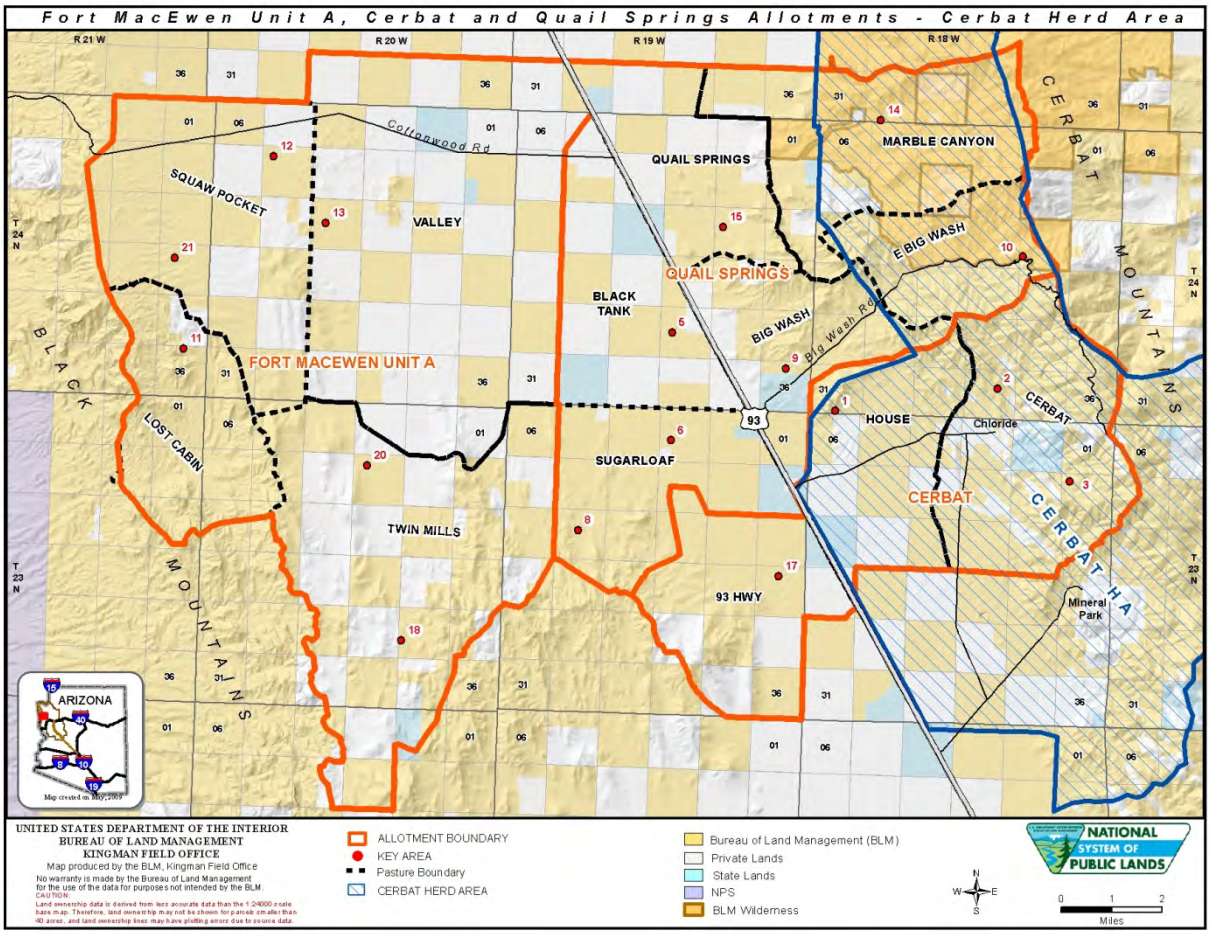

Figure 12. Cerbat Herd Area Boundary and the Quail Springs Allotment

4.1.12.3 Alternative 3 No Action

Range conditions at some key areas would continue to decline, under this alternative, increasing competition for forage between cattle, burros, horses, and wildlife. Declining forage conditions and amounts could cause burros and horses to forage on less desirable species. In combination with cattle grazing, this could lead to desired forage species of big galleta, black grama, bush muhly, Mormon tea, and globe mallow disappearing or becoming scarce. These animals would then need to switch to less palatable species such as flattop buckwheat which provides low quality forage to burros and horses.

4.1.12.4 Alternative 4 No Grazing

In the long term, the removal of cattle from the allotments would reduce competition for forage, space, and water in riparian and upland wild horse and burro habitats. In the short term, the shutting off of water under the no grazing alternative would seasonally exclude wild horses and burros from those pastures unless natural perennial waters (springs) existed. In the long term, BLM or some other entity could

assume responsibility to maintain some of the waters allowing use of these areas by wild horses and burros. If cattle were removed from the allotments, the AML for burros and horses could be increased as forage could be reallocated leaving more forage for wildlife, horses, and burros.

4.1.13 Wildlife including Special Status Species and Migratory Birds

Analysis Method

Each alternative will be compared to the current environmental conditions and grazing practices and the effects from each alternative will be described. Effects analysis will focus on upland and riparian wildlife habitats, special-status species, Sonoran desert tortoise, migratory birds, and bighorn. Analysis will disclose the impacts to habitats and how they affect wildlife's ability to survive and reproduce.

To make efficient use of the data available for this group of allotments and have a clean analysis without large amounts of repetition, it is necessary to make several assumptions about how the data can correlate to multiple habitat types and many special status species. As with all assumptions, there are times when they won't fit perfectly, but in general they are expected to cover the species and habitats within this group of allotments. If additional site-specific information is available for individual special status species, it will be used to analyze impacts to that species at that location.

The following assumptions were used to facilitate the analysis of special status species, migratory birds, and general wildlife habitats:

Assumption 1: Upland habitats that are meeting Standard 3 (Native Plant Communities) are either providing adequate habitat or have the ecological processes in place that will allow for the development of adequate habitat for upland special status species, migratory birds, and general wildlife.

Rationale: Upland habitats vary greatly depending on the soil type, climate, and landform, and very different habitats may be found close to each other. Data collected for analysis of Standard 3 are often all of the quantitative site-specific data that is available to assess upland wildlife habitat. Analysis of Standard 3 uses the data from trend sites, utilization measurements, and assessments based on the 17 indicators of rangeland health. This data is compared to the appropriate ecological site description from NRCS to determine if the desired plant community is present. In habitat management, the BLM cannot expect more from a certain habitat type than what it is capable of, based on its soil type, climate, and landform. Every location cannot provide habitat for every species, and it is not feasible to attempt to assess every single niche on the landscape. If a site has the appropriate soil, hydrological, and biological components and each process (nutrient cycling, hydrologic cycling, and energy flow) is functioning properly, then the site is providing what habitat it is capable of, or it can progress toward its site potential, and therefore, habitat potential. Properly functioning ecosystems can provide the diversity of habitats that are necessary for most species that are dependent on that ecosystem.

Assumption 2: Riparian habitats that are meeting Standard 2 are either providing adequate habitat or are developing suitable habitat for riparian-dependent special status species and general wildlife.

Rationale: BLM assesses riparian habitat using the Proper Functioning Condition method. Additional

species-specific habitat parameters are not measured in most areas. Riparian habitats vary greatly depending on their width, gradient, amount of water, and whether they are streams or springs. The habitat they are capable of providing also varies greatly, but when they are in Proper Functioning Condition, they are providing either the habitat they are capable of or the processes to develop to their capability are working properly. Riparian habitats in Properly Functioning Condition can provide the diversity of habitats that are necessary for most species that are dependent on that ecosystem.

Basis for the expected outcomes from changes in grazing management

Habitat for wildlife species and special status species must provide for food, cover, survival, and reproduction of each species. Not every plant community will provide all of the components necessary for every species. However, if the plant communities are able to maintain their vigor and diversity, and the ecological processes are functioning properly, then those plant communities would provide what habitat they are capable of or could progress toward their capability. Impacts to general wildlife species from livestock consists primarily of alterations to the vegetative community. If a vigorous native plant community is maintained with it natural variation then habitat for the natural variety of species on the CQFM allotments would be able to exploit their respective niches and populations would be expected to maintain themselves. Therefore impacts to general wildlife are considered with the analysis of impacts to vegetation and with the analysis of impacts to special status species.

New Water Developments

Developing new waters would improve livestock distribution and reduce grazing pressure on vegetation i.e. wildlife habitat, and provide wildlife new sources of water. Cattle would be able to reach new areas that are currently ungrazed and potentially increase forage competition with wildlife in these areas. Areas that were previously unused would have foraging cattle and lightly used habitat areas could become heavily used depending how close to the new waters these areas are located. Additional waters could provide cattle with new loafing areas potentially affecting the surrounding habitats by lowering the frequency and diversity of key forage plants as a result of frequent and high use within ½ to 1 mile radius of each water. It is expected that the acreage of land affected by loafing areas would increase under this alternative as compared with the current situation. Under proper stocking and distribution, it is expected that the loafing areas would be reduced to ¼ mile around any new or existing watering points.

Special Status Species – General Impacts

<u>Desert Tortoise</u>

Tortoises can be affected by cattle grazing in several ways including, crushing, collapsing of burrows, alteration of available cover through grazing, and competition for forage.

Crushing of tortoise: Tortoise can be crushed by cattle; however, no data exist on the frequency at which cattle trample desert tortoise. Cattle likely pose a low degree of risk to adult desert tortoise and possibly sub-adults above ground, simply because cattle would likely try to avoid stepping on what essentially would appear to them to be a rock (Boarman 2002). Hatchlings are more likely to be stepped on than adult tortoise.

Collapsing of burrows: Avery and Neibergs (1997) found that more burrows of desert tortoise were partially or completely destroyed in areas that were grazed by cattle than in a fenced area. In the rocky habitat of the Twin Mills, Sugarloaf, and Highway Pastures, the majority of burrows would be in drainage cut banks or under boulders, and therefore, unlikely to be collapsed.

Cover: The desert tortoise needs vegetation for cover from thermal extremes, for sheltersite construction, and for concealment from predators (Cordery et.al. 1993). Livestock grazing can reduce this cover and could require tortoises to travel further to find adequate cover and expose them to predators and extreme temperatures.

Forage Competition: Tortoise consume a wide variety of plants. Preferred forage plants for tortoise include a variety of perennial and annual grasses, forbs, vines, mallows, and shrubby buckwheat (Van Devender 2002, and Arizona Interagency Desert Tortoise Team 1996). Three-awn, bush muhly, big galleta, globemallow, and shrubby buckwheat, which are key forage species for livestock in the Fort MacEwen Allotment, are also important forage species for desert tortoise (Van Devender 2002).

Grazing management with periodic deferment that provides for high vigor and reproductive capability of vegetation would be expected to benefit tortoises by maintaining or increasing cover and available forage.

Construction and maintenance of range improvement, as well as, cattle gathering activities may bring workers into contact with desert tortoise. During these activities tortoises could be run over by vehicles or unintentionally harmed by handling. Unsurveyed areas north of the tortoise habitat line (Figure 9) may contain desert tortoise. However, the cattleguards would be built to allow small animals, including tortoise to escape if they fall in. Therefore, tortoise within surveyed or unsurveyed habitat could escape from a cattleguard if they fall into one.

Bighorn Sheep

Cattle grazing in and around bighorn sheep habitat can affect bighorn in a variety of ways.

Competition for forage: Bighorn sheep will readily use areas with slopes between 0 and 80% slopes while cattle typically use slopes between 0 and 30% (Ganskopp and Vavra 1987). Therefore, in areas with slopes between 0 and 30% in bighorn sheep habitat there is the potential for competition between livestock and bighorn sheep. Competition between cattle and bighorn has been cited as a concern for bighorn populations (Wishart in Schmidt and Gilbert ed. 1978, and Geist in Trefethen ed. 1975). In the lower Grand Canyon, diets of bighorn, cattle, and burros overlapped substantially and the authors predicted serious competition could occur. Seegmiller and Ohmart (1981) found a substantial overlap in the diets of bighorns and burros in the Black Mountains of Arizona. Cattle and bighorn in Montana were found to have substantial overlap in diets.

Avoidance of cattle: In Alberta, Canada, bighorn sheep spend more time on alert when cattle are nearby but do not appear to actively avoid areas with cattle unless they are directly approached by cattle (Brown et al. 2010). Newly transplanted bighorn in southern Idaho reduced and shifted their home range in response to entering the pasture and shifted and expanded their range back when livestock left the pasture (Bissonette and Steinkamp 1996). Anecdotal observations of individual bighorn sheep mingling with cattle within the Kingman Field Office have occurred.

Disease: Onderka et al. (1988) found that 5 of 8 bighorn sheep inoculated with a strain of *Pasteurella haemolytica* from cattle subsequently died of septicemia and pneumonia within 4 days. In Colorado, 21 dead or dying bighorn were sampled and found to have a strain of *Pasteurella* bacteria of suspected cattle origin which contributed to the pneumonia outbreak (Wolf et al. 2010).

Bighorn forage availability on the CQFM allotments has likely been reduced by the combination of burros and cattle. Additionally, competition between bighorn, cattle, and burros for natural water likely occurs within the allotments. Bighorn also make use of some of the manmade livestock waters within the allotments. The home ranges of bighorns in the Black Mountains may have been reduced or shifted by the presence of cattle and burros within the area. Finally disease has affected the bighorn sheep populations in the Black Mountains north of Highway 68, but this outbreak was not attributed to disease transmission from cattle. Disease transmission between domestic sheep and bighorn has been confirmed. Transmission between cattle and bighorn is more speculative, but research does indicate that it is possible (Onderka et al. 1988, Lawrence et al. 2010). Management of livestock that increases the vigor and abundance of key forage species would increase forage availability for bighorn and reduce competition between them and cattle, burros, and other wildlife.

In 2007 the AZGFD finalized their bighorn sheep management plan for the Black Mountains (AZGFD 2007). The objectives of this plan regarding cattle involve improving range conditions, reducing competition between bighorn and cattle for water and forage, and minimizing conflicts between cattle and bighorn (AZGFD 2007).

Special Status Bird Species (including raptors and migratory birds)

Livestock grazing can affect bird species by altering forage abundance through grazing and altering the abundance and quality of nest substrates through grazing or trampling. Cattle could occasionally trample ground nests or knock nests out of small shrubs as they pass, causing nest failure. These events are expected to be rare unless cattle are stocked at very high densities. Pastures that are grazed in the spring are going to offer less cover for ground nesting birds, which would make a suitable nest site more difficult to find or would expose nests to predators and reduce nest success. Pastures that are deferred during the spring when most song birds are nesting would offer abundant cover for ground nesting birds and would have increased seeds available as forage for birds.

When a pasture is meeting Standard 3, it is expected to have and maintain a desirable native plant community that would provide habitat for the expected variety and abundance of native wildlife species appropriate for that site. A diverse and vigorous plant community is going to support a more diverse and abundant insect population, which will provide more of a prey base for a wide variety of bird species compared to a plant community with low vigor and limited diversity. In diverse and vigorous pastures, birds will have suitable nest sites to choose from and would better avoid predators and would be able to obtain sufficient food to raise a successful brood.

4.1.13.1 Alternative 1 Proposed Action Adaptive Management Alternative

Desert Tortoise

Under this alternative, the risk of tortoise being crushed or their burrows being collapsed would be increased when livestock are concentrated in a single pasture compared to the current situation where cattle are spread out over a wider area and not as concentrated.

This alternative would provide for periodic growing season rest which could allow the plant community to trend towards or maintain the DPC objectives. Habitat for tortoise would be enhanced as plants that provide thermal cover and concealment cover from predators become more common.

As tortoise and livestock have similar diets and consume the same key species, forage competition could still be present under Alternative 1. There would be approximately 123 fewer head of cattle with this alternative compared to the current situation. Cattle would be out of the pastures that have tortoise habitat two years out of four during the spring or summer growing seasons, which would reduce forage competition during those years. The spring and summer are the seasons when tortoise would be most active. Livestock would be present and concentrated in pastures two years of four during the tortoise active season and competition for forage during these times may occur. This forage competition may be mitigated by the lower use limits on key species within the Joint Use Area as compared to the current situation. Use limits would not be lowered outside of the Joint Use Area.

Livestock grazing in the Twin Mills Pasture, which contains the majority of the tortoise habitat in these allotments, would be mostly grazed in the winter, which is outside of the tortoise active seasons. During the warm seasons when cattle are not present in these three pastures, forage competition would be reduced. During years of abundant ephemeral forage production, grazing by cattle would be mitigated by the sheer volume of forage available to herbivores. This is also true for the current situation. Currently, cattle are present yearlong in all pastures. Under Alternative 1, cattle would not be present every year in all seasons.

New water developments could reduce grazing pressure overall in a pasture, but they would move cattle into new areas not previously grazed or only lightly grazed by cattle. This could reduce the diversity, amount, and availability of forage for tortoise. An increase in the acreage of loafing around new water developments would decrease the amount of forage and cover available for tortoise.

There is potential that tortoise could be crushed by a vehicle or unintentionally harmed by handling by workers during livestock management activities but tortoise handling guidelines should reduce the risk of harm to tortoise.

Bighorn Sheep

The proposed grazing rotation would mitigate competition for forage and water between livestock and bighorn during the periods when livestock are not in the Twin Mills, Squaw Pocket, or Lost Cabin Pastures. However, when livestock are in these pastures they would be more concentrated than they are under the current situation and competition would increase during these periods. Bighorn may restrict their movements and habitat use to the steeper slopes of these pastures when livestock are present, and

bighorn may forage slightly less and remain on alert slightly more. Disease transmission between cattle and bighorn is possible but appears to be much less common than the transmission of disease between domestic sheep and bighorn, and the risk of transmission is not expected to increase under this alternative with the exception around new watering points in bighorn habitat. The impacts to bighorn sheep from the implementation of this alternative are not expected to increase when compared to the current situation. Impacts to bighorn may be less when compared to the current situation because meeting DPC objectives would improve the quality of habitat for bighorn providing them with sufficient food and cover in these pastures. Grazing 123 fewer head of cattle would reduce forage competition between bighorn and livestock. Competition for forage would be greater than under Alternative 2 as permitted vegetation use levels and stocking rates would be higher under the Proposed Action.

New water developments could reduce grazing pressure overall in a pasture but they would move cattle into new areas not previously or lightly grazed by cattle increasing contact between cattle and bighorn and potentially increasing competition for forage. An increase in the acreage of loafing around new water developments would decrease the amount of forage and cover available for bighorn sheep. Putting water directly into bighorn habitat would increase contact and conflict between cattle and bighorn. When cattle are in this pasture they would be concentrated around the watering point and bighorn would likely avoid these areas reducing their foraging opportunities. The potential for disease transmission between cattle and bighorn would rise if water was developed in bighorn habitat. It would rise especially during those times when cattle are concentrated in the pastures that contain bighorn habitat.

Special Status Species Migratory Birds and General Wildlife

Implementing the proposed deferred grazing system on these allotments to achieve or maintain the DPC objectives would result in improving the ecological condition of the allotments (see "Vegetation" discussion above), as well as provide for the habitat needs (i.e., forage, cover, nesting sites, and shelter) of wildlife including special status species and migratory birds. The recovery of areas not currently meeting objectives may be slowed as allowable use limits may keep plant productivity lower. This alternative is designed to maintain or make progress toward meeting Standard 3, and it is anticipated that wildlife, sensitive species, and migratory bird habitats would improve or be maintained for most species. However, recovery may be slowed because of the use limits that exceed what is recommended. Periodic rest from livestock grazing during the spring and summer growing seasons and winter use of the Twin Mills Pasture is expected to improve the frequency, cover, and productivity of key species such as bush muhly, black grama, and big galleta, likewise improving habitat for those species of wildlife that use these plants for cover and foraging.

Alternative 1 would not affect the roosting sites of bats. Maintaining or improving key species productivity, cover, and meeting the desired plant community (DPC) objectives may improve habitat for insects; thus, indirectly maintaining or improve foraging conditions for bats, Le Conte's thrashers, Birds of Conservation Concern, and other migratory birds.

During the migratory breeding season, grazing could result in the destruction of some nests of ground nesting bird species; however, cattle would not be present every year in every pasture. Resting pastures would overall reduce the contact that livestock have with breeding birds in most years during the grazing cycles. However, an increase in contact in those years when grazing is scheduled during the breeding

season would occur. Ground nests would potentially be trampled during those times. This alternative is designed to provide sufficient seed production for seed eating species and adequate forage for insects, which are important prey species to bats and many bird, reptiles and small mammals.

Keeping waters on public land operating yearlong, even when livestock are not in the pasture, would provide all wildlife with year round water. Those species that are more water dependent, such as mule deer, bighorn sheep, and Gambel's quail, would be able to continue to utilize an area after livestock have moved. However, if gates are closed to prevent livestock use of waters, some of these watering facilities would become unavailable to larger animals (mule deer and bighorn). Some of the watering facilities are not designed using wildlife friendly fencing standards.

Construction and maintenance of the proposed range improvements would cause a temporary disturbance to wildlife. This disturbance is not expected to occur for more than a day in any one area. Fences can form barriers to wildlife movement, but this would be mitigated by constructing the new fences and fence reconstructions as proposed in a wildlife friendly manner. The fence design allows big game to go over, under, or through the fences without injury. Since mule deer and bighorn are the largest forms of wildlife in the area, other wildlife would be able to easily cross under the fence lines.

Alternative 1 increases the amount of acreage that would be affected by cattle loafing near new waters and would reduce the habitat productivity of these areas for migratory birds and general wildlife.

Western Burrowing Owl: The literature discusses a direct relationship with grasslands, livestock grazing, and burrowing owls. This is typically associated with prairie dog towns and the close cropped vegetation that occurs within such areas. CQFM does not have prairie dog habitat; however, the lower stocking rate and utilization limits would allow the key species to reach a taller growth form, possibly reducing the habitat feature of short vegetation that burrowing owls prefer. In the more arid West Unit portion of the allotments, naturally wider plant spacing would mitigate the taller growth form of the vegetation.

Golden Eagle and Peregrine Falcon: Livestock grazing would not affect the nesting locations of these two species as their nests are found on inaccessible cliff faces. These species forage over large areas and livestock grazing in unlikely to affect the amount of available prey (rabbits and birds).

Two-colored Beardtongue: Two-colored beard tongue is unlikely to be eaten by cattle as it is not a preferred forage plant for cattle and use by livestock has not been observed and would be uncommon. Livestock grazing has the potential to affect the two-colored beard tongue by trampling and disturbance of habitat. However, given the dispersed nature of the plant on CQFM trampling by livestock would be uncommon.

4.1.13.2 Alternative 2 Reduced Preference Alternative

Desert Tortoise:

With scheduled growing season deferment in the Sugarloaf and Highway 93 pastures, and closure of the Twin Mills Pasture, it is expected that tortoise food plants, thermal cover, sheltersite cover, and plant cover for concealment from predators would increase compared to the current situation and to Alternative 1. There would be approximately 348 less head of cattle grazing on CQFM under Alternative 2. This

would reduce forage competition between livestock and tortoise compared to the current situation and Alternative 1.

Annual grasses and forbs provide a substantial amount of forage for tortoise, even after they dry out in the summer (Van Devender 2002). Ephemeral permits for grazing on annual plants would not be authorized during the next 10 years while the perennial plant communities regain their ecological health, i.e. meet the Arizona S&Gs. During this time, any forage competition between tortoise and livestock would be eliminated.

In the long-term, once DPC objectives are met in the Twin Mills Pasture, cattle grazing would resume under a deferred grazing strategy that consists of conservative use limits and a low stocking rate (230 AUs for all of CQFM). The use limits (35% vs 50%) and stocking rates (230 AUs vs 578 AUs) are much lower than the current use limits and stocking rates for both Altenative 1, Proposed Action and Alternative 3, No Action. This would reduce forage competition between cattle and tortoise. At times livestock would be grazing in tortoise habitat in each pasture during the tortoise active seasons; however, with the adjusted season of use, cattle grazing during most of this growing seasons would be limited to one year out of three. During the grazing of these pastures, direct competition for forage would occur between tortoise and livestock, however utilization limits on key species would be below the recommended limits of 45 percent designated in the Management plan for the Sonoran Desert Population of the Desert Tortoise in Arizona (Arizona Interagency Desert Tortoise Team 1996), and it is expected that there would be adequate forage left for tortoise. Meeting the DPC objectives for each of the key areas and Standard 3 in the pastures where Sonoran Desert tortoise habitat is found would provide for the dietary needs of the tortoise.

The risk of tortoise being crushed or their burrows being collapsed would be increased when livestock are concentrated in a single pasture compared to the current situation however fewer cattle means fewer potential encounters between cattle and tortoise. In the rocky habitat of the Twin Mills, Sugarloaf, and Highway pastures the majority of burrows would be in drainage cutbanks or under boulders and therefore unlikely to be crushed.

The maintenance or reconstruction of fences in tortoise habitat would be conducted from existing roads or on foot or horseback where road access is not available. Maintenance or reconstruction in this manner would reduce the danger of tortoise being run over by vehicles. To reduce the potential to harm tortoise when they are encountered during maintenance and reconstruction activities the tortoise handling guidelines included in the stipulations of the grazing permit would be followed (BLM 2013).

Impacts from the proposed well are similar to Alternative 1 but much smaller in nature as only one well would be drilled under Alternative 2.

Bighorn Sheep:

Impacts to bighorn sheep are similar to Alternative 1 but smaller in nature as there would be 348 less cattle grazing under this Alternative. Forage competition would be less as there would be fewer cattle. Avoidance of cattle by bighorn and potential disease transmission between bighorn and cattle would be less as there would be fewer cattle to avoid and transmit potential disease.

Competition with livestock would be mitigated by implementing the rotation system, lowering the stocking rate, lowering use limits set on the key species, maintaining or achieving the upland health standards at the key areas, and closing the Twin Mills Pasture. This would reduce competition for forage and space. Achieving the standards would allow for the vegetative communities to reach or maintain the DPC objectives for each ecological site and help to provide adequate amount and quality of forage for bighorn compared to the current situation. Limiting cattle use seasonally would reduce competition for space between livestock and bighorn during those times.

No impacts to bighorn are anticipated from construction of the proposed well as it is outside of bighorn habitat. The proposed fence realignment and fence extension would not impede crossing by bighorn as these fences would be built using fence specification designed to allow bighorn to cross. Disturbance of bighorn during maintenance of the existing range improvements would occur in any one area for one day or less.

Ephemeral grazing could still occur in bighorn habitat and impacts of this type of grazing would be unchanged from the current situation

BLM Sensitive Species, Migratory Birds, and General Wildlife

Implementing the proposed deferred grazing system on these allotments to achieve or maintain the DPC objectives would result in improving the ecological condition of the allotments (see "Vegetation" discussion above), as well as, provide for the habitat needs (i.e., forage, cover, nesting sites, and shelter) of wildlife including special status species and migratory birds. Because this alternative is designed to maintain or make progress toward meeting Standard 3 it is anticipated that wildlife, sensitive species, and migratory bird habitats would improve or be maintained for most species. Periodic rest from livestock grazing during the spring and summer growing seasons two out of three years, and the closing of the Twin Mills Pasture is expected to improve the frequency, cover, and productivity of key species such as bush muhly, black grama, and big galleta, likewise improving habitat for those species of wildlife that use these plants for cover and foraging.

Livestock grazing would not affect the roosting sites of bats. Maintaining or improving key species productivity, cover, and meeting the desired plant community (DPC) objectives may improve habitat for insects, thus, indirectly maintaining or improve foraging conditions for bats, Le Conte's thrashers, Birds of Conservation Concern, and other migratory birds.

During the migratory breeding season, grazing could result in the destruction of some nests of ground nesting bird species; however cattle would not be present every season in every pasture. Seasonally deferring pastures two out of three years during the growing seasons would overall reduce the contact that livestock have with breeding birds in most years during the grazing cycles. However, an increase in contact in those years when grazing is scheduled during the breeding season would occur, ground nests would potentially be trampled during those times. The utilization limit should provide sufficient seed production for seed eating species and adequate residual forage for insects, which are important prey species to bats and many bird, reptiles and small mammals.

Keeping waters on public land operating yearlong, even when livestock are not in the pasture, would provide all wildlife with year round water. Those species that are more water dependent such as mule deer, bighorn sheep, and Gambel's quail, would be able to continue to utilize an area after livestock have

moved. As one new well is proposed, this alternative increases the amount of acreage that would be affected by cattle loafing near the new water and would reduce the habitat productivity for about a ½ to 1 mile radius for migratory birds and general wildlife.

Construction of the proposed fence extension and realignment would cause a temporary disturbance to wildlife. This disturbance is not expected to occur for more than a day in any one area. Fences can form barriers to wildlife movement, but this would be mitigated by constructing the fences as proposed in a wildlife friendly manner. The fence design allows big game to go over, under, or through the fences without injury. Since mule deer and bighorn are the largest forms of wildlife in the area, other wildlife would be able to easily cross under the fence lines.

Western Burrowing Owl: Impacts to the burrowing owl are similar to Alternative 1, Section 4.1.14 except under Alternative 2 recovery of vegetation is expected to occur at a more rapid rate, and the short vegetation that owls prefer would be less abundant than under Alternative 1. Compared to the current situation this alternative may decrease the quality of habitat available to the burrowing owl as the owl prefers more degraded conditions like those that occur under the current situation. In the more arid West Unit portion of the allotments, naturally wider plant spacing would mitigate the taller growth form of the vegetation.

Golden Eagle and Peregrine Falcon: Same impacts as Alternative 1, Section 4.1.14.

Two-colored Beardtongue: Same impacts as Alternative 1, Section 4.1.14.

4.1.13.3 Alternative 3 No Action

Under this alternative Standard 3 would continue to not be met at some of the key areas and possibly these key areas would decline even further away from the DPC. Cattle would continue to use all pastures yearround with little to no growing season deferment, not allowing the key species opportunity to regain vigor or reproduce in most years.

The stocking rate of 578 AUs is higher than the 13 year average of 230 AUs that the permittee has been running. Not meeting Standard 3 at certain key areas with a historic stocking rate of 230 AUs suggests that these same key areas would also not meet Standard 3 with the same management and higher stocking rate of 578 AUs. When the permittee activates the permit to the full preference of 578 AUs (as he has since 2011), it is possible that areas where Standard 3 is currently being met may decline to not meeting, and areas that do not meet the standard will degrade even further. A higher stocking rate, higher use limits, and no growing season deferment results in greater grazing pressure on vegetation and especially on the palatable key forage plants.

This would affect wildlife by changing the plant community composition, cover, frequency, and function (see section 4.1.1.0, Vegetation). The key forage species at areas not meeting Standard 3 would continue to decline in frequency and possibly diversity of key forage plants would also be reduced at key areas. Cover of perennial forbs and grasses would be reduced which would reduce the amount and quality of forage and cover available to wildlife, special status species, and migratory birds.

Continuing with the higher stocking rates and use limits, compared to Alternatives 1 and 2, would allow livestock to consume a greater amount of forage. Livestock grazing can reduce the amount of forage

available to native herbivores (e.g., deer, bighorn sheep, tortoise), as well as reduce vegetative cover for ground nesting birds, desert tortoise, burrowing rodents, and other wildlife species dependent on ground cover for protection, food, thermal cover, and breeding sites. Impacts to wildlife would be greatest around cattle concentration areas of use such as range improvements (e.g., cattle troughs) where vegetation receives the heaviest use.

Impacts from trampling of nests by cattle would be reduced as cattle would be spread out and not as concentrated as under Alternatives 1 and 2.

The grazing permittee would continue to keep water on in all pasture which would provide wildlife with year round water and allow those species that are more water dependent such as mule deer would be able to continue to utilize an area.

Western Burrowing Owl: Habitat quality for this owl would remain the same under the current situation. This species is associated with low vegetative cover, short vegetation, and widely spaced plants, a feature not uncommon at some of the key areas under the current situation.

Golden Eagle and Peregrine Falcon: Same impacts as Alternative 1, Section 4.1.14.

Two-colored Beardtongue: Same impacts as Alternative 1, Section 4.1.14.

4.1.13.4 Alternative 4 No Grazing

Total removal of cattle from all of the allotments would maintain or facilitate progress towards meeting Standard 3. Wildlife habitat would improve or be maintained for most species as described above under Alternatives 1 and 2, Sections 4.4.14.1 and 4.4.15.1, but at a quicker rate. Recovery is expected within two decades as compared to two or more decades under Alternatives 1 and 2. Upland areas would provide adequate habitat or have the ecological processes in place that would allow for the development of adequate habitat for tortoise, bighorn, special status species, migratory birds, and general wildlife. Forage competition between livestock and wildlife would not occur and the danger of livestock stepping on tortoise or collapsing burrows would be removed.

Waters on public land and private lands maintained by the permittee potentially would be turned off and more water dependent species, such as mule deer and Gambel's quail, would be more restricted in their use of CQFM as a result of less water availability. The BLM, other agencies, or private entities could take over maintenance of the public waters and keep these waters on year-round.

4.2 Cumulative Effects

Cumulative impacts are those impacts resulting from the incremental effect of an action when added to other past, present, or reasonably foreseeable actions regardless of what agency or person undertakes such other actions (40 CFR 1508.7). Cumulative impacts were analyzed in the Kingman RMP/Final EIS (BLM 1995) to which this analysis is tiered. All resource values addressed in Chapter 3 have been evaluated for cumulative effects. If there is no net effect to a particular resource from an action, then there is no potential for cumulative effects. The action alternatives encompass a 10 year time period; therefore, that timeframe was selected for analysis. For cumulative effects analysis, the geographic scope of the proposed grazing permit renewals encompasses the 131,700 acres that comprise the CQFM Allotments.

4.2.1 Past and Present Actions

Past or ongoing actions that affect the same components of the environment as the action alternatives include: recreation use, minerals development, wild horse and burro management, vegetative and wildlife habitat improvements projects, invasive, non-native species control efforts, wildland fire, and fire management activities to reduce the threat and impact of wildfire (e.g., fuels reduction projects).

Guidance issued by the Council on Environmental Quality on June 24, 2005, points out that review of past actions is required only to the extent that this review informs agency decision-making regarding the alternatives. The guidance states, "agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." This is because a description of the current state of the environment inherently includes the effects of past actions.

4.2.2 Reasonably Foreseeable Action Scenario

It is reasonable to expect that most of the past, present, and ongoing actions discussed above are would persist and remain steady throughout the time frame considered in this analysis with relatively little change in intensity. These actions include continued grazing, potential minerals development, and population growth in the area, which would increase residential and commercial development on private lands as well as potentially increasing recreational uses on BLM lands. Continuation of these activities in the future would result in a continuation of effects similar to those that have resulted from past activities. Effects including soil and vegetation disturbance and habitat loss and fragmentation would continue.

In approximately 10 years, these allotments will again be reviewed and analyzed for consideration of permit renewal. Successful implementation of a new grazing system, in conjunction with proposed range improvements, would assist in meeting a wide range of resource objectives and help assure that long-term productivity and health of watershed and rangeland values would be maintained. When considered with past, present, and reasonably foreseeable future actions, implementation of the grazing management systems and new range improvement projects in addition to new terms and conditions and long-term objectives would be anticipated to improve resource conditions in the CQFM Allotments. Some activities may have increased by then and may be more of a factor in analyzing cumulative effects. For example, OHV use currently occurs in the area and may increase as the population within the region increases. Wildfires also seem to be increasing in northern Arizona; therefore, wildfire rehabilitation and invasive species may play a larger role than they currently do. No other known future actions are proposed to occur within the project area for the timeframe considered.

4.2.3 Analysis of Cumulative Effects

The Proposed Action would modify livestock management throughout the allotments and is designed to make progress toward meeting Standard 3 for rangeland health, resulting in an incremental positive cumulative effect for the area. Livestock grazing in the region has evolved and changed considerably since it began in the 1870s and has influenced the present day condition of the resources in the allotments. Given the past experiences with livestock impacts on resources on public lands, management of livestock grazing is an important tool in ensuring the protection of public land resources. Progress could be made toward meeting the Standards and Guidelines for Healthy Rangelands with improved grazing management, increased rest from grazing, and the additional terms and conditions and range improvements proposed. The Proposed Action would ensure the improvement of upland vegetative

communities throughout the allotments and result in beneficial effects for all resources present within the allotments.

Reasonably foreseeable future actions, such as the change in stocking rate, utilization limits, rotation and deferment, would be cumulatively beneficial to vegetative communities within the allotments and would be expected to aid in the maintenance/attainment of the Standards and Guidelines for Healthy Rangelands. Under the new grazing management system, invasive species that have a tendency to pioneer into areas disturbed by grazing would receive more competition from key species that are receiving less grazing pressure due to enhanced pasture management. These plant species may be more vigorous and productive throughout their lifecycles because of increased rest from grazing. The KFO would continue to monitor the allotments for the presence of invasive weeds.

Increased off-highway vehicle (OHV) use may also impact soil and vegetative communities through ground disturbance and may have detrimental effects to natural plant communities, which may lead to soil erosion, particularly if off-trail use occurs.

Wildfires are common in northern Arizona and have the potential to convert native range to non-native species. Upland areas may be susceptible to erosion following wildfire in a watershed, which could lead to proliferation of invasive weeds in these areas. Fire Emergency Stabilization and Rehabilitation efforts would be undertaken to help prevent the conversion of native range to non-native species. Emergency Stabilization and Rehabilitation efforts may vary in degrees of success but when successful should help control the spread of invasive, annual species.

Overall the effects of reasonably foreseeable future invasive weed monitoring and treatment, and wildfire rehabilitation would be beneficial to upland soils and vegetation in the long term, which would indirectly contribute to attainment of the Standards and Guidelines for Healthy Rangelands.

Livestock grazing in combination with the other identified actions have and will continue to alter upland vegetation composition, cover, and densities, which may reduce suitable habitat for wildlife in some cases. Livestock grazing in combination with recreational activities may contribute to wildlife habitat fragmentation, habitat loss, alteration of travel corridors, and other disturbances caused by wildlife/human interactions. Adherence to the new grazing system, as proposed would eliminate or reduce many of these impacts by maintaining or improving perennial vegetation diversity, and by improving the frequency, cover, and composition of palatable plant species. The Proposed Action could eventually lead to improvements in habitat for wildlife that would result in a positive cumulative impact to wildlife habitats within the allotments. The improved vegetative conditions would indirectly benefit wildlife, migratory birds, and most special status species.

Increased OHV use may have an adverse effect on wildlife within the allotments by increasing habitat fragmentation, destroying suitable habitat, and decreasing the ability of the habitat to maintain long-term population numbers. Increased disturbance by OHV users could concentrate wildlife in isolated areas and could result in decreased productivity or habitat impacts.

Wildfires at higher elevations within the Arizona Interior Chaparral plant community may be beneficial to wildlife by creating diverse habitats and seral stages. However, large scale fires, especially fires in the Mohave Desert at the lower elevation and precipitation zones of much of the project area, may lead to the

conversion of native habitats to red brome or other annual invasive grasses. The lower elevation plant communities of the Mohave Desert are not fire adapted. Wildfire suppression in these areas can be beneficial to wildlife by reducing the number of acres that are burned and may assist in limiting habitat fragmentation that can occur from large scale fires. Following a wildfire, rehabilitation of the burned area may occur if needed, which is expected to improve wildlife habitat through the prevention of red brome and other invasive species.

Through proper management of livestock, adequate habitat would be maintained within the allotments to support viable populations of the species discussed in this EA. Therefore, the action alternatives in combination with the past, present, and reasonably foreseeable activities considered in this analysis may impact some wildlife and their habitat; however, livestock grazing would not adversely impact the viability of these populations.

Wild horse and burro populations would continue to fluctuate within the allotments. Management actions like gathers, removals, adoptions, and holding facilities as well as natural factors like drought, wildfire, and reproductive rates would all influence the degree of fluctuation within the populations. Wild horse, burro, and wildlife populations have and would continue to influence the available forage for livestock. Natural occurrences like drought and fire can also reduce the available forage in an area. Higher populations of horses and burros decrease the amount of forage available for livestock and vice versa.

Rangeland and livestock ecosystems are complex, with numerous interactions among the system's living and non-living components. Consequently, the effects of a changing climate will have direct and indirect impacts at varying spatial and temporal scales. Climatic changes such as increased atmospheric concentration of CO^2, changes in temperature, and changes in precipitation patterns have the potential to affect rangeland ecosystems in the following ways: 1) changes in decomposition rates; 2) changes in aboveground net primary production; 3) shifts in grassland species; 4) changes in evapotranspiration and runoff; and 5) changes in forage quality (Ojima et al. 1991; Breymeyer et al. 1996; IPCC 1996, IPCC 2007). The effects that these changes may have on livestock grazing in the CQFM Allotments as well as the contribution that such grazing may have to climate change are currently unknown. The lack of summer rains in the past 20 years could be contributing to decreases in big galleta and other key species as observed in the CQFM vegetation data collected for the Rangeland Health Evaluation (BLM 2010).

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6 REFERENCES, ACRONYMS

6.1 References

Anning, D.W., T. Morgot, M. E. Flynn, and W. H. Remick 2007. Ground-water occurrence and movement, 2006, and water-level changes in the Detrital, Hualapai, and Sacramento Valley Basins, Mohave County, Arizona: U.S. Geological Survey Scientific Investigations Report 2007-5182, 24 pp.

Arizona Department of Transportation. 2009. Noxious Weed Survey Report and Mitigation Report by EcoPlan Associates 2008. In: Noxious and Invasive Plan. Hoover Dam to Mile Post 17. Project Number 093-MO 002 H534701C. Phoenix, Arizona.

Arizona Game and Fish Department. 2007. Black Mountains Bighorn Sheep Management Plan. Final. Phoenix, Arizona.

Arizona Game and Fish Department 2012. Arizona's State Wildlife Action Plan: 2012-2022. Arizona Game and Fish Department, Phoenix, Arizona.

Arizona Game and Fish Department 2013. Heritage Data Base Management System. Animal Abstracts, http://www.azgfd.gov/. Phoenix, Arizona

Arizona Interagency Desert Tortoise Team. 1996. Management Plan for the Sonoran Desert Population of the Desert Tortoise in Arizona.

Arizona Wildlands Invasive Plant Working Group. 2005. Invasive Non-Native Plants that Threaten Wildlands in Arizona. A categorized list developed by the Arizona Wildlands Invasive Plant Working Group. August 2005. Accessed May 17, 2011. http://sbsc.wr.usgs.gov/research/projects/swepic/SWVMA/InvasiveNon-NativePlantsThatThreatenWildlandsInArizona.pdf.

Avery, H.W. and Neibergs, A.G. 1997. Effects of cattle grazing on the desert tortoise, *Gopherus agassizii*: nutritional and behavioral interactions. Proceedings: Conservation, Restoration, and Management of Tortoises and Turtles – an International Conference. New York Turtle and Tortoise Society. Pp. 13-20.

Bailey, D. W. and J. R. Brown. 2011. Rotational Grazing Systems and Livestock Grazing Behavior in Shrub-Dominated Semi-Arid and Arid Rangeland. Rangeland Ecolcology and Management, pp. 1-9.

Bellows, Barbara C. 2003. Managed Grazing in Riparian Areas. National Sustainable Agriculture Information Service. https://attra.ncat.org/attra-pub/summaries/summary.php?pub=116.

Bissonette, J.A., and M.J. Steinkamp. 1996. Bighorn sheep response to ephemeral habitat fragmentation by cattle. *Great Basin Naturalist* 56: 319-325.

Boarman, W.I. 2002. Threats to desert tortoise populations: a critical review of the literature. Unpubl. Report, prepared for the West Mojave Planning Team and the Bureau of Land Management. 86 pp.

Brown, N. A., K. E. Ruckstuhl, S. Donelon, and C. Corbett. 2010. Changes in vigilance, grazing behaviour and spatial distribution of bighorn sheep due to cattle presence in Sheep River Provincial Park, Alberta. Agriculture, Ecosystems and Environment 135 (2010) 226–231.

Brown, P. E., and R.D. Berry. 2005. Roost surveys for Allen's lappet-browed bat (*Idionycteris phyllotis*) in the Cerbat and Black Mountains. For, Arizona Game and Fish Department, Phoenix, Arizona, State Wildlife Grant # E00461052.

Breymeyer, A.I., D.O. Hall, J.M. Melillo, and G.I. Ågren (eds). 1996. Global Change: Effects on Coniferous Forests and Grasslands. Scientific Committee on Problems of the Environment 56, John Wiley & Sons, Winchester, United Kingdom.

Burden T. 2012. Review Article, Practical feeding and condition scoring for donkeys and mules. The Donkey Sanctuary, Research Department, Slade House Farm. Devon, United Kingdom. Equine Veterinary Education, AE.

Canfield, R. H. 1939. The effect of intensity and frequency of clipping on density and yield of black grama and tobosa grass. United States Department of Agriculture Technical Bulletin No. 681.

Cordery, T.El, Jr., T. A. Duck, T. C. Esque, and J. J. Slack. Vegetation needs of the desert tortoise (Gopherus agassizii in the Sonoran and Mojave Deserts. *In*: Symposium on Vegetation Management of hot desert ecosystems, July 28-30, 1993.

Corman, T. E. and C.W. Wise-Gervais, eds. 2005. *Arizona Breeding Bird Atlas*. University of New Mexico Press. Albuquerque, New Mexico.

Council on Environmental Quality (CEQ). 2005. Guidance on the Consideration of Past Actions in Cumulative Effects Analysis. June 24, 2005. http://ceq.hss.doe.gov/nepa/regs/Guidance_on_CE.pdf. accessed June 14, 2011.

Douglas, B.J., A.G. Thomas, and D.A. Derkson. 1990. Downy brome *(Bromus tectorum*) invasion into southwestern Saskatchewan. *Canadian Journal of Plant Science* 70: 1143-1151.

Federal Register, Vol. 75, No. 239, Tuesday, December 14, 2010. Proposed Rules. Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To List the Sonoran Population of the Desert Tortoise as Endangered or Threatened.

Ganskopp, D. and M. Vavra. 1987. Slope Use by Cattle, Feral Horses, Deer, and Bighorn Sheep. Northwest Science, Vol. 61, No.2, 1987.

U.S. Fish and Wildlife Service. 2008. Birds of Conservation Concern. United States Department of Inteiror, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 85pp.

Gallizioli, S. 1977. Overgrazing on desert bighorn ranges. *Transactions of the Desert Bighorn Council* 21: 21- 23.

Galt, D., F. Molinar, J. Molinar, J. Navarro, J. Joseph, and J.Holechek. 2000. Grazing Capacity and Stocking Rate. Rangelands, Vol. 22, No. 6 (Dec., 2000), pp. 7-11.

Harbel C.H., and A.B. Nelson 1969. Grazing Management on Semidesert Ranges in Southern New Mexico. Jornada Experimental Range Report No. 1, pp. 1-13. Agriculture Research Service, Crops Research Division, U.S. Department of Agriculture, Las Cruces, New Mexico.

Heady, Harold f., Range Management. 1975., "Adjustment of Animal Numbers to Forage Supply," pp. 129-131. McGraw-Hill Book Company, New York.

Hibbard, Richard. 2013. Breeding Bird Atlas, Regional Coordinator, Southern Mohave County, Kingman, Arizona.

Holechek, J.L., M. Thomas, F. Molinar, D. Galt. 1999. Stocking desert rangelands: what we've learned. Rangelands 21(6).

Holechek, J.L. and D. Galt. 2010. Grazing Intensity Guidelines. Rangelands, Vol. 22, No. 3, pp. 11-14.

Holechek, J.L., D. Galt, J. Joseph, J. Navarro, G. Kumalo, F. Molinar, and M. Thomas. 2003. Moderate and light cattle grazing effects on Chihuahuas Desert rangelands. J. Range Manage. 56 133-139.

Holechek, J.L., R.D. Pieper, and C. H. Herbel. 2001. Range Management: Principles and Practices., 4th ed. "Grazing Intensity Considerations", pp. 222-224. Prentice-Hall, Inc., Upper Saddle river, New Jersey.

Holechek, J.L., T.T. Baker, J.C. Boren, and D. Galt. 2006. Grazing impacts on rangeland vegetation: What we have learned. *Society for Range Management* 28: 7-13.

Howery, L. 1999. Rangeland Management Before, During, and After Drought. The University of Arizona Cooperative Extension.

Hunter, R. 1991. Bromus invasions on the Nevada Test Site: Present status of *B. rubens* and *B. tectorum* with notes on their relationship to disturbance and altitude. *Great Basin Naturalist* 51: 176-182.

Hutchings, S.S., and G. Stewart. 1953. Circular No. 925. Increasing Forage yields on Intermountain Winter Range, p. 75. United States Department of Agriculture, Washington, D. C.

Intergovernmental Panel on Climate Change (IPCC). 1996. Climate Change 1995. Impacts, Adaptations, and Mitigation of Climate Change: Scientific-Technical Analyses. Contribution of Working Group II to the Second Assessment Report of the Intergovernmental Panel on Climate Change. R.T. Watson, M.C. Zinyowera, R.H. Moss (eds). Cambridge University Press, Cambridge.

IPCC. 2007. Climate Change 2007 – Impacts, Adaptation and Vulnerability Contribution of Working Group II to the Fourth Assessment Report of the IPCC. M. Parry, O. Canziani, J. Palutikof, P. V. D. Linden, and C. Hanson (eds). Cambridge University Press, Cambridge.

Jacoby, P.W. 1974. *A Glossary of Terms Used in Range Management*. Society of Range Management, Denver, CO.

Jones, F.L. 1980. The Desert Bighorn: its Life History, Ecology, and Management *in* G. Monson and L. Sumner, editors. . pp. 197-216. University of Arizona Press, Tucson.

Kauffman, J. B., W. C. Krueger, and M. Vavra. 1984. Ecology and plant communities of the riparian area associated with Catherine Creek in northeastern Oregon.

Krausman, P. R., V. C. Bleich, W. M. Block, D. E. Naugle, and M. C. Wallace. An assessment of rangeland Activities on Wildlife Populations and Habitats. *In* Briske, D.D., editor. {2011}. Conservation Benefits of Rangeland Practices: Assessment, Recommendations, and Knowledge Gaps. United States Department of Agriculture, Natural Resources Conservation Service.

Krueper, D., J. Bart, and T. D. Rich. 2003. Response of vegetation and breeding birds to removal of cattle on the San Pedro River, Arizona (U.S.A.). Conservation Biology 17:607–615.

Lawrence P. K., S. Shanthalingam, R. P. Dassanayake, R. Subramaniam, C. N. Herndon, D. P. Knowles, F. R. Rurangirwa, W. J. Foreyt, G. Wayman, A. M. Marciel, S. K. Highlander, and S. Srikumaran. 2010. Transmission of Mannheimia Haemolytica from Domestic Sheep (ovis aries) to Bighorn Sheep (ovis Canadensis): Unequivocal Demonstration with Green Fluorescent Protein-Tagged Organisms. Journal of Wildlife Diseases, 46(3), 2010, pp. 706–717.

McAdoo, K., B. Schultz, S. Swanson, and R. Orr. 2007. Northeastern Nevada wildfires 2006, part 2 – can livestock grazing be used to reduce wildfires? Fact Sheet-07-21. University of Nevada Cooperative Extension Service, Reno, Nevada.

McIntosh and Krausman 1982. Elk and mule deer distributions after a cattle introduction in northern Arizona. Pages 545-552 in J. M. Peek and P. D. Dalke editors, Wildlife livestock relationships symposium. University of Idaho, Moscow, Idaho.

McLuckie, A.M., C.R. Schwalbe, T. Lamb, and R.S. Hall. 1995. Genetics, morphology and ecology of a desert tortoise population. Proceedings of the Desert Tortoise Council Meeting, March, 1995. Unpublished.

Meen, A. 2000. Grazing Intensity and Forage Quality on the Arizona Strip Rangelands, Vol. 22, No. 6 (Dec., 2000), pp. 12-15

Monson, G., and A. R. Phillips. 1981. Annotated Checklist of the Birds of Arizona. 2nd ed. The University of Arizona Press, Tucson, Arizona.

Navarro, J. M., D. Galt, J. Holechek, J. McCormick, and F. Molinar. 2002. Long-term impacts of livestock grazing on chihuahuan Desert rangelands. J. Range Manage. 55: 400-405.

Ojima, D.S., T.G.F. Kittel, T. Rosswall, and B.H. Walker. 1991. Critical issues for understanding global change effects on terrestrial ecosystems. *Ecological Applications* 3: 316-325.

Onderka, D. K., S. A. Rawluk, and W. D. Wishart. 1988. Susceptibility of Rocky Mountain Bighorn Sheep and Domestic Sheep to Pneumonia Induced by Bighorn and Domestic Livestock Strains of *Pasturella haemolytica*. Can J Vet Res 1988; 52: pp. 439-444.

Overson, C. 2014. Letter from Clay Overson to the Kingman Field Office detailing the costs and effects of moving cattle. June 30, 2014.

Parsons, C. T., P. A. Momont, T. Delcurto, M. McInnis, and M. L. Porath. 2003. Cattle Distribution Patterns and Vegetation Use in Mountain Riparian Areas. Journal of Range Management, pp. 334-341.

Paulsen, H.A., Jr., and F.N. Ares. 1962. Grazing values and management of black grama and tobosa grasslands and associated shrub ranges of the Southwest. U.S. Dept. Agr. Tech. Bull, 1270 56p.

Pellant, M., P. Shaver, D.A. Pyke, and J.E. Herrick. 2005. Interpreting Indicators of rangeland health, version 4. Technical Reference 1734-6. U.S. Department of the Interior, Bureau of Land Management, National Science and Technology Center, Denver, CO. BLM/WO/ST-00/001+1734/REV05. 122 pp.

Peterson, E. 2006. Implementing a Cooperative Permittee Monitoring Program. Sublette County Extension, University of Wyoming Cooperative Extension Service, B-1169.

Powell, G. W., K. J. Cameron, and R. F. Newman. 2000. Analysis of Livestock Use of Riparian Areas: Literature Review and Research Needs Assessment for British Columbia. B.C. Ministry of Forests.

Seegmiller, R.F. and R.D. Ohmart. 1981. Ecological Relationships of Feral Burros and Desert Bighorn Sheep. Wildlife Monographs, No. 78, Jul., 1981, pp. 3-58.

Sheley, R. L. 1995. Integrated rangeland weed management. *Rangelands* 17: 222-223.

Smith, L., G. Ruyle, J. Maynard, S. Barker, W. Meyer, D. Stewart, B. Coulloudon, S. Williams, and J. Dyess. 2005. Principles of obtaining and interpreting utilization data on southwest rangelands. University of Arizona, College of Agriculture and Life Sciences, Tucson, Arizona.

Sprinkle, J., M. Holder, C. Erickson, A. Medina, D. Robinett, G. Ruyle, J. Maynard, S. Tuttle, J. Hays, Jr., W. Meyer, S. Stratton, A. Rogstad, K. Eldredge, J. Harris, L. Howery, amd W. Sprinkle. 2007. Dutchman Butte revisited – Examining paradigms for livestock grazing exclusion. *Rangelands* 29: 21-34.

Stoddart, L.A., A.D. Smith., and T.W. Box. 1975. Range Management 3rd ed., "Determination of Grazing Capacity," p. 182; "Management for Increased Production, "pp. 332-335; "Stocking to Prevent Damage to Plants," p. 335. McGraw-Hill Book Company, New York.

Severson, K. E., and P. J. Urness. 1994. Livestock grazing: A tool to improve wildlife habitat. In *Ecological implications of livestock herbivory in the West.* Society for Range Management, Denver, Co.

Thomas M. J. Hawkes, G. Khumalo, and J. L. Holechek. 2007. Brangus cow-calf performance under two stocking levels on Chihuahuan desert rangeland. Rangeland Ecol. Manage 60:110-114.

Thurow T. L. and C. A. Taylor Jr. 1999 Viewpoint: The Role of Drought in Range Management. Journal of Range Management, Vol. 52, No. 5, pp. 413-319

U.S. Department of Agriculture (USDA) Forest Service. 2008. Which environmental factors promote or deter cheatgrass expansion? http://www.fs.fed.us/rmrs/docs/rmrs-science/cheatgrass-challenge-2008-04.pdf

USDA Natural Resources Conservation Service (NRCS). 1993. Soil Survey of Mohave County Area, Arizona, Northeastern Part, and Part of Coconino County #625.

U.S. Department of the Interior (USDI) Bureau of Land Management (BLM). 1978. Cerbat/Black Mountains Final EIS. Kingman Field Office, Kingman, Arizona.

USDI BLM Range Program Summary 1979 cited in page 4

USDI BLM. 1980a. Cerbat-Quail Springs Allotment Management Plan. Kingman Field Office, Kingman, Arizona.

USDI BLM. 1980b. Fort MacEwen Allotment Management Plan. Kingman Field Office, Kingman, Arizona.

USDI BLM 1981. Hualapai-Aquarius final Grazing environmental Impact Statement. Phoenix, Arizona.

USDI BLM. 1983. Cerbat- Music Mountains Habitat Management Plan. Phoenix, Arizona.

USDI BLM. 1985. Rangeland Monitoring: Analysis, Interpretation, and Evaluation. Technical Reference 4400-7, November 1985.

USDI BLM. 1989. Final Environmental Impact statement Proposed Wilderness Program for the Arizona Mohave Wilderness Areas, Arizona State Office, Phoenix, Arizona.

USDI BLM. 1989a. BLM Manual H-1741-1 Fencing.

USDI BLM. 1995. Kingman Approved Resource Management Plan. Kingman Field Office, Kingman, Arizona.

USDI BLM 1995a. Wabayuma Peak & Mount Tipton Wilderness Management Plan. Kingman Field Office, Kingman, Arizona.

USDI BLM. 1996. Black Mountain Ecosystem Management Plan. Arizona State Office, Arizona.

USDI BLM 1996a. Sampling Vegetation Attributes. Interagency Technical Reference.

USDI BLM. 1997. Arizona Standards for Rangeland Health and Guidelines for Grazing Administration. United States Department of the Interior, Bureau of Land Management, Arizona State Office.

USDI BLM. 1999a. *Sampling Vegetation Attributes*, Technical Reference 1734-4. Written by: Coulloudon, B., K. Eshelman, J. Gianola, N. Habich, L. Hughes, C. Johnson, M. Pellant, P. Podborny, A. Rasmussen, B. Robles, P. Shaver, J. Spehar, J. Willoughby. Denver, CO. BLM/RS/ST-96/002+1730. pp. 171.

USDI BLM. 1999b. *Utilization Studies and Residual Measurements*, Technical Reference 1734-3. Written by: Coulloudon, B., K. Eshelman, J. Gianola, N. Habich, L. Hughes, C. Johnson, M. Pellant, P. Podborny, A. Rasmussen, B. Robles, P. Shaver, J. Spehar, J. Willoughby. Denver, CO. BLM/RS/ST-96/004+1730. pp. 174.

USDI BLM. 2001. *Ecological Site Inventory*, Technical Reference 1734-7. Written by: Habich, E.F. Denver, CO. BLM/ST/ST-01/003+1734. pp. 112.

USDI BLM. 2003. Riparian Area Management, Technical Reference (TR) 1737-16. *A user guide to assessing proper functioning condition and the supporting science for lentic areas*. Lentic Standard Checklist. BLM 1999, revised 2003. National Applied Resources Sciences Center, Denver, Colorado.

USDI BLM. 2004. Memorandum of Understanding Between the United States Department of Interior, Bureau of Land Management and the Public Lands Council. BLM MOU WO220-2004-01.

USDI BLM. 2005. *Interpreting Indicators of Rangeland Health, Version 4*, Technical Reference 1734-6. Written by: Pellant, M., P. Shaver, D.A. Pyke, and J.E. Herrick. Denver, CO. BLM/ST/ST-01/003+1734. pp. 112.

USDI BLM 2006. Bureau of Land Management Kingman Field Office Land Use Plan Evaluation. Kingman, Arizona.

USDI BLM. 2008. NEPA Handbook, H-1790-1.

USDI BLM. 2010. Rangeland Health Evaluation. Cerbat, Quail Springs & Fort MacEwen Allotments Rangeland Health Evaluation. Kingman Field Office, Kingman, Arizona.

USDI BLM. 2010a. Biological Evaluation for Permit Renewal for the Cerbat, Quail Springs, and Fort MacEwen A Grazing Allotments. Kingman Field Office, Kingman, Arizona. September 2010.

USDI BLM. 2012. Memorandum of Understanding Between Hualapai Tribe and the United States Department of Interior's Bureau of Land Management, Colorado River District, Lake Havasu, Arizona.

USDI BLM 2013. Tortoise Handling Guidelines. Kinngmand Field Office, Kingman, Arizona.

U.S. Geological Survey (USGS). 2008. Director Mark D, Myers memorandum to the Director of the U.S. Fish and Wildlife Service (FWS) and the Solicitor of the Department of the interior dated May 14, 2008 regarding, "The Challenges of Linking Carbon Emissions, Atmospheric Greenhouse Gas Concentrations, Global Warming, and Consequential Impacts" ("USGS memorandum").

U.S. Environmental Protection Agency. 2012. EPA website: http://www.epa.gov/ruminant.html/faq.html

Valentine K. A. 1970. Influence of grazing intensity on improvement of deteriorated black grama range. New Mexico Agr. Exp. Sta. Bull. 553. Las Cruces, New Mexico.

Van Devender, T. R. 2002. Natural History of the Sonoran tortoise in Arizona: life in a rock pile. Pages 3-28. *In* The Sonoran Desert tortoise: natural history, biology, and conservation (T. R. Van Devender, editor). University of Arizona Press and Arizona-Sonora Desert Museum, Tucson.

Van Devender, T. R. 2002. Diet of the Desert Tortoise176-177. *In* The Sonoran Desert tortoise: natural history, biology, and conservation (T. R. Van Devender, editor). University of Arizona Press and Arizona-Sonora Desert Museum, Tucson.

Van Dyke, F.G., R.H. Brocke, H.G. Shaw, B.B. Ackerman, T.P. Hemker, and F.G. Lindzey. 1986. Reactions of mountain lions to logging and human activity. *Journal of Wildlife Management* 50: 95-102.

Van Poollen, H. Walt , John R. Lacey. 1979. Herbage Response to Grazing Systems and Stocking Intensities. Journal of Range Management, Vol. 32, No. 4 (Jul., 1979), pp. 250-253

Wallace, M. C., and P. r. Krausman. 1987. Elk, mule deer, and cattle habitats in central Arizona. Journal of Range Management 40:80-83.

Wolfe, L. L., B. Diamond, T. R. Spraker, M. A. Sirochman, D. P. Walsh, C. M. Machin, D. J. Bade, and M. W. Miller. 2010. A Bighorn Sheep Die-off in Southern Colorado Involving a Pasteurellaceae

Strain that May Have Originated from Syntopic Cattle. Journal of Wildlife Diseases, 46(4), 2010, pp. 1262–1268.

Young, J.A., and R.A. Evans. 1978. Population dynamics after wildfires in sagebrush grasslands. *Journal of Range Management* 31: 283-289.

6.2 List of Acronyms and Abbreviations Used in this EA

ACEC	Area of Critical Environmental concern
AZGFD	Arizona Game and Fish Department
AML	Appropriate Management Level
AMP	Allotment Management Plan
Arizona S&Gs	Arizona Standards and Guidelines
AU	Animal Unit
AUM	Animal Unit Month
BLM	Bureau of Land Management
BMEMP	Black Mountain Ecosystem Management Plan
CCC	Consultation, Cooperation and Coordination
CFR	Code of Federal Regulations
CQFM	Cerbat, Quail Springs and Fort MacEwen Allotments
DOI	Department of the Interior
DPC	Desired Plant Community
DR	Decision Record
EA	Environmental Assessment
EIS	Environmental Impact Statement
FONSI	Finding of No Significant Impact
FLPMA	Federal Land Policy and Management Act of 1976
HA	Herd Area
HMA	Herd Management Area
HMP	Herd Management Plan

I	Improve
ID	Interdisciplinary Team
KFO	Kingman Field Office
LMNRA	Lake Mead National Recreation Area
MLA	Mohave Livestock Association
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NRCS	Natural Resources Conservation Service
OHV	Off-highway Vehicle
PM	Particulate Matter
p.z.	Precipitation Zone
RMP	Resource Management Plan
RRT	Range Resource Team
S&G	Standards and Guidelines
TGA	Taylor Grazing Act
USDA	United States Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USC	United States Code

7 APPENDICES

7.1 Appendix A – List of Common and Scientific Names of Plants

Table A-1. Common and Scientific Names of Plants by Growth Form.

Common Name	Scientific Name
Grasses	
3-Awn	*Aristida* sp.
Big galleta	*Pleuraphis rigida (Hilaria rigida)*
Black grama	*Bouteloua eripoda*
Bush muhly	*Muhlenbergia porteri*
Cheatgrass	*Bromus tectorum*
Desert needle grass	*Stipa speciosa*
Muttongrass	*Poa fendleriana*
Red brome	*Bromus rubens*
Sideoats grama	*Bouteloua curtipendula*
Shrubs and Trees	
Bladdersage	*Salazaria mexicana*
Buck brush	*Ceanothus greggii*
Catclaw acacia	*Acacia greggii*
Cheeseweed	*Hymenoclea salsola*
Chuckwalla's delight	*Bebbia juncia*
Desert rock-pea	*Lotus rigidus*
Flat-top buckwheat	*Eriogonum fasiculatum*
Globe mallow	*Sphaeralcea ambigua*
Greythorn	*Zizyphus obtusifolia*
Mesquite	*Prosopis velutina*
Mormon tea	*Ephedra nevadensis*
Menodora	*Menodora scabra*
Range ratany	*Krameria parviflora*
Shrubby buckwheat	*Eriogonum wrightii*
Winterfat	*Eurotia lanata*
White bursage	*Ambrosia dumosa*
White-stem paperflower	*Psilostrophe cooperi*
White ratany	*Krameria grayii*
Wolfberry	Lycium *andersonii*
Wooly-fruited bursage	*Ambrosia eriocentra*
Forbs	
Two-colored beard tongue	*Penstemon bicolor roseus*
Malta starthistle	*Centaurea melitensis*
Puncture vine	*Tribulus terrestris*
Mediterranean grass	*Schismus barbatus*

7.2 Appendix B Desired Pant Community Objectives

Table B-1. Desired Plant Community Objectives for Cerbat Allotment

Allotment Name	Key Area	ESD Name	Key Species	Composition Objective	Cover Objective*
Cerbat	1	Sandy Loam Upland 10-13" p.z.	Big galleta Black grama Bush muhly 3-Awn	26% to 47%	20% to 30%
			Flat-top buckwheat Mormon tea Range ratany Bladdersage	3% to 12%	
Cerbat	2	Granitic Hills 10 to 13" p.z	Big galleta Black grama Desert needle grass 3-Awn	17% to 33%	25% to 35%
			Flat-top buckwheat Mormon tea Range ratany Bladdersage	31% to 45%	
Cerbat	3	Granitic Hills 10 to 13" p.z.	Black grama Desert needle grass 3-Awn	17% to 33%	25% to 35%
			Flat-top buckwheat Buck brush	31% to 45%	
Cerbat	17	Clay Loam Upland 10-13" p.z.	Big galleta Black grama Bush muhly	22% to 38%	10% to 20%
			Flat-top buckwheat Mormon tea Range ratany	11% to 23%	
			Flat-top buckwheat Mormon tea Range ratany	2% to 9%	

* Maintain total live perennial vegetative cover

Table B-2 Desired Plant Community Objectives for Quail Springs Allotment

Allotment Name	Key Area	ESD Name	Key Species	Composition Objective	Cover Objective*
Quail Springs	5	Clay Loam Upland 10-13" p.z.	Big galleta Black grama Bush muhly	22% to 38%	10% to 20%
			Wolfberry Mormon tea Winter fat White-stem paperflower	1% to 12%	
Quail Springs	6	Clay Loam Upland 10-13" p.z.	Big galleta Black grama Bush muhly	21% to 35%	10% to 20%
			Wolfberry Mormon tea Winter fat White-stem paperflower	2% to 6%	
Quail Springs within Joint Use Area	8	Basalt Hills 10-13" p.z.	Big galleta Desert needle grass 3-Awn	9% to 24%	10% to 20%
			Flat-top buckwheat Mormon tea Range ratany Bladdersage Wolfberry	17% to 43%	
Quail Springs	9	Sandy Loam Upland 10-13" p.z.	Big galleta Black grama	20% to 35%	20% to 30%
			Flat-top buckwheat Mormon tea Range ratany Bladdersage	3% to 12%	
Quail Springs Allotment	10	Granitic Hills 10-13" p.z.	Black grama Sideoats grama Desert needle grass 3-Awn Bush muhly	17% to 38%	25% to 35%
			Flat-top buckwheat Menodora Buck brush	30% to 45%	
Quail Springs	14	Granitic Hills 10-13" p.z.	Sideoats grama Desert needle grass Black grama 3-Awn	16% to 33%	20% to 40%
			Flat-top buckwheat Shrubby buckwheat Mormon tea Range ratany Bladdersage	31% to 45%	
Quail Springs	15	Sandy Loam Upland 10-13" p.z.	Big galleta Black grama	20% to 35%	20% to 40%

*Maintain total live perennial vegetative cover

Table B-3 Desired Plant Community Objectives for Fort MacEwen Allotment

Allotment Name	Key Area	ESD Name	Key Species	Composition Objective	Cover Objective*
Fort MacEwen (within Joint Use Area),	11	Basalt Hills 6 to10" p.z.	Big galleta Bush muhly 3-Awn	15% to 8%	20% to 30%
			Flat-top buckwheat White ratany Range ratany	3% to 15%	
Fort MacEwen	12	Sandy Loam Upland 10-13" p.z.	Big galleta	1% to 5%	10% to 20%
			Flat-top buckwheat Mormon tea Range ratany	3% to 15%	
Fort MacEwen	13	Sandy Loam Upland 10-13" p.z.	Big galleta	1% to 5%	10% to 20%
			Flat-top buckwheat Mormon tea Range ratany	2% to10%	
Fort MacEwen within Joint Use Area	18	Basalt Hills 10-13" p.z.	Muttongrass Big galleta 3-Awn	2% to 10%	10% to 20%
			Shrubby buckwheat Flat-top buckwheat Mormon tea Range ratany Bladdersage	17% to 35%	
Fort MacEwen within Joint Use Area	20	Limy Hills 10-13" p.z.	Big galleta 3-Awn	10% to 15%	15% to 20%
			Mormon tea Range ratany	6% to 15%	
Fort MacEwen (aka Lost Cabin Spring) (Squaw Pocket Pasture) (within Joint Use Area),	21	Sandy Loam Upland 10-13" p.z.	Bush muhly Big galleta	2% to 10%	10% to 20%

* Maintain total live perennial vegetative cover

7.3 Appendix C. Alternative 1 Proposed Action Adaptive Management Implementation Plan.

7.3.1 Goals and Objectives

The allotments would be managed under the following goals and objectives.

Goal 1	The public land grazing allotments are managed for an economically viable ranch while meeting environmental objectives.
Goal 2	Grazing allotments are managed through partnerships to leverage available funding for new range improvements and to accomplish NEPA clearances required for range improvement implementation.
Goal 3	BLM responsibilities under FLPMA for managing public land under the principles of multiple use and sustained yield are upheld throughout the grazing permit renewal process.
Goal 4	Adaptive Management is followed when making changes to the grazing plan, stocking rate, and range improvements.
Objective 1	The allotment would be managed to achieve the Arizona Standards for Rangeland Health.
Objective 2	Utilization Criteria Objectives Utilization guidelines would allow either 40% or 50% use by cattle, burro, and/or wildlife depending on location within the CQFM. All key species, at key areas outside of the Joint Use Area of the Black Mountain Ecosystem, would have a 50% utilization limit. Inside the Joint Use Area the utilization limit would be 40%. The key areas located within the Joint Use Area are 8, 11, 18, 20, and 21.

7.3.2 Adaptive Management Strategies

Adaptive Management allows for flexibility in stocking rate in the following ways.

1. Adjustments are made in timing, intensity, frequency and duration of grazing, the grazing management system, and livestock numbers according to resource conditions and allows for the flexibility necessary to meet utilization guidelines and long-term desired conditions
2. The exact number of livestock authorized to graze on an annual basis would depend on such things as resource condition of the allotment, available water, annual forage production, condition of structural facilities, and range readiness.
3. Anything less than the full permitted livestock numbers represents a condition in which capable acres and other integral components of the range management, such as livestock waters, are producing less than required to support full permitted livestock numbers.

The following adaptive management strategies are applied to decision-making while managing under adaptive management.

1. Due to annual climatic variability, the length of time livestock are allowed in the pastures varies from year to year. Length of time may be altered by changing both entry and exit dates.

2. Stocking rates, grazing strategies and season of use are all tools to implement the decision.
3. Levels of livestock use, (e.g. livestock numbers, maximum or a range of livestock number and/or AUMs etc.) and seasons of use described are only approximations and recognize the natural ecological fluctuation in forage production.
4. When indicated by monitoring, changes in management strategy should be considered. The permittee's ability to adjust quickly management is integral to the adaptive management strategy.
5. Other livestock and resource management practices such as excluding or closing areas to domestic livestock grazing, herding, changing salt locations, supplementing with nutrients, and adding rangeland improvements may also be considered.
6. Based on monitoring results of the previous season, and observed trends towards the accomplishment of resource management objectives, permitted numbers and length of stay and method of management can be reasonably predicted for the next grazing season.

7.3.3 Terms and Conditions

7.3.3.1 Mandatory Terms and Conditions

Grazing preference: The combined authorized grazing preference for both the West and East Management Units under Adaptive Management would be 578 AU, 559 cattle, and 15 horses. Horses would be authorized under a rest rotated grazing schedule in the Quail Springs Pasture and Big Wash Pastures. One horse equals 1.25 AUs.

7.3.3.2 Other Terms and Conditions

Stocking Rate: The initial stocking rate would be 458 Animal Units (AUs) based on calculations using the Desired Stocking Rate Formula (BLM 1985). After applying a rotation there would be 3 AUs less as a result of pasture production differences, so the initial stocking rate would be 455 AUs. Calculations for the stocking rate analysis for the Proposed Action are available at KFO. The stocking level could be adjusted either up or down using an adaptive approach which focuses on monitoring data in relationship to resource management objectives. The adaptive management response which specifies how adjustments would be made to the stocking rate using triggers outlined in this plan.

Fuels management and ephemeral use: Intensive grazing management may be used to control red brome and reduce fuel loads. Therefore, ephemeral use could be authorized during the 10 year grazing period, based on BLM guidance on ephemeral use. In these cases, cattle would be moved to areas of red brome, and their movement would be restricted via water hauls, temporary fencing etc. Ephemeral use could occur on the east or west side of the CQFM allotment depending on location of available ephemeral vegetation.

7.3.4 Grazing System Schedule

A grazing schedule would be used as a template with pasture rest and the rotation schedule being subject to change year to year, based on climatic conditions, physiological needs of the plants, site specific monitoring data and range improvements (Tables C-2 and C-3).

The allotments would be managed as two units, one east and one west of U.S. Highway 93. The names of the pastures in the East and West Management Units are listed in Table C-1 and the locations are shown in Figure C-1. Livestock management under the Adaptive Management Alternative provides grazing deferment in spring and summer growing seasons as presented in Tables C-2 and C-3.

Table C-1. Pastures in the West and East Management Units.

West Management Unit Pastures	Total Acres	East Management Unit Pastures	Total Acres
Twin Mills	13,568	Big Wash	5,766
Lost Cabin/Squaw Pocket	16,776	East Big Wash	4,920
Black Tank Valley	15,107	Quail Springs	6,000
Sugarloaf	7,518	Marble Canyon	9,697
Highway 93	5,449	House	5,581
		Cerbat	9,071

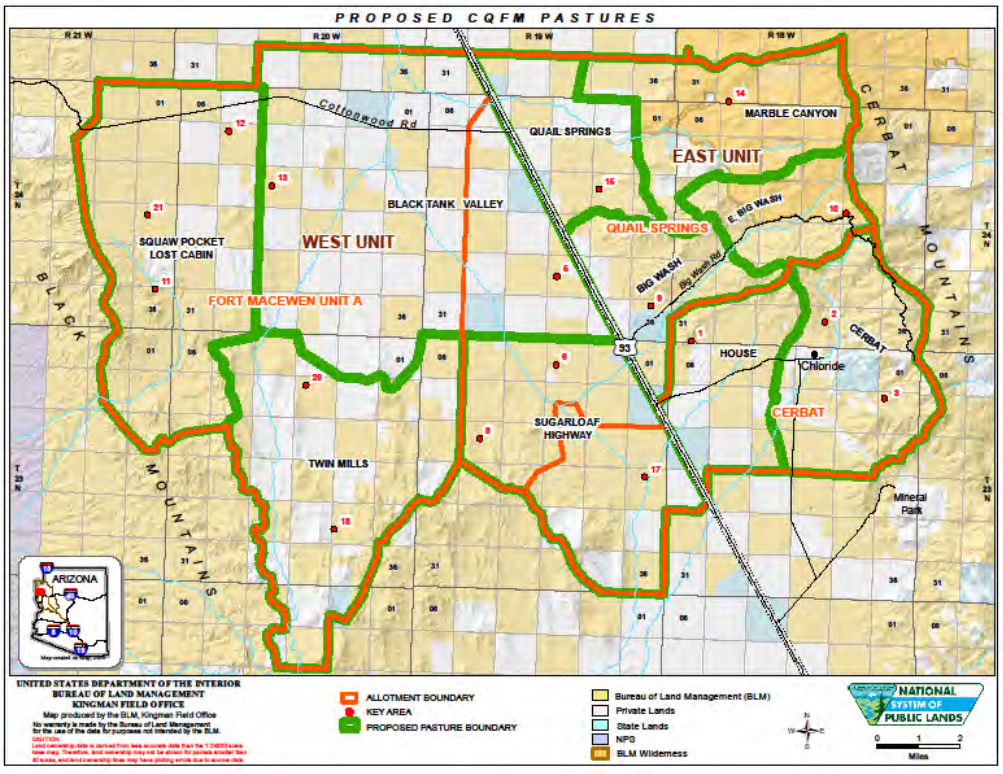

Figure C-1. East and West Units and Pasture Boundaries within the Allotments.

West Management Unit

The West Management Unit is made up of five pastures as follows: Twin Mills, Lost Cabin/Squaw Pocket, Black Tank/ Valley, Sugarloaf, and Highway 93. Cattle are planned to be moved twice a year in accordance with Table C-2.

Twin Mills Pasture would be grazed in the winter outside the growing seasons or when an abundant ephemeral growth year occurs. Prior to cattle turnout, ephemeral production would have to exceed 280 pounds to the acre.

Table C-2 Grazing System Schedule for West Management Unit

YEAR 1	West Management Unit												
Months	May	June	July	August	September	October	November	Dec. 1 wk	Dec . 3 wks	January	February	March	April
Pastures													
Black Tank/Valley	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest
Sugarloaf	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest
Squaw P./Lost C.	Rest	Rest	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed
Hwy 93	Rest	Rest	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed
Twin Mills	Rest	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Rest	Rest

YEAR 2	West Management Unit												
Months	May	June	July	August	September	October	Nov. 2 wks	Nov. 2 wks	December	January	February	March	April
Pastures													
Black Tank/Valley	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest
Sugarloaf	Rest	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed
Squaw P./Lost C.	Rest	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed
Hwy 93	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest
Twin Mills	Rest	Rest	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Rest	Rest

YEAR 3	West Management Unit												
Months	May	June	July	Aug. 1 wk	Aug. 3 wks	September	October	November	December	January	February	March	April
Pastures													
Black Tank/Valley	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed
Sugarloaf	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed
Squaw P./Lost C.	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest	Rest	Rest	Rest
Hwy 93	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest	Rest	Rest	Rest
Twin Mills	Rest	Rest	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Rest	Rest

YEAR 4	West Management Unit												
Months	May	June	July	August	September	OCT. 2 wks	OCT. 2 wks	November	December	January	February	March	April
Pastures													
Black Tank/Valley	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed
Sugarloaf	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest	Rest
Squaw P./Lost C.	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest	Rest
Hwy 93	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed
Twin Mills	Rest	Rest	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Rest	Rest

East Management Unit

The East Management Unit is made up of six pastures which have been combined into upper and lower areas due to differences in vegetation types related to higher or lower amounts of precipitation from elevation differences. The three lower pastures are House, Big Wash, and Quail Springs. The three upper pastures are Cerbat, East Big Wash and Marble Canyon. Cattle are planned to be moved twice a year (Table C-3).

TABLE C-3 Grazing System Schedule for East Management Unit..

YEAR 1					***East Management Unit***								
	Months												Move
Pastures	May	June	July	August	September	October	Nov. 3 wks	Nov. 1 wk	December	January	February	March	April
House	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest
Big Wash	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest
Quail Springs	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest
Cerbat	Rest	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed
East Big Wash	Rest	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed
Marble Canyon	Rest	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed

YEAR 2					***East Management Unit***								
	Move		**Months**			Move	Move					Move	Move
Pastures	May	June	July	August	September	Oct. 3wks	Oct. 1 wk	November	December	January	February	March	April
House	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest	Grazed
Big Wash	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest	Grazed
Quail Springs	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest	Grazed
Cerbat	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest
East Big Wash	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest
Marble Canyon	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest

YEAR 3				***East Management Unit***									
	Months			Move	Move					Move	Move		
Pastures	May	June	July	AUG. 3 wks	AUG. 1 wk	September	October	November	December	January	February	March	April
House	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed
Big Wash	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed
Quail Springs	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed
Cerbat	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest
East Big Wash	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest
Marble Canyon	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest

YEAR 4				***East Management Unit***									
	Months	Move	Move					Move	Move				
Pastures	May	June 3 wks	June 1 wk	July	August	September	October	November	December	January	February	March	April
House	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed
Big Wash	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed
Quail Springs	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed
Cerbat	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest
East Big Wash	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest
Marble Canyon	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest

YEAR 5					***East Management Unit***								
	Move	Move			**Months**		Move	Move					
Pastures	May 3 wks	May 1 wk	June	July	August	September	October	November	December	January	February	March	April
House	Grazed	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed
Big Wash	Grazed	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed
Quail Springs	Grazed	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed
Cerbat	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest
East Big Wash	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest
Marble Canyon	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest

YEAR 6					***East Management Unit***								
	Move	Move			**Months**		Move Move	Move					Move
Pastures	May 3 wks	May 1 wk	June	July	August	September	October	November	December	January	February	March	Apr. 3 wks
House	Grazed	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed
Big Wash	Grazed	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed
Quail Springs	Grazed	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed
Cerbat	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest
East Big Wash	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest
Marble Canyon	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest

YEAR 7					East Management Unit								
	Move	Months			Move	Move	Move			Move	Move		
Pastures	May	June	July	August	September	October	November	December	January	Feb. 3 wk	Feb. 1 wk	March	April
House	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest
Big Wash	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest
Quail Springs	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest
Cerbat	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed
East Big Wash	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed
Marble Canyon	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed

YEAR 8					East Management Unit								
	Months		Move	Move				Move	Move				
Pastures	May	June	July	August	September	October	November	Dec. 3 wks	Dec. 1 wk	January	February	March	April
House	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest
Big Wash	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest
Quail Springs	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest
Cerbat	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed
East Big Wash	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed
Marble Canyon	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed

YEAR 9				***East Management Unit***									
	Move	Move		**Months**			Move	Move					Move
Pastures	May	June	July	August	September	October	Nov. 3 wks	Nov. 1 wks	December	January	February	March	April
House	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest
Big Wash	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest
Quail Springs	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed	Rest	Rest	Rest	Rest	Rest	Rest
Cerbat	Grazed	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed
East Big Wash	Grazed	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed
Marble Canyon	Grazed	Rest	Rest	Rest	Rest	Rest	Rest	Grazed	Grazed	Grazed	Grazed	Grazed	Grazed

Responsibility: The permittee would provide actual use information by pasture including number of animals, kind and class of livestock, and period of use.

Communication: The permittee would contact the BLM prior to making moves outside of the schedule and would keep records of when and where livestock were actually moved, and provide the actual use information to the BLM seasonally by pasture. Moves outside the scheduled use periods would be made using adaptive management principles. Meetings between BLM and the grazing permittee would be conducted prior to each scheduled move to discuss previous year's monitoring, moves, etc. and the coming year's grazing schedule and climatic conditions.

7.3.5 Range Improvements

Fences:

1. Relocate the existing fence and realign the road across Lost Cabin Wash along the west boundary of the Lost Cabin Pasture out of the wash to a nearby upland location. The gate would be replaced with a cattleguard (Figure 2). The road in Lost Cabin Wash provides remote access to the National Park Service lands and therefore receives a lot of vehicle use. Because of this activity, the gate at this location is often left open which allows cattle to wander onto the National Park.
2. Remove fence between Squaw Pocket and Lost Cabin Pastures to combine into one pasture.
3. Realign the pasture boundary between Sugarloaf/Twin Mills boundary to incorporate Pilgrim Mine area into Sugarloaf Pasture.
4. The boundary fence to the west of Lost Cabin Spring needs to be extended approximately 0.5 miles to the south and tied into a natural boundary. The location of this fence is T24N, R21W, sections 22, 23 and 26 (Figure C-2).
5. Reconstruct the fence between House and Cerbat Pastures. This fence would be realigned from private uncontrolled land to land owned by the permittee in section 9 of T23N, R18W.
6. Repair the fence between the Sugarloaf and Highway Pastures.
7. Repair the fence along the southeast portion of the Highway Pasture.
8. Remove portions of the fence between Black Tank and Valley Pastures to create one pasture.

Standard Operating Procedures (fences)

1. When fences are realigned, extended, or reconstructed they would be built and then maintained using BLM fencing standards (BLM Fencing Manual H-1741-1). Standards would be different depending on the big game species present (bighorn or mule deer).
2. Maintenance or reconstruction of fences in tortoise habitat would be conducted from existing roads or on foot or horseback where road access is not available.

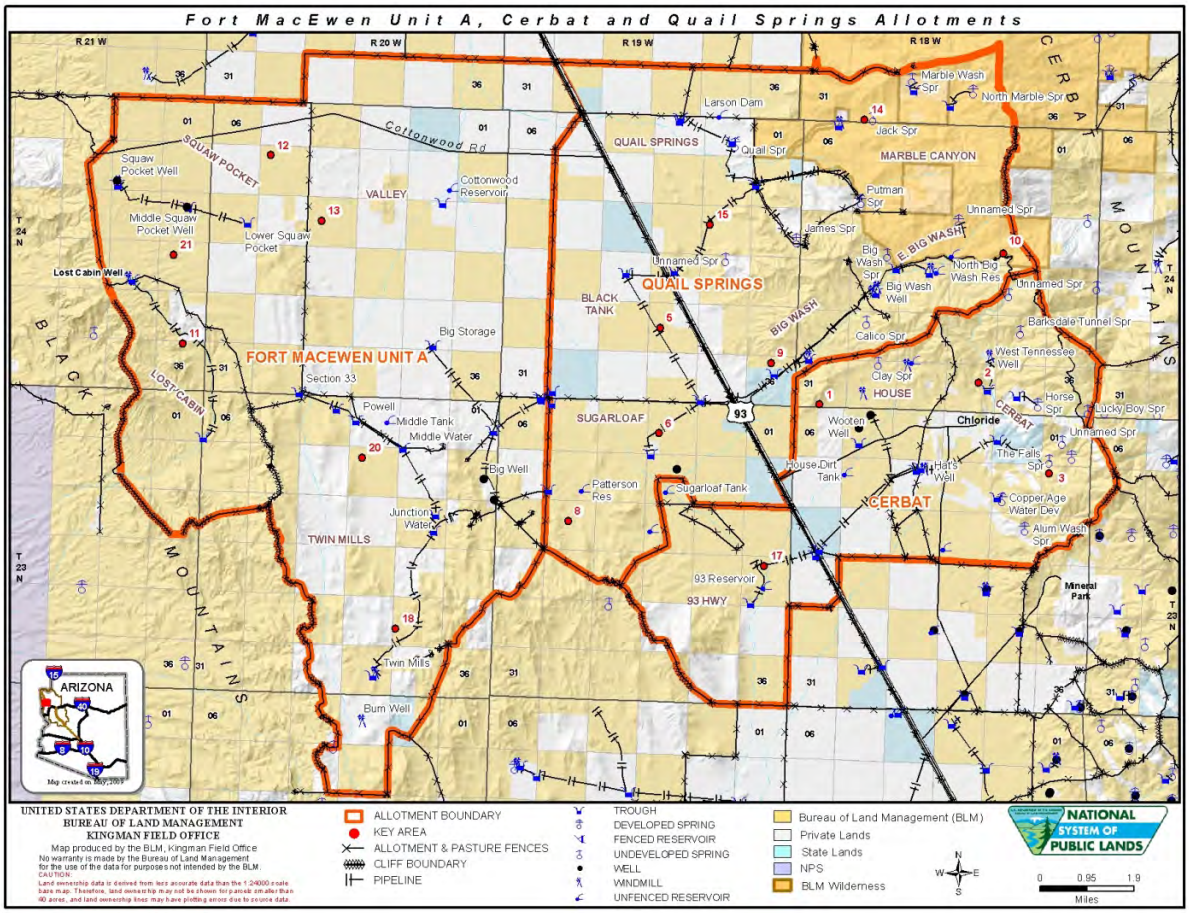

Figure C-2. Existing Range Improvements.

Cattleguards:

Install concrete cattleguards as shown on Figure C-3.

Standard Operating Procedures (cattleguards)

All new cattleguards would be constructed with concrete and designed to prevent entrapment of small animals including desert tortoise.

Water Facilities: Wells, storage tanks, troughs and pipelines.

Drill and equip new wells as shown in Figure C-3 and C-4. The wells would have an approximately 12 foot windmill, solar, or other appropriate energy source, 10,000 gallon storage tank, and a 500 gallon trough for livestock, wildlife, wild horses, and wild burros (areas within the Herd Management Area or Herd Area). Until the new wells are developed the permittee would haul water to the locations of the proposed new wells in order to implement the grazing system.

Reconstruct approximately 4.5 miles of pipeline starting in Section 10 of T23N, R18W. Water would be provided to the pipeline from a tap into the Chloride water line. The reconstruction would then follow the existing pipeline as shown on the map in a west /southwesterly direction crossing under US 93 in section 18 of T23N, R18W and ending at a trough in the Highway Pasture in section 17 of T23N, R19W.

Reconstruct the earthen reservoir in section 17 of T23N, R19W.

Standard Operating Procedures (Troughs)

Upon discussion and approval from the authorized officer, waters could be turned on and off to facilitate movement and management of cattle and domestic horses. Facility fencing would be modified to allow wildlife access.

The watering troughs would meet BLM wildlife design standards and not stand higher than 20 inches from ground level and be equipped with a wildlife escape ramp. All of the facilities would be colored to blend with the surrounding landscape.

Upland Exclosures:

Exclosures would be constructed and would be approximately 10 acres in size. The exclosures would be used as control areas to compare grazed and ungrazed areas within pastures. The BLM would build and maintain the exclosure fences following BLM fencing standards (BLM Fencing Manual H-1741-1).

Exclosures would be constructed and/or maintained in the following locations:

1. near Key Area 5 in the Black Tank Pasture;
2. near Key Area 12 in the Squaw Pocket Pasture;
3. near Key Area 6 in the Sugarloaf Pasture;
4. near Key Area 17 in the Highway 93 Pasture;
5. near Key Area 18 in the Twin Mills Pasture; and
6. near Key Area 20 in the Twin Mills Pasture.

Riparian Exclosures:

The existing exclosure around Big Wash Spring would be reconstructed. The BLM would build and maintain the exclosure fence following BLM fencing standards (BLM Fencing Manual H-1741-1).

Rain Gauges and Soil Moisture Probes:

To better monitor actual rainfall and soil moisture the BLM has three existing rain gauges, along with soil moisture probes, located on the allotments. The BLM and the permittee would determine locations for additional rain gauges and probes. The permittee would read the existing and new gauges. Mohave County weather stations would provide additional rainfall data.

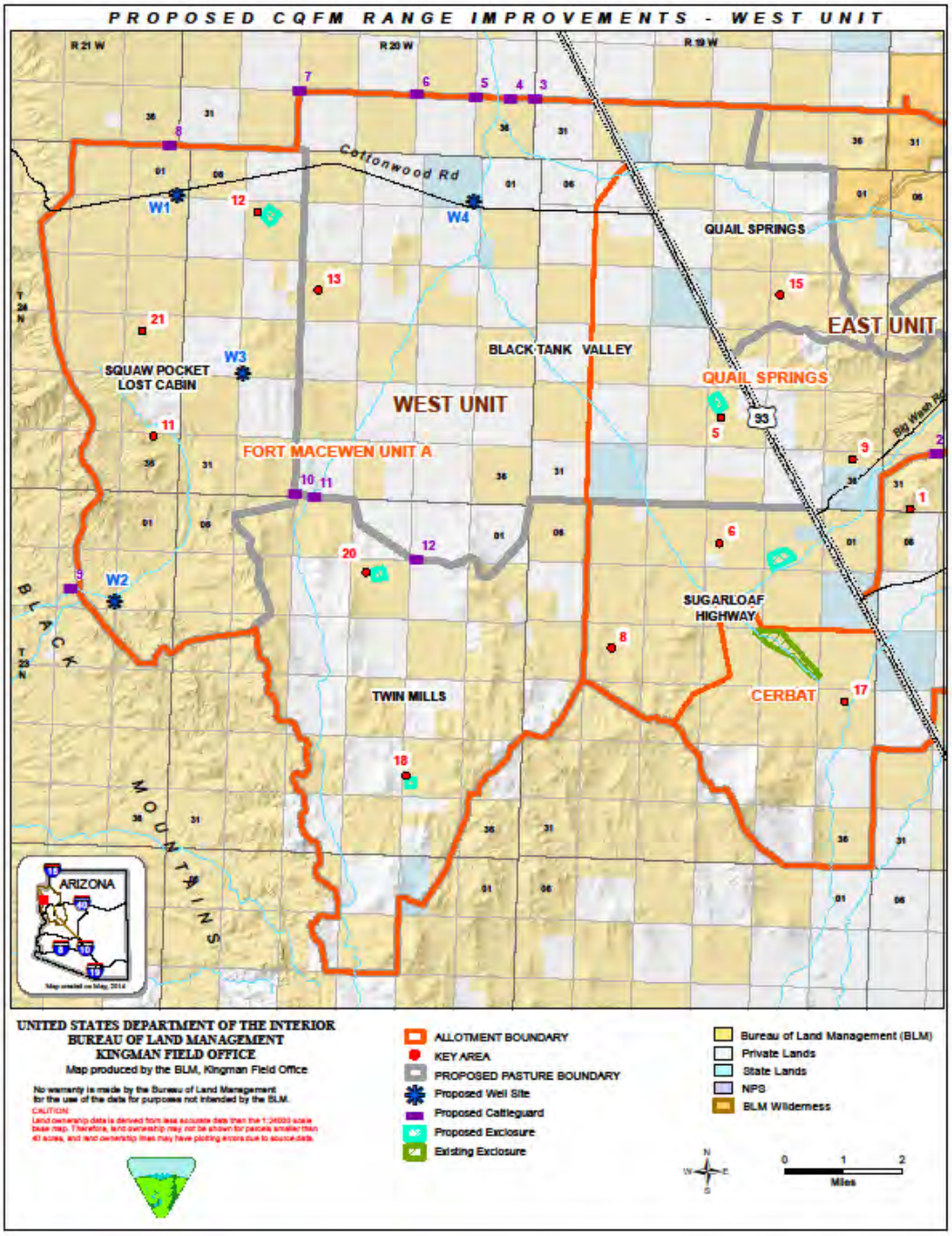

Figure C-3. Proposed Range Improvements in the West Unit showing proposed wells, cattleguards, and exclosures.

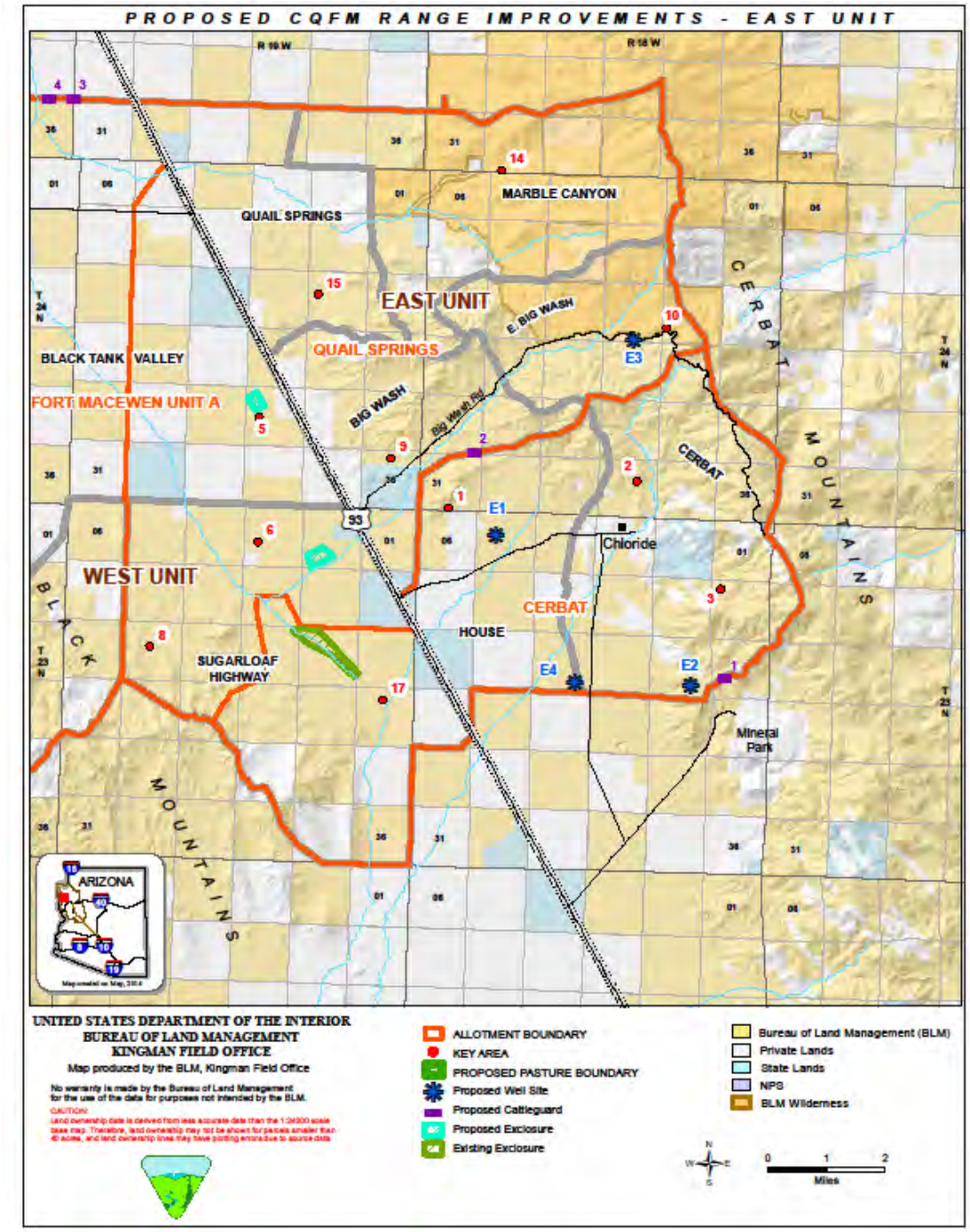

Figure C-4. Proposed Range Improvements in the East Unit showing proposed cattleguards, wells and exclosures.

7.3.6 Adaptive Management: Monitoring, Communication, and Response

Adaptive management focuses on responsiveness to monitoring outcomes and a collaborative process to implement a flexible grazing system in order to achieve land health objectives.

If monitoring indicates that desired conditions are not being achieved and current livestock grazing practices are causing non-attainment of resource objectives, livestock grazing management on the allotment would be modified in cooperation with the permittee. Adaptive management allows the BLM to adjust the timing, use levels, intensity, frequency and duration of grazing, and livestock numbers temporarily or on a more long-term basis.

7.3.6.1 Monitoring

Rangeland monitoring requires repeated observations or measurements, of fixed locations, for multiple years in order to determine trend. Monitoring is designed to observe changes in plant communities and allow evaluation into the cause of the change. Monitoring helps reduce uncertainty and improves rangeland management. Within an adaptive management framework, monitoring is designed to inform decision-making. BLM would invite the permitte, NRCS, County Extension, AZGFD, and interested public to collect monitoring data together and discuss management implications of the data.

7.3.6.2 Cooperative Monitoring, Communication, and Drought Planning

A cooperative monitoring program would be implemented between KFO and the permittee. Information sharing and relationships built through a cooperative monitoring program invariably leads to better management of the resources as both parties document good stewardship of the resources. Monitoring by the permittee, in collaboration with the BLM, increases understanding on both sides. The amount of quality data that can be collected increases and leads to a better understanding of local conditions, which leads to more effective adaptive management. Clear, achievable objectives for the monitoring have been developed. One clear objective is to meet Standard 3 on all upland sites. A cooperative monitoring program would bring about close coordination and communication between BLM, the permittee, and other involved parties. A BLM range specialist would train the permittee and any others that may be involved in monitoring (the permittee's family members, partners, and other employees) on monitoring methods. The range specialist would initially work with the permittee on collecting data. Both short-term and long-term monitoring is necessary to gather reliable data from which adaptive management decisions can be made. Monitoring also allows the parties to understand how grazing strategies can be responsive to long-term stewardship objectives. (Peterson 2006 and BLM 2004).

Drought in the Mojave Desert is going to occur and grazing management must plan for drought rather than only respond when a drought occurs. The University of Arizona (Howery 1999) offers several recommendations regarding drought management including:

1. Stock allotment below the long term average carrying capacity and make appropriate reductions during a drought.
2. Rangelands in good or excellent condition are less impacted and recover more quickly from drought than rangelands in fair or poor condition.
3. Grazing systems should be planned to give grazed areas periodic deferment or rest and to set aside ungrazed areas to be used during drought emergencies.
4. Once drought is recognized reduce the herd as soon as possible so it in balanced with forage supply.

5. Rest pastures for an entire growing season or more following severe drought. Resist the temptation to restock to pre-drought levels as soon as the drought breaks.
6. Use pastures only when key forage species are dormant for one or more growing seasons.
7. Defer grazing until after key forage species have produced mature seed.

Table C-4. Monitoring protocol used for data collection.

Data Monitoring Protocol				
What	**Where**	**When**	**Who**	**Notes**
Utilization	Within pastures at Key Areas and other locations	Two- three times/year	BLM/ permittee. Other participants welcome.	
Long Term Trend	Within pastures at Key Areas	one time/five years	BLM/ permittee. Other participants welcome.	
Precipitation	Within allotment vicinity	Seasonally and after large storm events.	Permittee, Mohave County.	Existing rain gauges, and new rain gauges placed by the permittee. Mohave County weather stations.
Invasive Plant Species	Within pastures	Mapping extent. When other vegetation data is collected.	BLM/ permittee. Other participants welcome.	
Gates	At pasture and allotment boundaries. Exclosures	As part of day to day ranch operations.	Permittee and BLM	
Riparian monitoring (springs)	Springs	one time/ three to five years	BLM/ permittee. Other participants welcome.	
Exclosures vegetation monitoring	On site	During land health evaluation data collection trips.	BLM/ permittee. Other participants welcome.	

Utilization and Long Term Trend Monitoring*:*

Forage utilization would be monitored to ensure livestock numbers are in balance with available forage and that adequate vegetation remains at the end of the grazing period to meet soil, watershed and wildlife requirements. These measurements would be taken periodically throughout the year and at the end of winter prior to spring green up. Utilization data represents only one piece of the data that should be considered prior to making livestock management decisions. Seasonal use, trend, climate patterns, historic impacts, and local experience should all be considered with utilization data when making grazing management decisions (Smith et al. 2005). In addition soil moisture, localized drought, rainfall conditions, and onsite vegetation assessment, including ephemeral vegetation, would be taken into account.

Long-term trend monitoring at Key Areas would continue to be conducted once every five years.

- Established Key Areas would be evaluated to determine if they are still valid in accordance with TR 4400-1. Additional Key Areas may be added.

- Monitoring data includes frequency, dry-weight rank (relative composition), cover, utilization, and repeat photography.

Exclosure Vegetation Monitoring

Monitoring studies would be set up in each exclosure.

Precipitation and Soil Moisture Monitoring

Precipitation amount and timing would be monitored within the allotments. The permittee would collect rainfall and soil moisture data on the allotments. Precipitation data from the Mohave County weather stations would be compiled by the BLM.

7.3.6.3 Adaptive Management Response

Monitoring data along with communication, local knowledge, and predictions are used to make adjustments on the range. The adjustment is called an adaptive management response. Several important terms are frequently used in any adaptive management strategy: objective, indicator, and trigger point.

Objectives should be specific, measurable, achievable, realistic, and time-sensitive. The desired outcomes can be resource oriented, economically oriented, etc.

An indicator is used to determine whether an objective is being met. For example indicators include, cover, frequency, and composition. Indicators should be able to measure long-term as well as short-term changes.

There are both soft and hard triggers. A soft trigger signifies that an action is needed to keep from reaching the hard trigger. A hard trigger signifies an immediate management action is needed to maintain the health of the plant community by mitigating the effects of grazing. Utilization levels can be used as triggers. For example, 60-70% utilization means that the physiological needs of the plant are not being met because reproduction and root maintenance is not taking place. This would have a direct effect on

plant frequency. Under this example it would be expected that frequency would decline if this level of utilization continues.

Reaching soft and/or hard triggers would prompt discussions regarding range condition and adjustments to the grazing management. Additional parameters that would be considered in addition to utilization levels include: soil moisture, plant regrowth potential, plant vigor, distribution issues, mineral/salt issues, uniform use in pasture, pastures last used, expected or recent local precipitation, water availability and volume, and drought predictions.

Utilization and Trend Adaptive Management Response

If a soft trigger for utilization is reached, the team discusses and agrees on which actions are needed. If a hard trigger for utilization is reached, the team agrees on which of the following immediate actions to take: permittee reduces numbers, moves cattle, leaves cattle in same pasture, shortens months within a given pasture, etc.

The soft trigger within the Joint Use Area is 30%, and the hard trigger is 40%. The soft trigger outside the Joint Use Area is 40%, and the hard trigger is 50%. The triggers apply to any key species. If a soft or hard trigger is reached, the team discusses and agrees on which of the following actions are needed: permittee reduces numbers, moves cattle, leaves cattle in same pasture, shortens months within a given pasture etc.

Reduction or addition of livestock numbers and allotted grazing time in pastures would be partially based on vegetation monitoring (utilization, plant frequency, plant vigor (as measured by apparent trend), ground cover, and presence of ephemeral forage). As a utilization level of 40% is being approached within the Joint Use Area of the Black Mountain Ecosystem, and 50% outside of the Joint Use Area, it would trigger a field meeting to assess current and possible future management actions. If utilization levels ultimately meet or exceed the threshold of 40-50% respectively, there would be a discussion, with documentation, to adjust the stocking rate through either an adjustment of total livestock numbers, duration of grazing in the pasture, or both.

Plant frequency and ground cover are measured at key areas, every 5 years, using the long term trend method as presented in TR 1734-4.

If monitoring data indicates a change, BLM and the permittee would meet to discuss management options and implement modifications.

The following table identifies potential management actions which could be taken based on monitoring data collected for Key Species within the Joint Use Area and outside of the Black Mountain Joint Use Area (Table C-5).

Table C-5. Triggers and management actions based on key species utilization, long term trend data and ephemeral forage.

Triggers and Management Actions				
Monitoring Method	Monitoring Frequency	Location	Triggers	Management Discussion Topics
Key Species Utilization (Key species are listed in Appendix B for each Key Area)	As needed to assess hard and soft triggers. Expected to be measured 2x/year or more. Potential monitoring periods: prior to break of plant dormancy, end spring, end of summer, during and/or at the end of grazing period.	Within Black Mountain Joint Use Area	>40% utilization during a grazing period >40% utilization for 3 consecutive years, or cattle moved early for 3 consecutive years <40% utilization for 3 consecutive years	Reduce numbers, move cattle, shorten time within a given pasture Reduce numbers, move cattle, shorten time within a given pasture Increase time in pasture or keep current management without changes. Increase stocking rate
		Outside Black Mountain Joint Use Area	>50% utilization during a grazing period >50% utilization for 3 consecutive years, or cattle moved early for 3 consecutive years <50% utilization for 3 consecutive years.	Reduce numbers, move cattle, shorten time within a given pasture Reduce numbers, move cattle, shorten time within a given pasture Increase time in pasture or keep current management without changes. Increase stocking rate
Long Term Trend includes frequency, dry-weight rank (relative composition), repeat photography, and ground cover estimates.	Minimum of 1x/5 years	All Key Areas	Data results trending upward Data results trending downward	Increase stocking rate or increase time in pasture depending on season or keep current Management without changes. Decrease stocking rate, time in pasture, or use limits.
Ephemeral forage	Seasonally, when ephemeral bloom occurs.	All pastures where ephemeral growth occurs.	Apply the ephemeral rule, and when in tortoise habitat 280 lb. per acre of ephemeral forage needed prior to turnout	Complete ephemeral inspection and evaluation worksheet and make recommendations. Assess use on perennial forage during grazing and following livestock removal. >50% use on ephemeral forage allowed in fuels reduction areas.

Climatic Conditions Adaptive Management Response

Precipitation data and soil moisture data would be used in conjunction with drought condition and outlook

predictions from the USDA/NOAA Drought Monitor (http://droughtmonitor.unl.edu/). This information would be used to indicate the climatic conditions in the area of the allotments. When there are indicators of below normal or above normal conditions for the CQFM area, BLM would schedule a meeting with the permittee and invited partners to discuss local conditions and outlooks and determine what management adjustments are needed such as pasture deferment, rest, livestock rotation, change in numbers, etc. Although drought identification would be based on the Drought Monitor the actual management actions would be based on site specific conditions within the allotments as shown in Table C-6.

The Society for Range Management has defined drought as receiving 75% or less precipitation than the long-term average (SRM 1989). For the purposes of adaptive management response the following general guidance would be used:

> Below normal (abnormally dry to moderate drought): Less than 75% of long term average.
>
> Below normal (severe to exceptional drought): Less than 75% of long term average, soil moisture approaching 0%, prediction of drought to continue or become more severe.
>
> Normal: 75%-125% of long term average.
>
> Above normal: Greater than 125% of long term average.

In addition, more specific definitions can be found from the USDA/NOAA Drought Monitor (http://droughtmonitor.unl.edu/).

The long term average for each month and season (defined below) would be calculated using data collected by BLM from 3 rain gauges within the allotments using the Rangeland Health Evaluation (BLM 2010). Anomalies, such as influence from hurricanes in September/October, would be omitted from the average.

The CQFM receives precipitation in two distinct seasons which have a direct correlation to growth of cool and warm season plants. For the purposes of this document, the season having effect on cool season perennial plant growth and on spring ephemeral production is October-March. The season of rainfall, having effect on warm season perennials and summer ephemeral vegetation is July through September. It is the seasonal rainfall that is important to determining whether the precipitation is normal, below normal, or above normal and not the yearly average. Precipitation in conjunction with soil moisture and daytime/nighttime temperatures would indicate whether conditions are favorable for plant growth.

Cool Season

Trigger: Determine if rainfall from October-January is below or above normal. Observe allotments to determine site specific conditions which include soil moisture, air temperature both day and nighttime, vigor of perennial species, and current state of ephemeral growth. Other discussion topics will include rainfall predictions for February and March, expectation of ephemeral growth for February-March, etc.

This will help determine any changes needed in grazing management.

May and June – driest months, however if rainfall occurs it may extend the growth period for ephemeral plants.

Warm Season

Trigger: Determine if July and August rainfall are: Normal, Below Normal or Above Normal.
If below or above normal go to allotments and determine site specific conditions which include soil moisture, potential for summer ephemerals, and vigor of perennial species. Additional discussion items include: Is there a lot of growth from the rains? Is there a lot of growth that allow cattle to stay longer? Is there a need to let the perennials grow unhindered during this time?

May and June – driest months, however if rainfall occurs it may start the warm season growth period early.

Table C-6. Precipitation conditions expected on the allotments and the management responses for each set of conditions.

Adaptive Management Precipitation Related Scenarios *Terminology based on the Drought Monitor USDA/NOOAA		
Precipitation/ Vegetation Condition	**Grazing Management**	**Additional Actions to Discuss**
Normal (Not Drought)	Follow grazing rotation schedule	Monitor utilization and precipitation/soil moisture.
Above Normal (Not Drought) Abundant Ephemeral Forage	Move cattle to pastures with abundant ephemeral forage until forage begins to cure. Then resume grazing rotation schedule.	Meeting with permittee and BLM to discuss movement of cattle to areas with ephemeral forage or leaving livestock in current pasture longer to take advantage of additional ephemeral forage.
Below Normal (*Abnormally Dry to Moderate Drought)	Follow grazing rotation schedule	Begin conversations between permittee and BLM about current allotment specific conditions and outlook. Determine if a change in grazing management is needed including adjusting rotation, reducing numbers, utilizing temporary water hauls, etc.
Below Normal (*Severe to Exceptional Drought)	Spread cattle into all pastures except one on the west and one on the east which would be rested through the drought so that when the drought breaks cattle can be moved into a fresh pasture. Reduce numbers to be in balance with available forage.	Meeting with BLM and permittee to discuss current allotment specific conditions and outlook. Determine if additional changes in grazing management are needed including adjusting rotation, reducing numbers, utilizing temporary water hauls, etc. Also conversations about when livestock would be returned to the rotation and how management should proceed after the drought breaks.

Adaptive Management Meetings

Adaptive management focuses on flexibility and responsiveness to monitoring outcomes. Successful adaptive management includes annual and semi-annual meetings. The following meetings would take place with the permittee, BLM and other interested publics and stakeholders.

Annual meetings:

1. Convened by the permittee and/or the BLM.
2. Held annually during fall/winter months.
3. Members: representatives from the BLM, permittee, AZGFD, University of Arizona Cooperative Extension, NRCS, Arizona State Land Department, interested publics and stakeholders.
4. Function:
    a. propose and coordinate appropriate monitoring schedule and data to be collected during upcoming monitoring season;
    b. analyze data previously collected such as utilization, long-term trend, weather, gates, need for wells;
    c. identify issues based on monitoring data and discuss options for adjusting livestock management to address those issues;
    d. and modify grazing system through a consensus seeking process;
    e. modification, if corrections are needed to the monitoring plan, communication or adaptive management response;
    f. evaluate current precipitation and trends that incorporate predictions of drought and climate change.

Semi annual meetings:

1. Convened by the permittee and/or BLM, held 2x/yr (end of spring-April/May, end of summer-Aug/Sept)
2. Members: core team comprised of BLM, permittee, NRCS, County Extension, and AZGFD to discuss specifics on the allotment such as range condition, rotation, seasonal utilization monitoring, range infrastructure and collect monitoring data (utilization, long term trend, etc)
3. Other meetings could take place requested by BLM, the permittee, interested publics, and stakeholders.

Additional Cattleguards

There has been a problem with gates being left open and/or stolen on the CQFM. The following adaptive approach is meant to foster communication and develop criteria for if/when additional cattle guards are to be installed.

1. If gates are left open more than 5 times per month, then consider the addition of a cattleguard.
2. If gates are stolen at one location more than once consider the addition of a cattleguard.
3. The permittee is responsible for timely communication to the Assistant Field Manager in order to communicate the need for this adaptive approach.

Additional Wells

The results of use pattern mapping and adaptive management would be used to indicate if additional wells are needed.

7.4 Appendix D. Alternative 2 Reduced Preference Alternative

7.4.1 Terms and Conditions

Renew the three perennial/ephemeral grazing permits for CQFM allotments for a period of 10 years with the following grazing system schedule (Table D-1) and the Terms and Conditions listed below.

TableD-1. Alternative 2 Grazing System Schedule, Years 1–5.

Pasture Name	Herd Size (AUs)	AUMs/Pasture	AUMs/Remain	Start Date	End Date	Grazing Days
Year 1 West Unit Projected Schedule						
Sugarloaf Highway	102	362	5	March 1	June 15	107
Black Tank Valley	102	448	40	June 16	Oct. 15	122
Lost Cabin Squaw Pocket	102	498	39	Oct. 16	Feb 28	136
Twin Mills	Rest	Rest	Rest	Rest	Rest	Rest
Year 1 East Unit Projected Schedule						
House /Big Wash	90	317	2	March 1	June 15	107
E. Big Wash/ Quail Spr.	90	294	24	June 16	Sept. 15	92
Marble Canyon/ Cerbat	90	519	24	Sept.16	Feb 28	166
Year 2 West Unit Projected Schedule						
Black Tank Valley	102	448	40	March 1	June 30	122
Lost Cabin Squaw Pocket	102	498	39	July 1	Nov. 15	136
Sugarloaf Highway	102	362	5	Nov. 16	Feb 28	107
Twin Mills	Rest	Rest	Rest	Rest	Rest	Rest
Year 2 East Unit Projected Schedule						
Big Wash/ E. Big Wash	90	284	14	March 1	May 31	92
Quail Spr./Marble Canyon	90	416	11	June 1	Oct. 15	137
House / Cerbat	90	430	25	Oct. 16	Feb 28	136

Year 3 West Unit Projected Schedule						
Lost Cabin Squaw Pocket	102	498	39	March 1	July 15	137
Sugarloaf Highway	102	362	5	July 16	Oct. 30	108
Black Tank Valley	102	448	40	Nov. 1	Feb. 28	120
Twin Mills	Rest	Rest	Rest	Rest	Rest	Rest
Year 3 East Unit Projected Schedule						
E. Big Wash Quail Spr.	90	294	24	Mar 1	May 31	122
Marble Canyon / House	90	419	14	June 1	Oct. 15	137
Big Wash / Cerbat	90	417	12	Oct. 16	Feb 28	136
Year 4 West Unit Projected Schedule						
Sugarloaf Highway	102	362	5	March 1	June 15	107
Black Tank Valley	102	448	40	June 16	Oct. 15	122
Lost Cabin Squaw Pocket	102	498	39	Oct. 16	Feb 28	136
Twin Mills	Rest	Rest	Rest	Rest	Rest	Rest
Year 4 East Unit Projected Schedule						
Quail Spr./ Marble Canyon	90	416	11	March 1	July 15	137
House/ Big Wash	90	317	2	July 16	Oct. 31	108
E. Big Wash /Cerbat	90	397	37	Oct. 16	Feb 28	136
Year 5 West Unit Projected Schedule						
Black Tank Valley	102	448	40	March 1	June 30	122
Lost Cabin Squaw Pocket	102	498	39	July 1	Nov. 15	137
Sugarloaf Highway	102	362	5	Nov. 16	Feb 28	106
Twin Mills	Rest	Rest	Rest	Rest	Rest	Rest

Year 5 East Unit Projected Schedule						
Marble C House/	90	419	14	March 1	July 15	137
Big Wash/ E. Big Wash	90	284	14	July 16	Oct. 15	92
Quail Spr / Cerbat	90	427	22	Oct. 16	Feb 28	136

The West and East Management Units would be managed under a deferred rotation grazing system in which cattle would be moved three times a year.

Flexibility: The grazing schedule would be used as a template with pasture rest and the rotation schedule being subject to change year to year, based on climatic conditions, wildfire, physiological needs of the plants, as well as site specific monitoring data. The rancher would contact the BLM prior to making moves outside of the schedule and would keep records of when and where livestock were actually moved, and provide the actual use information to the BLM each year. The final decisions concerning moves outside the scheduled use periods would be made by the BLM authorized officer.

Annual Meetings: An annual meeting between BLM and the grazing permittee would be conducted to discuss previous years monitoring, moves, etc. and the coming year's grazing schedule and climatic conditions. Emergency situations such as loss of a water facility which would necessitate immediate removal of livestock from an area would be handled on a case by case basis and would involve consultation with the above parties. The final decisions concerning the annual meeting recommendations and emergency situations would be made by the BLM authorized officer.

The combined authorized stocking level for both the West and East Management Units under Alternative 2 would be 203 AUs which includes cattle and 10 horses (horse use would be allowed intermittently throughout the year for a total of two months in Quail Springs Pasture). This stocking level would be adjusted based on monitoring data in relationship to resource management objectives. Any future adjustments in stocking rate would be based upon actual use, utilization, cover, frequency, and composition data. Stocking rates could remain the same or be adjusted upward or downward depending on whether land health standards are being achieved. The initial stocking rate was based on actual use and a determination of attainment of the land health standards.

Areas within CQFM that fall within the "joint use area" would have utilization limits as in the Black Mountain Ecosystem Management Plan (BLM 1996), and presented in *Section 1.2, Conformance with Land Use Plan* of this document. These limits would become a part of the terms and conditions of the grazing permit. The key areas located within the joint use area are 8, 11, 18, 20, and 21.

All key species at key areas outside of the Joint Use Area of the Black Mountain Ecosystem would have an average use limit of 35 percent over three years.

When utilization levels reach or exceed 40% cattle would be removed from the pasture.

The permittee would have one year from date of the permit renewal to repair the Lost Cabin Squaw Pocket fences or these pastures would be closed to grazing 43 CFR 4110.3-2.

No ephemeral use (no additional livestock) would be authorized for the 10 year grazing period, i.e. life of the permit. The base herd may be allowed to remain in a pasture for extended periods of time based upon the presence of ephemeral forage.

The permittee would be required to have ear tags on all livestock authorized to graze.

A change in kind of livestock from cattle to horses would be included on the term permit for the Quail Springs Allotment to allow the permittee to have 10 head of horses in the Quail Spring Pasture near his headquarters for up to two months each year only when cattle are in the pasture according to scheduled pasture rotations.

The permittee would provide actual use information by pasture including number of animals, kind and class of livestock, and period of use.

All waters located on public land would be left on and functional when cattle are not in the pasture.

Table D-2. Alternative 2 Proposed Pastures in the West and East Management Units

West Management Unit Pastures	East Management Unit Pastures
Twin Mills Lost Cabin/Squaw Pocket Black Tank /Valley Sugarloaf /Highway	Big Wash East Big Wash Quail Spring Marble Canyon House Cerbat

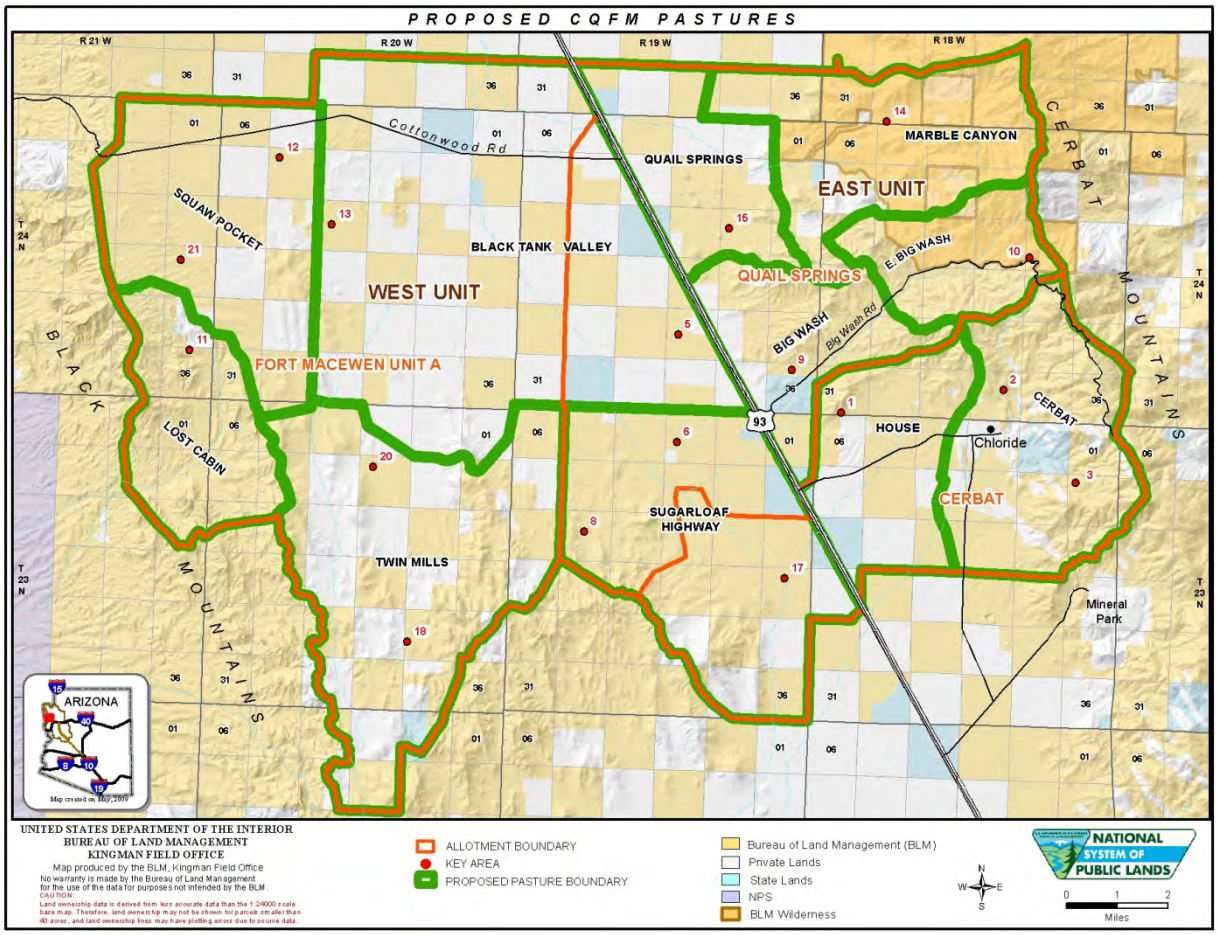

Figure D-1. East and West Units and Pasture Boundaries within the Allotments

7.4.2 Livestock Management

West Management Unit

Livestock management under Alternative 2 provides grazing deferment in the spring and summer for all pastures two out of three years (Table D-1). In order to implement Alternative 2, all boundary fences must be repaired to control livestock movements.

Close the Twin Mills Pasture to cattle grazing until the cover and frequency objectives relating to the desired plant community of Standard 3 are met. The objectives will be considered met when perennial vegetative cover at Key Area 20 reaches 15 to 20 percent. Current monitoring data indicates perennial vegetative cover at Key Area 20 at 9 percent.

Combine the Sugarloaf and Highway 93 Pastures into one pasture named Sugarloaf Highway Pasture.

Combine the Valley and Black Tank pastures into one pasture named the Black Tank Valley Pasture.

Squaw Pocket and Lost Cabin pastures would remain separate but managed as one unit i.e., grazed at the same time.

East Management Unit

The proposed livestock management under Alternative 2 provides grazing deferment in the spring and summer for each pasture three out of five years. Once perennial watering facilities for livestock are developed in the Cerbat Pasture, all pastures would receive spring and summer grazing deferment two out of three years.

Limit grazing use in the Cerbat Pasture to fall and winter until a perennial watering facility for livestock is developed in this pasture.

7.4.3 Existing Range Improvements

The following permitted range improvements would be repaired or modified within one year of the date of implementation of the Proposed Action. If not repaired or modified to control livestock then one or more of these pastures would not be authorized for grazing use, resulting in temporary suspension of livestock AUMS.

1. Relocate the existing fence and realign the road across Lost Cabin Wash along the west boundary of the Lost Cabin Pasture out of the wash to a nearby upland location. The gate would be replaced with a cattleguard (Figure D-3). The road in Lost Cabin Wash provides remote access to the National Park Service lands and therefore receives a lot of vehicle use. Because of this activity, the gate at this location is often left open which allows cattle to wander onto the National Park.
2. The boundary fence to the west of Lost Cabin Spring needs to be extended approximately 0.5 miles to the south and tied into a natural boundary. The location of this fence is T24N, R21W, sections 22, 23 and 26 (Figure D-3).
3. The fence along the west side of Squaw Pocket Pasture and the west side of Lost Cabin Pasture need to be maintained or reconstructed.
4. Repair West Unit boundary fences between Fort MacEwen Units A and B.
5. When fences are realigned, extended, or reconstructed they would be built and then maintained using BLM fencing standards (BLM Fencing Manual H-1741-1). Standards would be different depending on the big game species present (bighorn or mule deer).
6. Maintenance or reconstruction of fences in tortoise habitat would be conducted from existing roads or on foot or horseback where road access is not available. No off-road vehicle would be authorized.
7. To improve riparian habitat and make progress towards meeting Standard 2 at Big Wash Spring, the existing fence would be repaired or replaced. The fence around the spring would be approximately 100 feet long by 50 feet wide and built and maintained by the BLM using BLM fencing standards (BLM Fencing Manual H-1741-1). This would exclude livestock from the spring source and riparian vegetation, but allow for wildlife access. The location of this spring is T24N, R18W, section 17 (Figure D-2).

8. The Sugar Loaf Seeding Exclosure (Range Improvement #035058) fence would be modified. Two gates at each end of the road through this exclosure are often left open by the general public allowing livestock access into the exclosure. In order to keep livestock from grazing within this exclosure, the fence would be relocated to the north side of the road. Moving the fence to the north side of the road would remove the road from the inside of the exclosure thus eliminating the need for gates. The location of this exclosure is T 23N, R19W, sections 14 and 15 (Figure D-2).

7.4.4 Proposed Range Improvements

Install a cattleguard along the road down Lost Cabin Wash adjacent to the fence that separates the Lost Cabin and Squaw Pocket pastures. The location of the new cattleguard is T24N, R21W, section 23 (Figure D-3). The cattleguard would be designed to prevent entrapment of small animals.

Drill and equip a well in the Cerbat Pasture. The well would have an approximately 12 foot windmill, 10,000 gallon storage tank and 500 gallon trough for livestock and wildlife. The BLM trough would meet wildlife standards and would not stand higher than 20 inches from ground level and be equipped with a wildlife escape ramp. All of the facility would be colored to blend with the surrounding landscape. The location of the new well is T24N, R18W, section 34 SESE ¼ (Figure D-4).

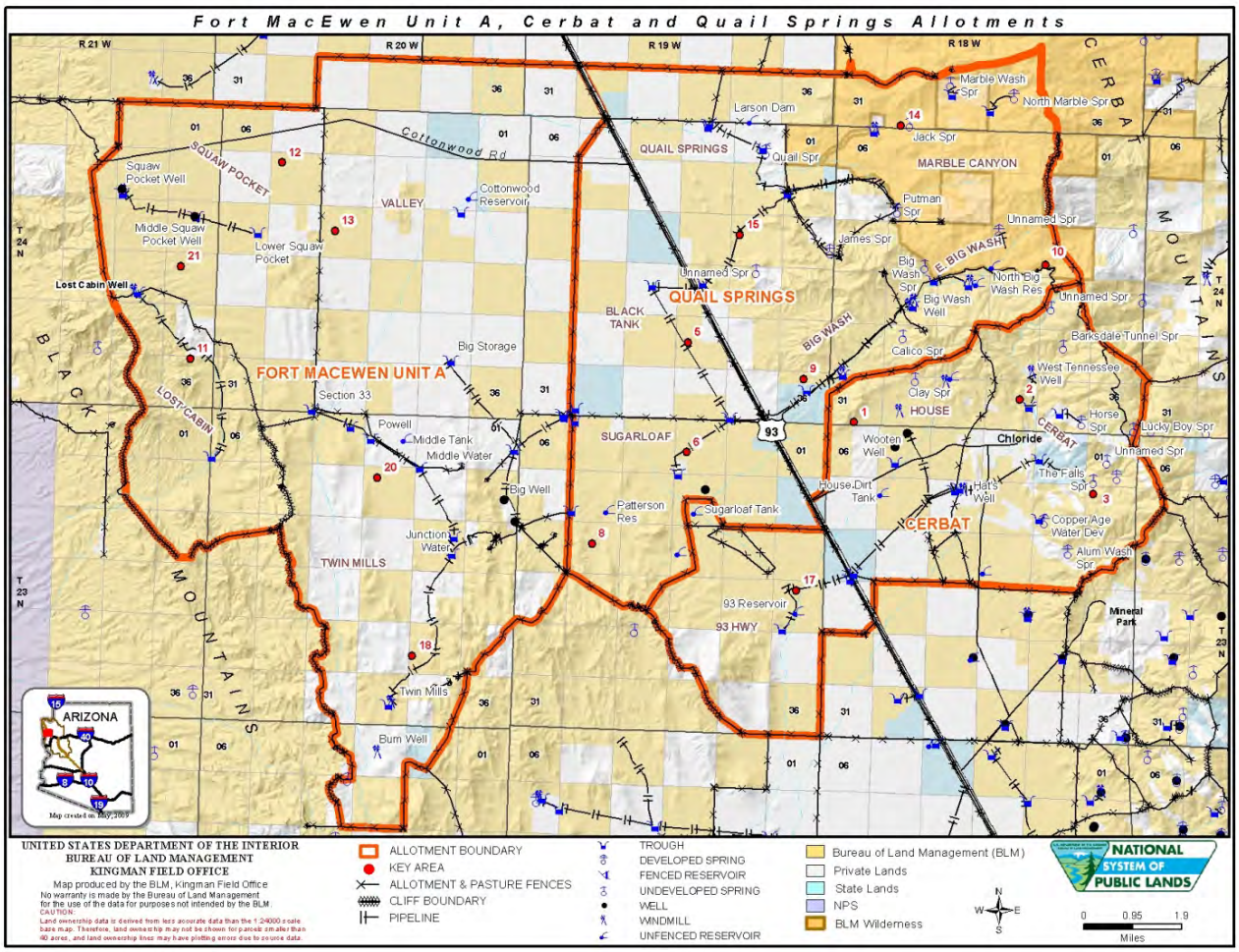

Figure D-2. Existing Range Improvements.

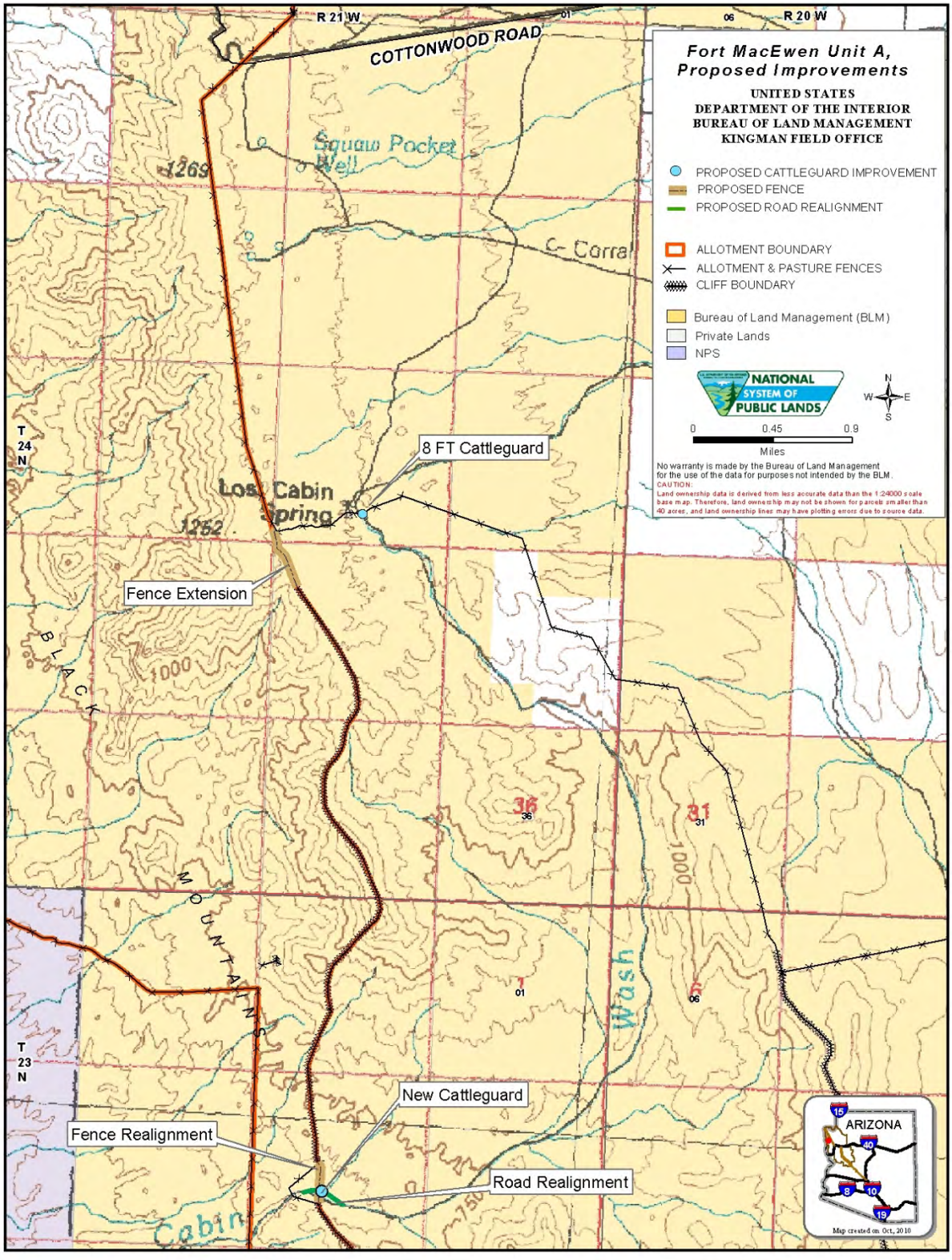

Figure D-3. Fort MacEwen Allotment Proposed Improvements

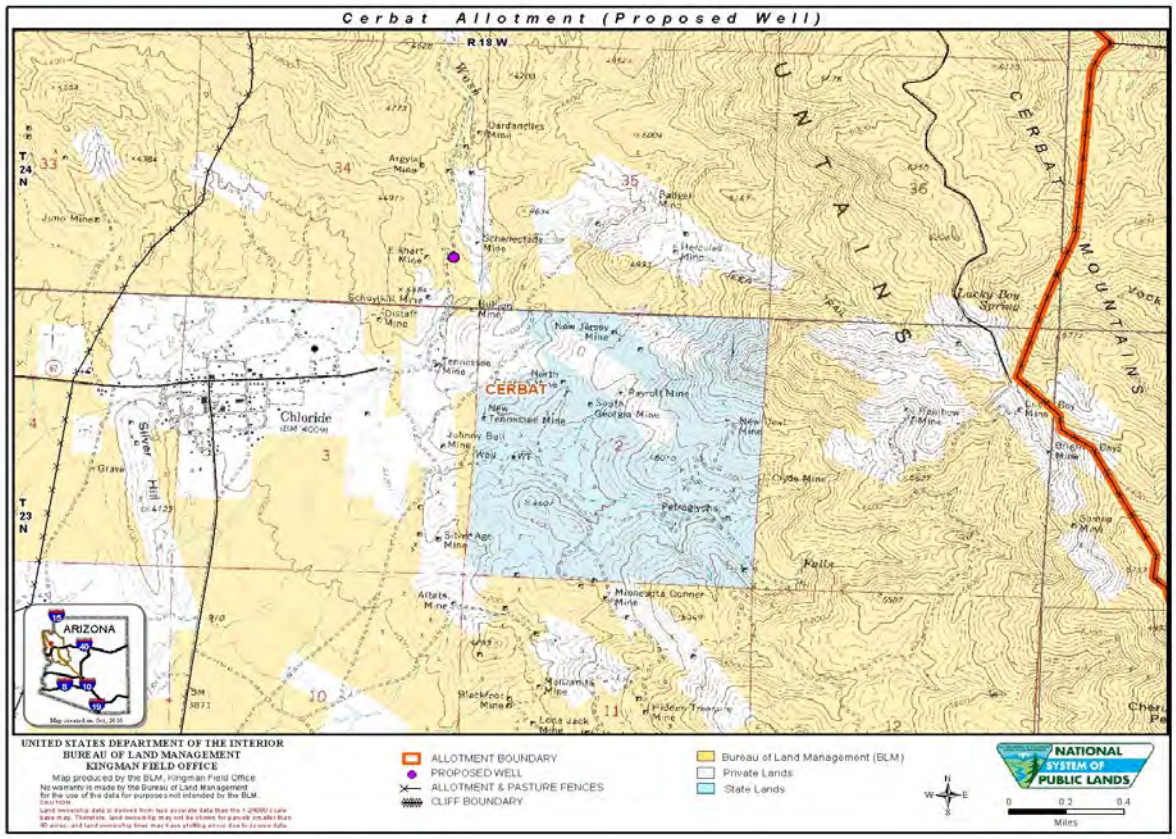

Figure D-4. Proposed well in the Cerbat Pasture of the Cerbat Allotment

7.4.5 Exclosure Construction

Three exclosures would be constructed in order to exclude livestock grazing from those locations: near Key Area 5 in the Black Tank Pasture; near Key Area 12 in the Squaw Pocket Pasture; and near Key Area 20 in the Twin Mills Pasture. These exclosures would be approximately 10 acres in size and would be used as control areas to compare grazed and ungrazed areas within these pastures. The BLM would build and maintain the exclosure fences using BLM fencing standards (BLM Fencing Manual H-1741-1).

7.4.6 Monitoring Protocol and Criteria for Stocking Rate Analysis

BLM resource specialists would periodically monitor the allotments over the 10-year term of the grazing permit to ensure that the fundamentals or conditions of rangeland health are being met within the allotments, in accordance with 43 CFR 4180. If monitoring indicates current livestock grazing practices are causing non-attainment of resource objectives, the BLM could modify the terms and conditions of a grazing permit (i.e., number of cattle, turn out dates, removal dates, etc.) temporarily or on a more long-term basis, as deemed necessary, after consultation with the livestock permittee.

Evaluate the stocking rate over the next three years using actual use data and utilization data collected by pasture every year.

BLM would monitor Swicker and Lower Falls Springs determine the efficacy of the grazing system and would identify future management changes, if needed.

7.4.7 Stocking Rate Analysis

Grazing Capacity or Stocking Rate Analysis: The following is the process for determining the grazing capacity or initial stocking rate for CQFM allotments. Grazing capacity refers to the maximum stocking rate possible year after year without causing damage to vegetation or related resources (Holechek et al. 1999).

The thirteen year average for each allotment from 1998 to 2010 is presented in the table below (Table D-3). The averages were used as the base stocking rate. The average for each allotment was used to allocate forage for each pasture.

Cerbat Allotment can support 588 AUMs or 49 AUs.

The Quail Springs Allotment was allocated 1015 AUMs or 85 AUs.

The Fort MacEwen Allotment was allocated 834 AUMS or 69 AUs. The Twin Mills Pasture of the Fort MacEwen Allotment was allocated 411 AUMs or 34 AUs. These AUMS were removed because of the proposed closure of Twin Mills Pasture. The Valley Pasture has approximately 12,000 acres of private uncontrolled land which cannot be used in the calculation of AUMs.

The initial stocking rate for CQFM is 203 AUs.

Table D-3. Thirteen year average stocking rate for CQFM.

Year	Cerbat AUMs	Quail Springs AUMs	Fort MacEwen AUMs
1998	1953	2397	1437
1999	518	1757	1777
2000	1150	632	1777
2001	679	367	626
2002	132	0	0
2003	371	522	828
2004	211	340	667
2005	335	162	1242
2006	391	297	759
2007	391	1782	1777
2008	502	1836	1766
2009	338	991	1766
2010	670	2106	1769
Average	**588**	**1015**	**1245**

7.4.8 Desired Plant Community Objectives Alternative 2

These allotments would be managed to achieve the desired plant community (DPC) objectives included in the *Cerbat, Quail Springs, and Fort MacEwen Rangeland Health Evaluation*. The evaluation lists and evaluates achievement of the allotment DPC objectives. These objectives were developed by an ID Team and expressed in species composition and perennial vegetative cover (Appendix B Table B-1 through Table B-3) See Appendix A for a list of the common and scientific names of plants.

7.5 Appendix E. Alternative 3 No Action –No Change to Current Terms and Conditions

7.5.1 Grazing System

Generally cattle have been and are grazed in all pastures year round. Table E-1 shows the grazing preference and current use. Table E-2 shows the pastures within the West and East Management Units.

Table E-1. Alternative 3, No Action, grazing preference and current season of use.

Allotment	Percent Public Land	Number and Kind of Livestock	Season of Use	Active AUMs	Suspended AUMs	Total AUMs
Cerbat	93	175 Cattle	03/01-02/28	1,953	0	1,953
Quail Springs	90	242 Cattle	03/01-02/28	2,614	0	2,614
Fort MacEwen (Unit A)	92	161 Cattle	03/01-02/28	1,777	745	2,522
Totals	578 Cattle			6,344	745	7,089

Table E-2. Alternative 3, No Action, Pastures in the West and East Management Units

West Management Unit	East Management Unit
Fort MacEwen Allotment (Unit A) Pastures: Valley (aka Cottonwood) Twin Mills Squaw Pocket Lost Cabin	Quail Springs Allotment Pastures: Big Wash East Big Wash Quail Spring Marble Canyon
Quail Springs Allotment Pastures: Black Tank Sugarloaf	Cerbat Allotment Pastures: House Cerbat
Cerbat Allotment Pasture: Highway 93	

7.5.1.1 West Unit

The current grazing system in the West Unit consists of the following components. In mid-April, cattle are gathered from these pastures and moved into the shipping corrals located in the southeast corner of the Big Ranch Allotment. The cattle are then separated into cattle to ship and cattle to keep. The cattle that are kept are released back to the Valley, Black Tank, Sugarloaf, and Highway 93 pastures where they are grazed until mid-October.

Cattle are prevented from moving back and forth between the lower and upper portions of the West Unit by distance between waters and internal pasture fences. When livestock are moved into an area, they are placed at the water source. When livestock are removed from a pasture, those waters on public land

remain available to wildlife and burros. The distance between waters is approximately 5 to 8 miles, and in the hotter months, most of the cattle remain near where they are originally placed. During the cooler months, cattle may go back and forth between the lower and upper portions of the West Unit.

Portions of some of the internal pasture fences act as barriers to cattle movement; however, some of these fences are in disrepair. In the West Unit, large sections of pasture fence have been cut or removed completely in some of the pastures that contain a large amount of private land, such as the Valley and Black Tank pastures. Even in pastures where the fencing has not been cut, keeping gates shut is difficult due to the high volume of traffic. This is also true for some of the gates along boundary fences.

7.5.1.2 East Unit

The current grazing system in the East Unit consists of the following components. In early May, cattle are gathered and moved into the shipping corrals located at the headquarters on the Quail Springs Allotment. The cattle are separated into cattle to ship and cattle to keep. The cattle that are kept are moved to the Big Wash, Quail Springs, and House pastures. During the cooler months, cattle may go back and forth between the lower and upper portions of the East Unit.

In the East Unit, pasture and boundary fencing are in better condition; however, keeping gates closed is still a problem. The permittee can use water to control where the livestock graze by closing off water in corrals. In the Quail Springs Allotment the permittee is using water and fencing to control livestock. In the House Pasture (Cerbat Allotment), there is only one permanent water development and one reservoir that intermittently collects water.

In the Cerbat Pasture (Cerbat Allotment), all waters are in the form of low producing or seasonal springs. Because of this the Cerbat Pasture can only be used during the fall and winter grazing periods. All waters are open to wildlife and wild horses year-round. The exclosure fence around Big Wash Spring would be repaired.