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Bureau of Land Management**

**FINAL Environmental Assessment
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**Black Mountain Herd Management Area
Wild Burro Gather and Population Control Plan
Final Environmental Assessment**

Mohave County, Arizona

U.S. Department of the Interior
Bureau of Land Management
Colorado River District
Kingman Field Office
2755 Mission Blvd.
Kingman, Arizona 86401
(928) 718-3700

U.S. Department of the Interior
Bureau of Land Management
Colorado River District
Lake Havasu Field Office
1785 Kiowa Ave.
Lake Havasu City, Arizona 86403
(928) 505-1200

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CHAPTER 1 INTRODUCTION

This environmental assessment (EA) has been prepared to analyze the Bureau of Land Management's (BLM) Kingman Field Office (KFO) and Lake Havasu Field Office (LHFO) proposal to, over the next 10 years, remove excess wild burros, achieve and maintain the established appropriate management level (AML), and implement fertility control for wild burros on lands within and near the Black Mountain Herd Management Area¹ (HMA).

This document is tiered to the Proposed Kingman Resource Area Resource Management Plan and Final Environmental Impact Statement (BLM 1993), Approved Kingman Resource Area Resource Management Plan (Kingman RMP) and Record of Decision (BLM 1995), the Black Mountain Ecosystem Management Plan (BMEMP) (BLM 1996), the LHFO Record of Decision and Approved Resource Management Plan (LHFO RMP) (BLM 2007), and the ZonaStat-H Porcine Zona Pellucida (PZP) Fertility Management Pilot Project for Wild Female Burros (known as the HSUS Pilot Project) EA² (BLM 2017).

This EA has been prepared in compliance with the National Environmental Policy Act of 1969, as amended (NEPA) following the guidance provided in BLM NEPA Handbook H-1790-1 (Rel. 1-1710, January 2008), and in compliance with guidance provided in the August 6, 2018 memorandum "Additional Direction for Implementing Secretary's Order 3355 Regarding Environmental Assessments." If BLM determines that implementation of the proposed action or alternatives would not result in "significant environmental impacts," a finding of no significant impact will be prepared to document that determination, and a decision record will be issued providing the rationale for approving the chosen alternative.

1.1 Background

The Black Mountain Herd Area (HA) covers nearly 1.1 million acres of public, state, tribal, and private lands in Mohave County in northwestern Arizona (see Table 1 and Appendix C Figure 1). Within the Black Mountain HA is the slightly smaller Black Mountain HMA (see Appendix C, Figure 2). The Black Mountain HMA is just over 1 million acres, including 567,063 acres of BLM-administered land and portions of the National Park Service (NPS) Lake Mead National Recreation Area (Lake Mead NRA). The NPS and BLM cooperate on managing burros in Lake Mead NRA. The Black Mountains wild burro herd is the largest wild burro herd on public lands.

¹ Herd Management Areas (HMAs) are areas that the BLM manages for wild horse and burro populations on federal lands. Herd Areas (HAs) are areas where feral burro and horse herds existed at the time of the passage of the Wild and Free-Roaming Horses and Burros Act of 1971.

² In cooperation with the BLM, the Humane Society of the United States (HSUS) is conducting a four-year fertility management project in the Black Mountain HMA. In 2017, the BLM gathered 111 female burros from the HMA and treated 76 of them with the immunocontraceptive vaccine PZP. The remaining 33 of the 111 gathered female burros were not treated with the vaccine, in order to serve as an untreated control group for the pilot project. The project goal is to determine how feasible and effective it is to re-locate treated female burros and remotely deliver vaccine boosters to them in the field, via dart gun.

Table 1: Black Mountain HA and HMA Land Status

Surface Management Agency	Herd Area (acres)	Herd Management Area (acres)
Bureau of Land Management	574,383	567,063
National Park Service (Lake Mead NRA)	168,599	165,005
Arizona State Trust Land	35,263	25,322
Arizona Game and Fish - State Wildlife Areas	1,463	1,042
Private Land	285,832	245,357
Fort Mojave Indian Reservation	22,719	0
US Fish and Wildlife Service (Havasu Wildlife Refuge)	7,071	0
Bureau of Reclamation	870	0
Federal Aviation Administration	107	0
Total Acreage	1,096,307	1,003,789

Management of wild burros in the Black Mountain HMA is guided by the Kingman RMP, the BMEMP, and the Lake Mead NRA Draft Environmental Impact Statement Burro Management 1994 and Final Environmental Impact Statement Burro Management, February 1995 (referred to throughout the document as the Lake Mead NRA Burro Management Plan).

The BMEMP set the AML for the Black Mountain HMA at 478 wild burros. The AML is defined as the number of adult wild burros³ that can be sustained within a designated HMA to achieve and maintain a thriving natural ecological balance (TNEB) in keeping with the multiple-use and sustained yield management of the area. The Black Mountain HMA AML was established at a level that would maintain healthy wild burros and meet vegetation objectives over the long-term (BLM 1996).

As is true for any estimates of wildlife abundance or herd size, there is always some level of uncertainty about the exact numbers of wild burros in any HA/HMA or non-HMA area. The estimates shown here reflect the most likely number of burros, based on the best information available to the BLM and may not account for every animal within the HA/HMA. Aerial surveys conducted in 2014 indicated a population estimate of 1,517 to 1,827 burros (Griffin 2015). By late 2019, the population of wild burros living in and near the Black Mountain HMA is estimated to have grown to approximately 2,205 animals. This population is more than 3.6 times AML (Table 2) (see Section 3.3.1 for more in depth analysis).

³ Unweaned foals do not count toward AML. A foal is typically weaned between 6 to 12 months of age; weaning is dependent upon the mother's health and other environmental conditions.

Table 2: Black Mountain Herd Management Area Population

Herd Management Area	Total Acres (BLM and NPS)	Appropriate Management Level	Estimated Population by January 2020	Excess Wild Burros	Percentage Over AML
Black Mountain	732,068	478	2,205	1,727	361%

Approximately 857 wild burros have been gathered and removed from the Black Mountain HMA since the population estimate in 2014 through numerous small gathers to address nuisance burros on private lands, and burros that posed safety issues along public highways. The removal of these nuisance animals has been calculated into the estimated population size and number of excess animals. During the hot summer months, some wild burros are residing permanently outside the HMA boundaries and adversely impacting private property (See Appendix C, Figure 3). Damage has also been noted to range improvements (such as fences and water developments) on both private property and within the HMA on public lands.

Burro herds can double in size every four years. The last non safety- or nuisance-related gather for excess burros in the Black Mountain HMA was over 15 years ago in 2003. Palatable forage in the Black Mountain HMA is degraded and rangeland health is not meeting BLM land health standards in the Fort MacEwen Allotment and the Big Ranch Allotment Unit B. The overpopulation of wild burros is a contributing factor to the poor land health. The current burro herd size is nearly four times greater than AML and is causing unacceptable levels of resource damage to the rangeland ecosystem.

Based on current information, the BLM has determined that there are approximately 1,727 wild burros above AML within the Black Mountain HMA. These excess wild burros need to be removed in order to achieve a TNEB and prevent further degradation of rangeland resources.

1.2 Purpose of and Need for Action

The purpose of the proposed action is to, over the next 10 years, gather and remove excess wild burros from within and outside the Black Mountain HMA and to achieve and maintain AML, achieve a TNEB, alleviate deterioration of the rangeland, and address public safety and private property damage concerns.

The need for the action is based on the BLM's obligations established by the provisions of Section 1333(a) of the Wild Free-Roaming Horses and Burros Act of 1971, as amended (WFRHBA) which mandates management of wild burros in a manner that is designed to achieve and maintain a TNEB on the public lands, protect rangeland resources from deterioration associated with overpopulation, and address nuisance complaints and public safety concerns.

1.3 Plan Conformance

The proposed action and other action alternatives are in conformance with the Kingman RMP (BLM 1995) and the LHFO RMP (BLM 2007), as required by regulations found in Title 43 of the Code of Federal Regulations (CFR), section 1610.5-3(a). This proposal is consistent with the LHFO RMP because it defers to the Kingman RMP for management decision on the HMA (as

shown in maps 34 and 35 of the LHFO RMP). The action alternatives also conform to management direction in the BMEMP and Lake Mead NRA Burro Management Plan.

Kingman RMP

- Pg. 18, Goal - “Actively manage for healthy, viable populations of wild horses and burros in an ecological balance with other resource values within the three existing herd management areas.”
- Pg. 55, Objective - “Manage for a viable population of wild and free-roaming horses and burros to achieve, maintain a thriving, natural ecological balance in herd management areas and enhance the habitat in a desirable condition for continued multiple use.”
- Pg. 86 - Wild horse and burro management on public lands requires maintenance of herd inventory, habitat monitoring and the removal and placement of excess animals to the public for adoption.

Black Mountain Ecosystem Management Plan

Goals, objectives, and management actions for the Black Mountain HMA are provided in the BMEMP on pages 29-35. The decisions pertaining to wild burro management are as follows:

- Seeks healthy functioning ecosystem and long-term viability for all species in the ecosystem.
- Sets utilization limits for key plant species (see Table 4, BLM 1996).
- Establishes initial stocking rates for ungulates that will promote proper functioning and sustainability of the ecosystem.
- Provides for the management of wild burros as an integral part of the natural system.

“Whenever the BLM-NPS joint census data shows more than 125 burros within the boundaries of the park [Lake Mead NRA], the Recreation Area and BLM will cooperatively remove the excess animals” (BLM 1996).

Lake Mead NRA Burro Management Plan

Wild burros on the Lake Mead NRA are managed under the Lake Mead NRA Burro Management Plan (NPS 1994, 1995).

- NPS would be the lead agency for burro management within the park in cooperation with the BLM.

1.4 Relationship to Statutes, Regulations, Policies or other Plans

The proposed action and action alternatives are consistent with the following Federal laws, policies, and regulations. These include, but are not limited to the following:

- The WFRHBA,
- The Federal Land Policy and Management Act of 1976 (FLPMA),
- Fundamentals of Rangeland Health (43 CFR 4180),
- Taylor Grazing Act of 1934, as amended (TGA),
- The NEPA, and
- The BLM Wild Horses and Burros Management Handbook (H-4700-1).

The proposed action and action alternatives are consistent with the applicable regulations at 43 CFR 4700 and are also consistent with the WFRHBA, which mandates that BLM “protect the

range from the deterioration associated with overpopulation,” and remove excess wild burros from an area “in order to preserve and maintain a thriving natural ecological balance and multiple use relationships in that area.” Additionally, federal regulations at 43 CFR 4700.0-6 (a) state that wild burros “shall be managed as self-sustaining populations of healthy animals in balance with other uses and the productive capacity of their habitat.”

1.5 Decision to be Made

The BLM authorized officer will determine whether to implement all, part, or none of the proposed gathers and/or population control measures. The decision will not set or adjust AML within the Black Mountain HMA nor adjust authorized animal unit months (AUMs) for livestock grazing within the HMA, as these decisions were set through previous planning and implementation-level decisions and would be undertaken in conformance with applicable regulations.

1.6 Scoping and Issue Identification

The following issues were identified by the BLM interdisciplinary team in relation to the BLM’s management of wild burros in the planning area:

Wild Burros

- Potential impacts to population size and annual growth rate,
- Potential impacts to individual wild burros from handling stress,
- Potential impacts to herd social structure,
- Effectiveness of proposed fertility control applications,
- Potential effects to genetic diversity, and
- Potential impacts to animal health and condition.

Vegetation, Soils

- Potential impacts to vegetation from trap and holding sites associated with wild burro gather activities,
- Potential impacts to the distribution and density of non-native or noxious plants,
- Potential impacts to soil resources at trap and holding sites, and
- Potential impacts to forage used by wildlife and permitted livestock.

Water Resources

- Potential impacts to springs and riparian vegetation,
- Potential impacts to functionality of springs and water availability.

Wildlife, Migratory Birds, and Special Status Species

- Potential for temporary displacement, trampling or disturbance,
- Potential impacts to habitat/forage, and
- Potential competition for forage and water.

CHAPTER 2 PROPOSED ACTION AND ALTERNATIVES

This chapter of the EA describes the proposed action and alternatives, including any that were considered but eliminated from detailed analysis. Standard operating procedures and best

management practices that would apply to the action alternatives (Alternatives A-D) are provided in Appendices E-I.

2.1 Alternative A (Proposed Action)

Selective Removal of Excess Wild Burros to AML, and Population Growth Suppression using Fertility Control Vaccines and Sex Ratio Adjustments. *Gather and remove excess wild burros, utilizing all BLM-approved gather methods, use fertility control vaccine treatments and adjust sex ratios to reduce population growth to achieve and maintain AML.*

Under Alternative A, the BLM proposes to, over a period of 10 years from the initial gather, reduce the Black Mountain HMA herd size to AML (478 adult burros) using a range of tools that include removal of excess burros and use of fertility controls to slow down the rate of reproduction. To reach AML, it is currently estimated that 1,727 excess wild burros would be removed from areas in and adjacent to the HMA. All excess wild burros residing in areas outside of the HMA would be gathered and removed. Once AML is reached, BLM would maintain approximately 287 males and 191 females in the HMA to achieve a 60/40 male to female sex ratio. BLM would gather up to 100 of the 191 remaining female burros⁴ (or approximately 50%) and administer fertility control vaccines using the most current approved formula.

BLM would conduct subsequent maintenance gathers as necessary over the 10-year period to remove additional wild burros to maintain the population at AML. BLM would continue to implement the fertility control components of Alternative A by adjusting the population to maintain the 60/40 sex ratio in the HMA and treat or booster 100 (or approximately 50%) of the female burros remaining in the HMA with a fertility control vaccine. The target removal numbers for follow-up gathers, fertility treatments, and sex ratio adjustments would be adjusted based on periodic monitoring and population inventories for the Black Mountain HMA. The combination of these actions is intended to lower the population growth rate within the HMA in order to extend the intervals between removals.

Genetic monitoring samples have been collected and are currently awaiting analysis by Texas A&M University to determine current levels of genetic diversity (i.e., observed heterozygosity) for this herd. The analysis is not expected to be available until mid-2020. However, based on known seasonal movements of the burros within the HMA and current herd size, it is expected that the burro herd would maintain adequately high levels of observed heterozygosity, which is the measure of genetic diversity BLM uses in genetic monitoring. If future monitoring results indicate that levels of heterozygosity are lower than desirable, then BLM may choose to bring additional burros into the HMA to supplement genetic diversity.

2.2 Alternative B

Selective Removal of Excess Wild Burros to AML and Population Growth Control using Fertility Control Vaccines, Sex Ratio Adjustments, and Gelding a Portion of the Male Population.

⁴ The female burros that are currently being treated with the PZP vaccine in the HSUS Pilot Project (<https://go.usa.gov/xVkye>) would be included as part of the 100 treated females until the completion of the HSUS Pilot Project.

Alternative B is the same as Alternative A but would also include gelding as a component of the fertility control treatments, along with selective removal of excess wild burros to AML, sex ratio adjustments, and population growth control using fertility control vaccines in females.

Once AML is achieved, approximately 100 of the 287 male burros remaining in the HMA would be gelded and released. BLM would conduct follow-up gathers as necessary over a 10-year period to maintain approximately 100 geldings in the HMA. It would be expected that additional burros may need to be gelded every four to five years. Any follow-up gathers would be conducted in a manner consistent with those described under Alternative A. The gelding operations would be conducted in accordance with methods identified in Appendix E.

2.3 Alternative C

Selective Removal of Excess Wild Burros to AML, and Population Growth Control using Fertility Control Vaccines Only.

Alternative C is the same as Alternative A but would not include sex ratio adjustments. Alternative C would include selective removal of excess wild burros to AML and population growth control using fertility control vaccines only. Additionally, the number of females treated with fertility control would be increased from 100 to 150 females to take in account the increased number of females remaining in the HMA. Any follow-up gather activities during the subsequent phases of this alternative over the 10-year period would be conducted in a manner consistent with those described under Alternative A, but without any sex ratio adjustments.

2.4 Alternative D

Gather and Remove Excess Animals to AML without Fertility Control or Sex Ratio Adjustment.

Alternative D is the same as Alternative A but would not include fertility control vaccines or sex ratio adjustments. Under Alternative D, gather operations, achievement and maintenance of AML, and maintenance gathers would be conducted as described in Alternative A. However, no fertility control or sex ratio adjustment would be used. Assuming a 50/50 sex ratio (239 males and 239 females) at AML (478) with no fertility control or sex ratio adjustments, 239 females could have foals. Using the standard estimated 15% annual growth rate, this equates to approximately 71 burros ($478 \times 0.15 = 71$) needing to be removed annually to maintain the population at or near AML. Compared to Alternatives A, B, and C, gather frequency would need to be increased under Alternative D to maintain the population at AML and more burros would need to be removed and placed into the BLM adoption program.

2.5 No Action Alternative

Under the No Action Alternative, individual nuisance gathers would continue to occur to address nuisance complaints and public safety concerns. The HSUS Pilot Project would continue until completed. Gathers to remove excess wild burros would not occur. There would be no active management to control the size of the wild burro population, control growth rates, or manage the wild burro population at AML. The wild burro population would likely continue to increase at an approximate rate of 15% per year. Within five years, the wild burro population could exceed 3,800 (see Table 3), which would be 706% above AML. Wild burros residing outside the HMA

would remain in areas not designated for management of wild burros and population numbers would continue to increase. Increasing numbers of excess wild burros crossing highways and impacting private lands would intensify the current wild burro/public safety concerns.

Table 3: Population Growth Estimate (No Action Alternative)

Year	Population Estimate	15% Net herd Growth (Births minus Deaths) ⁵	Estimated Number of Burros Over AML
2020, January	2,205	330	1,727
2021, January	2,535	380	2,057
2022, January	2,915	437	2,437
2023, January	3,352	502	2,874
2024, January	3,854	578	3,376

The No Action Alternative would not be in conformance with existing laws and regulations which require the authorized officer to remove excess animals immediately upon determination that excess wild burros are present and their removal is necessary. Although the No Action Alternative does not comply with the WFRHBA and does not meet the purpose and need for the action in this EA, it is included as a basis for comparison with the action alternatives, and to assess the effects of not removing excess burros at this time.

2.6 Management Actions Common to Alternatives A, B, C and D

The BLM proposes to gather and remove approximately 1,000 wild burros beginning in late 2020/early 2021, dropping the herd size to an estimated 1,205 adult burros. After this initial gather BLM would conduct an aerial survey, to obtain an updated population estimate. This population estimate would be used to determine the number of excess wild burros that still need to be removed. BLM expects to gather and remove approximately 727 wild burros after the completion of the survey (unless the population estimate shows a different result) for a total of approximately 1,727 animals (not including the foals eligible to be weaned 6 months or older from the 2019 foal crop) from the Black Mountain HMA to get to the established AML of 478 adult burros.

The BLM would utilize all approved gather methods, including bait trapping, helicopter drive trapping, and roping if necessary, to gather wild burros. The BLM would follow the Standard Operating Procedures (SOPs) found in Appendix F, Appendix G, and BLM Handbook 4700-1 Wild Horses and Burros Management Handbook. Gather methods would be determined on a case-by-case basis depending on access, time of year, funding, personnel availability and the difficulty of gathering the burros (due to terrain, weather, water and forage availability, and/or number of burros to be gathered).

⁵ The assumption is that these animals (births minus deaths) are added to the herd over the course of the year.

The most efficient gather technique would be chosen as determined by the gather needs of the specific area. Water or bait trapping would likely be the most used gather method. Any trapping activities would be scheduled in locations and during time periods that would be most effective to gather sufficient numbers of animals to achieve management goals for the areas being gathered. Helicopter gathers would be conducted in areas where bait trapping is not possible due to access or where other environmental conditions exist that make it difficult to bait trap. Helicopter gathers may also occur in all areas to increase gather efficiencies, as determined by the BLM. The primary focus under all action alternatives would be on gathering burros from areas where public safety is a concern (such as roadways where burro-vehicle collisions have occurred), heavily concentrated areas within the HMA with the most severe resource impacts, nuisance burros on private lands within and outside the HMA, and from Lake Mead NRA zero use areas (areas not managed for burro use).

After the HMA population is restored to AML, selective removal procedures would prioritize removal of younger excess wild burros and allow older, less adoptable, wild burros to be treated with a fertility component and released back to the HMA.

- Various factors make it impossible to remove all of the estimated 1,727 excess burros at one time. As a result, multiple gathers (combination bait and helicopter) would need to occur potentially over several years before AML is reached. Should attainment of AML take several years, the number of excess burros would likely exceed 1,727, due to the addition of new foal crops each year. The amount of time to get the population to or near AML is difficult to predict and would be based on funding, the amount of space in BLM short-term holding facilities, environmental conditions and other circumstances that may arise.
- The subsequent maintenance gather activities would be informed by ongoing monitoring and conducted in a manner consistent with those described for the initial gather.
- If the genetic diversity is determined through the analysis of baseline genetic monitoring samples, or through results of any future genetic monitoring, to be relatively low, then fertile burros from other HMAs could be introduced into the Black Mountain HMA herd to augment genetic diversity throughout the HMA
- Range rehabilitation (such as reseeding, vertical mulching, scarification, etc.) may occur as needed at trap sites and/or temporary holding facilities to prevent the introduction of invasive species.
- Gather operations could involve non-HMA areas immediately adjacent to the Black Mountain HMA boundary, such as near the Bullhead City limits and Lake Mead NRA.
- While in the temporary holding corral, burros would be identified for removal or released based on age, gender and/or other characteristics in order to maintain a diverse age structure, herd characteristics, and confirmation (body type).
- BLM does not intend to remove any burros directly involved in the HSUS Pilot Project. Those females are identifiable because of existing freeze marks. However, upon

completion of the HSUS Pilot Project these burros may be selected for removal. Foals belonging to females involved in the project (females with freeze marks) may be removed if old enough to be weaned during the initial removal efforts. Burros involved in the HSUS Pilot Project may be transported to a gather-related, temporary holding facility until the completion of the gather or may be immediately released, depending on the circumstances.

- BLM would continue rangeland health and population monitoring for the HMA in accordance with the BMEMP.

2.7 Management Actions Common to Alternatives A, B, and C

In addition to the management actions discussed in Section 2.6, Alternatives A, B, and C would involve the following:

Fertility Control Treatment, Field Darting

- All burros that are selected to be treated with fertility control would be transported to a BLM holding facility or off-range corral, aged, microchipped (in the nuchal ligament) and freeze marked (numerical hip number left and right hips) for identification prior to being released. Freeze marking and microchipping would help identify the animals for future record keeping about vaccine treatment histories. Marking may also help with future assessments of fertility control treatment efficacy, though that is not a requirement of these alternatives.
- Female burros would be held and treated with an approved fertility control vaccine as per the respective schedule or treatment plan and then be released back into the HMA near where they were gathered. To help improve the efficacy and duration of the fertility control vaccine, females could be held for an additional 30 days and given a booster shot prior to release. Females selected for fertility control that have foals that are not old enough to be weaned would be returned to the HMA together with their foal.
- All females selected for fertility control treatment would meet the age requirement of 2-15 years old.
- Immuno-contraceptive treatments would be conducted in accordance with approved standard operating and post-treatment monitoring procedures (as described in Appendix H, or future updates). Male and female burros returned to the range would be selected to maintain a diverse age structure, herd characteristics and conformation (body type).
- The subsequent maintenance gather activities to implement fertility control vaccines would be conducted in a manner consistent with those described for the initial gather and ideally would be conducted between November through February which is identified as the period of maximum effectiveness for fertility control vaccine application in equines. Funding limitations and competing priorities might impact the timing of maintenance gathers and population control components of the action alternatives.
- Additional females would be selected for fertility control treatment during subsequent

maintenance gathers, to take the place of females lost due to natural mortality or females that can no longer be effectively treated (because the vaccine effects have worn off) by the time of those gathers or animals that no longer meet the age requirement or have been on the vaccine too long.

- Preliminary data from the HSUS Pilot Project indicates that burros can be vaccinated successfully in a remote setting via darting. It is not clear yet what level of effort is required to treat females on a schedule that would maintain their infertility. If the final results from the HSUS Pilot Project confirm that burros can be successfully darted in a remote setting, BLM could administer follow up fertility control vaccine (booster doses). These booster doses would be administered to the burros based on the effort required to effectively deliver the fertility control vaccine. If there is an opportunity to remotely dart a female(s) prior to the results of the project being released, BLM may choose remote delivery rather than capture for booster vaccines. Management decisions about how much remote darting would be used as opposed to hand-injections of captured animals would depend on available funding, staff time, and BLM determinations after the conclusion of the HSUS Pilot Project. This method is currently approved for use and is being used by BLM in other HMAs on horses.

2.8 Management Actions Common to Alternatives A and B

In addition to the management actions discussed in Sections 2.6 and 2.7, Alternatives A and B would involve the following:

- The sex ratio of the herd would be skewed to 60% males to 40% females to attempt to reduce the population growth rate (see Appendix D).
- In addition to the 76 vaccinated females currently part of the HSUS Pilot Project, an additional 24 females would be vaccinated, for a total of 100 fertility control treated animals in the HMA. The HSUS Pilot Project burros may receive a booster at the trap site depending on their treatment status. The control animals identified in the pilot project would not be included in the 100 treated females initially but may be included upon the completion of the HSUS Pilot Project. Upon completion of the HSUS Pilot Project, BLM would continue to treat and maintain approximately 100 females in the HMA with fertility control.

2.9 Alternatives Considered but Eliminated from Detailed Analysis

2.9.1 Use of Fertility Control Only, No Removals

Population effects of contraception have been modeled in wild horses. Fewer demographic studies exist for feral burros than for feral horses (Ransom et al. 2016), but fertility and survival rates are comparable enough that it is reasonable to infer that fertility control could lead to comparable effects in wild burros as it does in wild horses. Contraception by itself does not remove excess horses or burros from an HMA's population, so if a wild horse or burro population is in excess of AML, then contraception alone would not fully address the continuing environmental effects of horse or burro overpopulation. Successful contraception reduces future reproduction. The current burro herd size is many times greater than AML and is causing unacceptable levels of resource damage to the rangeland ecosystem. Contraception alone would

not reduce ongoing damage until after many years in which deaths on the range outnumber surviving foals. Unless approximately 80% or more of females are vaccinated every year, the burro herd would continue to grow (based on Garrott 1991, assuming that burro demography is reasonably comparable). Depending on the vaccine used, maintaining such high vaccination rates would require annual gathers of nearly the entire herd, which would be costly and logistically difficult. Even if BLM gathered the majority of the herd every year in order to maintain that vaccination rate, some removals would still be needed in order to reach AML within a decade.

This alternative would not meet the purpose and need for action. The wild burro population would not be brought back to AML soon enough to prevent continued heavy resource damage. Even if reproduction was brought to zero through the use of fertility control (an outcome that is extremely unlikely), resource concerns would continue to escalate. Implementation of this alternative would result in increased gather and fertility control costs without achieving a TNEB or resource management objectives.

2.9.2 Use of Bait and/or Water Trapping Only

The Black Mountain HMA contains three wilderness areas for a total of approximately 164,000 acres, all of which are roadless. The use of bait and water trapping in these areas would be very limited due to the lack of access for pickup and transportation of animals from the trap sites. Burros would only be caught when and if they left the wilderness area. Additionally, bait trapping requires specific conditions (limited forage and water sources on the range) that are conducive to capturing burros via trap. If these conditions do not exist, or are impacted by rains, the trapping success rate is significantly reduced. Bait trapping, while effective in specific conditions, would not be cost-effective or practical to meet gather criteria relative to range conditions in the Black Mountain HMA. This alternative would not succeed in reducing the number of excess burros in the area and thus would not meet the purpose and need for action.

2.9.3 Raising or Lowering the Appropriate Management Levels for Wild Burros

The BLM established the AML based on many years of data collection, resource monitoring, and multi-agency planning efforts. The current AML is based on established biological and cultural resource monitoring protocols and land health assessments and was approved in the BMEMP and the Kingman RMP. Delay of a gather until the AML can be reevaluated is not consistent with or required by the WFRHBA, Public Rangeland Improvement Act of 1978 (PRIA), FLPMA, the BMEMP EA, or the existing RMP. Monitoring data collected within the HMA does not indicate that an increase in AML is warranted at this time. On the contrary, such monitoring data confirms the need to remove excess wild burros to reverse downward resource trends and promote improvement of rangeland and riparian health. Even if the AML were reevaluated at this time, it would be highly unlikely that AML would be increased enough to accommodate the current population due to the utilization limits set in the BMEMP being exceeded (see vegetation and soil resources Section 3.3.2). Additionally, severe resource degradation would continue occur during the time it takes to recalculate AML, and large numbers of excess animals would ultimately need to be removed from the HMA in order to achieve AML or to prevent the death of individual animals under emergency conditions. This alternative was eliminated from further consideration because it is contrary to the WFRHBA which requires the BLM to manage the rangelands to prevent resources from deterioration associated with an overpopulation of wild horses and burros. In addition, raising the AML where there are known resource degradation

issues associated with the current overpopulation of wild burros does not meet the purpose and need to restore and maintain a TNEB.

Once the current AML has been achieved and maintained, and future data suggests that adjustments in the AML are needed (either upward or downward) then changes could be made based on an analysis of monitoring data, including a review of wild burro habitat suitability, such as the condition of water sources in the HMA. For the reasons stated above, this alternative was eliminated from further consideration.

2.9.4 Remove or Reduce Livestock within the Black Mountain HMA

This alternative would remove or reduce authorized livestock grazing instead of gathering and removing wild burros within the HMA. This alternative was not considered in detail because it is outside of scope of this project and contrary to previous decisions which allocated forage for livestock use. Changes in livestock management would not be in conformance with the RMP or the WFRHBA, which directs the Secretary to immediately remove excess wild horses and burros once BLM has determined removal is necessary to achieve TNEB. Livestock grazing can only be reduced or eliminated through provisions identified within the grazing regulations (43 CFR 4100) and must be consistent with multiple use allocations set forth in the RMP. This alternative would be contrary to the BLM's multiple-use mission as outlined in FLPMA because this alternative would exchange use by livestock for use by wild horses. The BLM is required to manage wild burros in a manner designed to achieve a TNEB between wild horse and burro populations, wildlife, livestock, and other uses.

2.9.5 Use of Alternative Capture Techniques Instead of Helicopter Capture

Gather and capture methods other than helicopter can include chemical immobilization, net gunning, and wrangler/horseback drive trapping as potential methods for gathering wild burros. Net gunning techniques normally used to capture big game animals also rely on helicopters. Chemical immobilization is a very specialized technique and strictly regulated. It would be impractical to implement either of these methods given the size of the project area, access limitations, and difficulties in approaching the wild burros.

Use of wrangler on horseback drive trapping to remove excess wild burros can be effective on a small scale and under certain geographic conditions. However, given the number of excess wild burros to be removed, the large geographic size of the Black Mountain HMA gather area, access limitations, and difficulties in approaching the wild burros, this technique would be ineffective and impractical. Horseback drive trapping is also very labor intensive. None of these techniques would succeed in removing sufficient numbers of burros to restore AML and thus the purpose and need for the project would not be met. For these reasons, these alternative capture techniques were eliminated from further consideration.

2.9.6 Designation of the HMAs to be Managed Principally for Wild horses or Burros

Under 43 CFR 4710.3-2, this action would require amendment of the Kingman RMP and revisions to the BMEMP, both of which are actions outside the scope of this EA. Only the BLM Director or Assistant Director (as per BLM Manual 1203: Delegation of Authority) may establish a Wild Horse and Burro Range after a full assessment of the impact on other resources through the land-use planning process. Wild Horse and Burro Range is not an "exclusive" designation. Designation would not necessarily exclude livestock or other public multiple-use

uses; therefore, levels of livestock grazing permitted could remain the same. This alternative is also inconsistent with the BLM's multiple use management mission under FLPMA. Changes to or the elimination of livestock grazing cannot be made through a wild horse gather decision.

2.9.7 Release and Relocation of Burros to New Areas

As stated in the BLM's Land Use Planning Handbook (H-1601-1, Appendix C, Page 7), HMAs and HAs are limited to areas of the public lands that have been designated as habitat for wild horses and burros at the time of the passage of the WFRHBA. Relocating animals to areas outside of existing HMAs and HAs would violate BLM policies and other federal regulations.

Relocating nuisance wild burros to other areas within the HMA or other HMAs in Arizona is not a viable alternative since all HMAs in Arizona are currently overpopulated based on current population estimates. Wild burros that are outside of the HMA/HA would continue to be removed under separate nuisance gathers at the landowner's request.

CHAPTER 3 AFFECTED ENVIRONMENT/ENVIRONMENTAL CONSEQUENCES

3.1 General Project Setting

The Black Mountain HMA is located in northwestern Arizona and occupies the western third of Mohave County. The area parallels the eastern shoreline of the Colorado River for approximately 80 miles, from Hoover Dam on the north end to Interstate 40 on the south end. The Black Mountain HMA is the largest HMA in Arizona, with about one million acres of Mojave Desert scrub and Grand Canyon Desert scrub.

This geographic province is primarily formed from volcanic origin, mostly basalt, and is characterized by large mesas, steep cliffs, slopes, rocky foothills, alluvial fans, and sandy washes. The highest point in the Black Mountain range is Mount Perkins at 5,456 feet. The average elevation of the Sacramento Valley to the east is 2,000 feet. The Mojave Valley to the west is much lower in elevation, with the Colorado River flowing at an average elevation of 540 feet. The Range of climate throughout the HMA is warm, windy and dry, with summer temperatures exceeding 120 degrees Fahrenheit in the lower elevations and winter temperatures reaching as low as 25 degrees Fahrenheit or less. Along the Colorado River, the area receives approximately three inches of rainfall per year and at the higher points of elevation (peaks) as much as 12 inches of rain annually.

Three wilderness areas (Mt. Wilson, Mt. Nutt, and Warm Springs) exist within the HMA (see Appendix C, Figure 4). The Wilderness areas exhibit a rugged topography and support a wide variety of animals, including a large herd of desert bighorn sheep.

Two Areas of Critical Environmental Concern (ACECs) exist within the HMA, the Black Mountains Ecosystem Management ACEC covering approximately 114,242 acres of public lands and the Bullhead Bajada Natural and Cultural ACEC covering approximately 7,090 acres of public lands (see Appendix C, Figure 4). The Black Mountains Ecosystem Management ACEC provides for bighorn sheep, wild burro, and Cerbat beard-tongue (a federal candidate plant species) habitat, as well as outstanding scenic values and open space and includes rare and outstanding cultural resources. The Bullhead Bajada Natural and Cultural ACEC provides for

historic and prehistoric resources and habitat for the state-listed Sonoran Desert tortoise and other special status and sensitive species.

3.2 Resources and Uses

Table 4 summarizes the environmental resources that would be affected by the proposed project and rationale for whether the topic will be carried forward for detailed analysis. Those resources or uses that the resource specialists on BLM’s interdisciplinary team (IDT) determined not present or present but not affected by the alternatives are not carried forward or discussed further. Resources or uses determined to be present that may be affected are carried forward in the document for detailed analysis.

Table 4: Resources and Uses

Resource or Use	Present Yes/No	May Be Affected Yes/No	Rationale for Non-analysis	Analyzed in Section
Access	Y	N	Some temporary access restrictions in areas could occur while gathers are being conducted. These are expected to be of a short duration (typically less than 12 hours at a time) and possibly for consecutive days in some areas. During temporary restrictions, alternative access options would be provided by the BLM on-site as necessary. As these access restrictions would be sporadic and temporary in nature, and alternative access would be provided, the effects to access would be negligible.	--
Air Quality	Y	N	Air quality is not expected to be impacted by the action alternatives. Areas of disturbance would be small and temporary. Fugitive dust from travel on dirt/gravel roads would occur, but no air quality standards would be exceeded.	--
Areas of Critical Environmental Concern (ACEC)	Y	Y	There are two ACECs within the Black Mountain HMA, as described in Section 3.1 above. Trap site locations would be located in disturbed sites and avoid any potential conflicts with sensitive habitat or specific cultural resources with an ACEC. ACEC locations are depicted on Figure 4 in Appendix C. A cultural resource specialist and wildlife biologist would be consulted as to the timing of the gather and where trap site locations can be placed without causing conflict to the ACEC values (refer to Kingman RMP) within the gather area. Cultural resource values within the ACECs would be avoided and therefore not affected by any of the action alternatives. Impacts to ACEC values, pertaining to wildlife are analyzed in the Wildlife Resources section of this document.	Wildlife 3.3.4
Special Status Species	Y	Y	Analyzed in document.	Vegetation 3.3.2 Wildlife 3.3.4

Resource or Use	Present Yes/No	May Be Affected Yes/No	Rationale for Non-analysis	Analyzed in Section
Cultural Resources	Y	N	A number of known cultural resources exist within the Black Mountain HMA that would be avoided during the gather in accordance with gather SOPs. Trap sites and holding facilities located in areas that have not been surveyed would be surveyed before the gather begins to prevent any effects to cultural resources. If unanticipated cultural resources are discovered during the trapping process at the capture sites, trapping would cease immediately, and the Authorized Officer would be notified.	--
Environmental Justice	N	N	There are no low-income, minority, or tribal populations within the area that would experience disproportionate impacts from implementing any of the alternatives.	--
Farmlands (Prime and Unique)	N	N	Resource not present.	--
Fire Management	N	N	No impacts to fire management activities would occur.	--
Fish Habitat	Y	N	Project would not occur in suitable fish habitat.	--
Floodplains	N	N	No floodplains have been identified within the project area.	--
Forestry Resources and Woodland Products	N	N	Resource not present	--
Human Health and Safety	Y	Y	Analyzed in document.	3.3.6
Land Use Authorizations	Y	N	Lands and realty authorizations would not be affected as existing roads would be utilized.	--
Lands with Wilderness Characteristics	Y	N	Lands with wilderness characteristics have been identified and inventoried within the project area. However, the action alternatives would not impact these characteristics or change the finding of wilderness characteristics, therefore lands with wilderness characteristics would not be affected.	--
Livestock Grazing Management	Y	Y	Analyzed in document.	3.3.5

Resource or Use	Present Yes/No	May Be Affected Yes/No	Rationale for Non-analysis	Analyzed in Section
Migratory Birds	Y	Y	Analyzed in document.	3.3.4
Mineral Resources	Y	N	Mining/minerals actions would not be impacted by the alternatives as no gathers would occur in active mining areas.	--
Native American Religious Concerns/ Traditional Values	Y	N	The Black Mountains have a variety of important cultural resources including sites of traditional religious and cultural value to local Native American Tribes. The project area includes the ancestral lands of several Indian tribes including the Mohave, Hualapai, and Yavapai. Consultation has been initiated with the local tribes to determine the level of interest in this project and desire for formal consultation on the project. Trap sites would be placed to avoid known cultural resources.	--
Non-native, Invasive Species	Y	Y	Analyzed in document.	3.3.2
Paleontological Resources	Y	N	The alternatives would not impact paleontological resources as there would be minimal surface disturbance associated with any alternative.	--
Recreation	Y	N	Activities associated with the action alternatives would not impact recreational opportunities such as motorized touring (see access addressed above), hunting, non-motorized uses and other dispersed recreational opportunities as capture operations would be dispersed in isolated locations throughout the HMA. Activities would take place over a short duration (typically less than 12 hours in any one (1) location) and be in conformance with the Kingman RMP (BLM 1995) and BMEMP (BLM 1996) for the management of recreational resources. Users of public lands would still have access to use their public lands for the aforementioned activities with little to no interruption. Although users may be temporarily displaced, there are readily available tracts of public lands located nearby that provide similar or substantially the same opportunities as those available on temporarily inaccessible tracts of public lands. Therefore, recreational opportunities are not affected nor are the beneficial outcomes for which BLM is managing.	--
Socioeconomics	Y	N	The action alternatives would not contribute to the local populations or tax-base of local communities	--

Resource or Use	Present Yes/No	May Be Affected Yes/No	Rationale for Non-analysis	Analyzed in Section
			on a long-term basis, therefore there would be negligible impacts to socioeconomics.	
Soil Resources	Y	Y	Analyzed in document.	3.3.2
Threatened or Endangered Species	Y	N	There would be no effect to Threatened, Endangered, Proposed, or Candidate Species, or to Critical Habitat as activities would occur outside of suitable habitat.	--
Travel and Transportation Management	Y	N	All vehicular or off-highway vehicle travel would be along existing roads, trails, and navigable washes and therefore not create additional routes or conflicts with the management of travel and transportation resources on public land. There would be no cross-country travel associated with any of the alternatives.	--
Vegetation Resources	Y	Y	Analyzed in document.	3.3.2
Visual Resources	Y	N	The alternatives would not include any long-term ground-disturbing activities. Impacts would be minimal (short term) and would not impact the characteristic landscape and therefore would comply with visual resources management Class I, II, III, and IV management objectives.	--
Wastes, Hazardous or Solid	N	N	The alternatives would not use or introduce any hazardous or solid wastes.	--
Water Resources	Y	Y	Analyzed in document.	3.3.3
Water Quality (Surface/Ground)	N	N	The project would not impact water quality (Surface/Ground)	--
Wetlands/ Riparian Zones	N	N	There are no wetland or riparian zones within the project area, springs are addressed in the water resources section.	--
Wild and Scenic Rivers	N	N	Wild and scenic rivers do not occur in the project area.	--
Wild Horses and Burros	Y	Y	Analyzed in document.	3.3.1
Wilderness	Y	N	Wilderness areas are located within the Black Mountain HMA and are depicted on Figure 3 in Appendix C. Portions of temporary trap sites may	--

Resource or Use	Present Yes/No	May Be Affected Yes/No	Rationale for Non-analysis	Analyzed in Section
			be located within wilderness but would conform to BLM wilderness policy and BLM Manual 6340 Management of BLM Wilderness. Corrals (traps) would not be set up in wilderness; however, the wings for helicopter drive traps may extend into wilderness. Additionally, all capture operations would be in conformance with the Wilderness management prescriptions found in the BMEMP (BLM 1996) and BLM Manual 6340 Management of BLM Wilderness.	
Wildlife	Y	Y	Analyzed in document.	3.3.4

3.3 Resources/Issues Brought Forward for Analysis

The potential impacts to the resources and resource uses listed in the tables above were evaluated by the IDT to determine if detailed analysis would be necessary. Those resources that were determined to warrant detailed analysis in this EA are discussed and analysis provided below.

3.3.1 Wild Burros

Affected Environment

What are now managed by BLM as wild burros were first introduced to the Black Mountains in Arizona by miners and prospectors in the early 1860s. With few natural predators, the burros have thrived in this environment. Wild burros are medium-sized ungulates that can use a variety of terrain including flat areas as well as the steep, rugged terrain usually associated with desert bighorn sheep. Typically, wild burros are opportunistic grazers that can efficiently use coarse, lower quality forage (BLM 1996). Wild burros are a long-lived species with documented survival rates that may exceed 92% for all age classes, and they do not self-regulate their population size, except through periodic die-offs when resource availability is extremely low (NRC 2013). Across the desert southwest, mountain lions are thought to be the only predator that predate on wild burros with any frequency, but that frequency is thought to be low (reviewed in Douglas and Hurst 1993). Burros have been reported with claw marks from mountain lion attacks (Erick Lundgren, unpublished data), but the frequency of predation by lions has apparently not slowed down the burro herd growth rate in Black Mountain HMA in recent years. Therefore, it is not thought that mountain lion density is high enough in the Black Mountain HMA to cause substantial mortality in the burro herd. Coyotes are not prone to prey on wild burros unless young, or extremely weak. Other predators such as a wolf or bear do not exist in this HMA. No information exists to suggest that disease would substantially reduce burro herd growth in the Black Mountain HMA now or in the future. Wild burros are protected, managed, and controlled by the federal government under the authority of the WFRHBA, as amended, to ensure healthy herds thrive on healthy rangelands. The WFRHBA and FLPMA require that the BLM care wild burros as part of its multiple-use and sustained yield mission.

The Black Mountain HMA wild burro population was most recently surveyed by helicopter in 2014, in cooperation with the Arizona Game and Fish Department and the NPS. Data collected

during the surveys was analyzed by the US Geological Survey (Griffin 2015). The survey indicated a total population range from 1,517 to 1,827, which averaged 1,672 burros (including adults and foals). Of the 1,672 total burros, 1,389 were estimated to be adults and 283 as foals.

The HMA is divided near the center by State Route 68 and due to adverse weather conditions the survey was divided into two phases, spring and fall. State Route 68 serves as a natural barrier to burro movement between the north half and south half of the HMA. Burro crossings do occur near Bullhead City and Golden Valley, and at some underpasses along the highway or through the right-of-way fence, however these crossovers are intermittent near Bullhead City and are very minimal in the Golden Valley area. The northern part of the HMA, north of State Route 68 was surveyed in the spring. The southern part of the HMA, south of State Route 68 was surveyed in the fall. There were 298 unique groups of burros recorded throughout the HMA, with group sizes ranging from one to 33 burros (see Appendix C, Figure 5).

Three different types of analysis used the data collected during the 2014 helicopter population survey, i.e. Lincoln Peterson technique using area correction, Lincoln Peterson technique not using area correction, and the Huggins analysis utilizing sighting covariates (Griffin 2015). The analysis concluded that there was no way to determine which estimate from those three approaches was the most accurate. To determine the estimated overall population size in the HMA for 2014, BLM averaged the estimate from the Lincoln Peterson technique not using area correction and the estimate from the Huggins analysis. The Huggins analysis led to an estimated 1,517 burros within the HMA and the Lincoln Peterson not using area corrections led to an estimated 1,827 wild burros, with an average between the two numbers being 1,672 wild burros estimated for 2014 in the Black Mountain HMA which includes both adults and foals.

A 15% annual growth is a typical expectation that is also used for many other BLM-managed burro herds. BLM considers that an annual growth rate of 15% is a reasonable expectation for the Black Mountain HMA herd. This rate reflects the addition of new animals to the herd (i.e., births and immigrants) as well as mortalities and emigrants. During the 2014 spring survey effort in the northern portion of the HMA, the Lincoln-Peterson survey estimate was 245 burros and the Huggins estimate was 296 burros, resulting in an estimated total number of burros at 270. Because the estimated number of foals per adult in the north was 0.17 in that spring survey, the north had an estimated 39 foals and 231 adults. During the 2014 fall survey effort in the southern portion of the HMA, the Lincoln-Peterson estimate was 1,582 burros and the Huggins estimate was 1,221 burros, resulting in an estimated total number of burros of 1,401. Because the estimated number of foals per adult in the south was 0.21 in that fall survey, the north had an estimated 243 foals and 1,158 adults.

Overall, the estimated number of adults in the HMA in 2014 was 1,389. Applying an expected 15% annual growth rate to the 1,389 adults present in 2014 leads to an estimated herd size of 1,597 by the spring of 2015.

It is estimated that the Black Mountain HMA wild burro population would be approximately 2,205 adult burros by early 2020 (see Table 2). This number is based on the estimated number of adults that were present in 2014, the assumption that the annual growth rate is 15% and after accounting for the burros that were removed in each year from the HMA (See Table 5). Foals born in a given year are considered adults on January 1 of the following year.

In Table 5 below, the population estimate is the expected number of adult burros at the start of the time period listed. Net Recruitment is the additional number of animals expected to be added to the herd over the following year as a result of foals born as well as adult and foal mortality. Burros Removed is the exact number of animals that were removed by BLM in the time period. The population estimate in the next time period is the previous population estimate, plus new herd growth, minus the number removed.

Table 5: Population Estimates

Year	Population Estimate (Adults)	Net Recruitment	Burros Removed
2014, Spring (survey)	1,389	208	0
January 2015	1,597	239	101
January 2016	1,735	260	58
January 2017	1,937	290	143
January 2018	2,084	312	101
January 2019	2,295	344	434
January 2020	2,205	330	N/A

Based upon all information available at this time, the BLM has determined that there would be a minimum of approximately 1,727 adult wild burros over AML by January 2020 (see Table 3) within the Black Mountain HMA. That is the estimated number of adult burros that would need to be removed in order to achieve the established AML, restore a TNEB, and prevent further degradation of rangeland resources resulting from the current overpopulation of wild burros. Rangeland resources have been and are currently being adversely affected within the Black Mountain HMA (See Appendix C, Figures 6-9).

A population inventory flight is not planned prior to the initial gather contemplated under the action alternatives since the HMA is known to be at least 1,000 wild burros over AML. A population inventory flight would be conducted after the initial gather. Besides the inherent expense and human safety concerns regarding helicopter surveys, the flights are most beneficial under specific, limited environmental conditions.

The Henneke Body Condition Chart provides a standard for assessing burro health by using a scale of 1 to 9, with 1 being poor condition, 9 being extremely fat, and 5 being moderate (ideal weight). Body Condition Scores (BCS) vary within the HMA depending on annual precipitation. During the summer of 2018, which was an unusually dry summer, burros were observed with a body score of 2 based on the Henneke Body Condition Chart. Females with foals seemed to be affected the most with several burros observed with a BCS of 2-3. The male burros seemed to not be as affected, as most were observed at a BCS of 3 and 4. Large groups of wild burros are also permanently residing outside HMA boundaries in search of resources (forage and water). Some groups reside around and on private property, as well as near Highways 66, 68, 93, and 95 causing public safety concerns for the public and motorists along the highways (see Appendix C, Figures 3 and 10-12).

Wild burros gathered from the Black Mountain HMA were sampled for genetic monitoring in 2004. Sampled animals were most genetically similar to the standard donkey breed (Cothran 2008). With respect to other BLM wild burro herds that had been sampled at that time, the Black Mountain HMA samples were most genetically similar to burro samples from Big Sandy HMA (Cothran 2008). Cothran referred to the genetic samples from Black Mountain HMA as coming from “Kingman” in his 2008 report. Cothran (2008) found that genetic variability was relatively high, compared to the mean value for feral burros. Cothran (2008) noted that, “the Black Mountain AML is 478 for burros. This number should produce a very low rate of loss of variation.” He also noted that, “The Kingman population...has an AML that should require no action if population size is maintained.” Observed heterozygosity was high enough to suggest that inbreeding was not a problem at that time (Cothran 2008), and the herd has generally grown since then, to its present large herd size, which is far greater than AML. Compared to the rate of loss of genetic diversity in a population of a constant size, genetic diversity decreases more slowly in a population that starts at the same given size but grows rapidly. This is a result of the mathematical and empirical expectation that larger populations lose heterozygosity more slowly than smaller populations (Hartl and Clark 2007). The approximate loss per generation of observed heterozygosity is inversely proportionate to 2 times the genetic effective population size (Hartl and Clark 2007); for example, even if the genetic effective population size were as low as 250, then heterozygosity loss per generation would only be approximately 0.2%. In keeping with guidelines in the BLM Wild Horses and Burros Management Handbook (BLM 2010), fertile wild burros from other HMAs could be introduced into Black Mountain HMA in the future if genetic monitoring revealed an undesirably low value for observed heterozygosity.

Because of history, context, and the potential for natural or human-caused movements, wild burros that live in the Black Mountain HMA herd should not be considered to be a genetically isolated population. The National Academies of Sciences report (2013) recommended that wild horses and burros living in single HMAs should not be considered genetically isolated populations. Rather, managed herds of wild burros should be considered as components of interacting metapopulations, connected by similar ancestry and interchange of individuals and genes due to both natural and human-facilitated movements. Wild burros in the Black Mountain HMA can be considered part of a larger metapopulation (NRC 2013) that has demographic and genetic connections with other BLM-managed herds. The 2013 National Academies of Sciences report included additional evidence that shows that the Black Mountain HMA herd is not genetically unique, with respect to other wild burro herds. Appendix F of the 2013 NRC report shows the estimated 'fixation index' (F_{st}) values between 25 pairs of samples from wild burro herds that had been genotyped up to that time. F_{st} is a measure of genetic differentiation, in this case as estimated by the pattern of microsatellite allelic diversity analyzed by Dr. Cothran's laboratory. Low values of F_{st} indicate that a given pair of sampled herds has a shared genetic background; the lower the F_{st} value, the more genetically similar are the two sampled herds. Values of 0.10 indicate only a modest level of differentiation; F_{st} values for the Black Mountain HMA wild burro herd had pairwise F_{st} values that were less than 0.10 with 9 of the 24 other sampled herds. Only if values are above about 0.15 are any two sampled subpopulations considered to have evidence of significant differentiation (Frankham et al. 2010). Along with BLM's prerogative to move animals between herds to augment genetic diversity, these results lend further support to the interpretation that wild burros in Black Mountain HMA are relatively

similar to other wild burro herds, as part of a connected metapopulation that includes wild burros in other HMAs.

Diet/dietary Overlap with Other Species

The dietary overlap between wild burros and cattle is much higher than with wildlife, and averages between 60 and 80% (Hubbard and Hansen 1976, Hansen et al. 1977, Hanley 1982, Krysl et al. 1984, McInnis and Vavra 1987). Ruminants, especially cattle, must graze selectively, searching out digestible tissue (Olsen and Hansen 1977). As cecal digesters, burros are one of the least selective grazers in the West because they can consume high fiber foods and digest larger food fragments (Hanley and Hanley 1982, Beever 2003). A gather would ultimately benefit wild burros and rangeland resources. Removal of excess wild burros would allow for reduced competition for the remaining resources left on the range. Removal of excess wild burros would ensure that individual animals do not perish due to starvation, dehydration, or other health concerns related to insufficient feed and water. Additionally, a gather would remove excess wild burros while they remain in adequate health to transition to feed.

Environmental Effects of Alternative A

Alternative A would remove excess wild burros within, adjacent to, and outside the Black Mountain HMA, HA and Lake Mead NRA boundaries to achieve the AML of 478. All wild burros residing outside the HMA or in areas where they are creating public safety nuisance issues would be removed. Successful implementation of the fertility control and sex ratio components of this alternative requires the HMA be gathered to below the AML in the short term, but burros selected for fertility control would be released back into the HMA very quickly after being treated with fertility control which would restore the herd size to AML.

A sex ratio adjustment within the HMA is designed to reduce the number of fertile females in the HMA. Achieving the 60% male to 40% female sex ratio out on the range and replacing some of the removed females with male burros allows BLM to reduce the population growth rate and should reduce the number of excess animals to be gathered, treated and removed during future maintenance gathers.

Successful implementation of Alternative A should reduce the population growth rate by nearly half or more when the HMA is at AML. By utilizing fertility control and sex ratio adjustments, there would be 91 fertile females in the HMA which should result in approximately 27 foals per year; this would be a 62% reduction in annual population growth.

Removal of excess animals, coupled with reduced reproduction as a result of fertility control and sex ratio adjustments, would result in improved herd health, as measured by the body condition of females, foals, and jacks in the wild. Competition for forage and water between burros, livestock, and wildlife would be reduced. Less competition for forage and water resources would reduce stress and promote healthier animals. Additionally, reduced reproduction rates would be expected to extend the time interval between gathers and reduce disturbance to individual animals as well as herd social structure (that is, jenny and foal) over the foreseeable future.

Reduced competition would reduce stress and fighting for limited resources (water and forage) and promote healthier animals. With this reduced stress on resources, burros may not wander as

much into the nearby roadways or communities thereby increasing burro and public safety.

Helicopter/ Bait and Water Trap Impacts to Wild Burros

The following activities, when conducted as part of Alternative A, could lead to stress (defined here as emotional distress or physical discomfort) for individual burros:

- Capture and/or re-capture,
- Sorting, separation between males and females and transportation to temporary holding facilities,
- Identification process, to include freeze marking and microchipping,
- Administering fertility control vaccines and/or the booster vaccine, and
- Holding in captivity for approximately 30 days for vaccination and booster treatments.

All gather operations would be conducted in accordance with the Comprehensive Animal Welfare Program (CAWP) for Wild Horses and Burro Gathers⁶. Handling of the wild burros, such as during sorting and freeze marking, could result in stress or injury to the animal(s). By utilizing the measures included in the CAWP the likelihood of stress or injury to burros is minimized.

The rates of certain impacts to herds and individual animals resulting from wild horse and burro gathers can vary and have been summarized in published studies (Hansen and Mosley 2000, Ashley and Holcomb 2001, GAO 2008, Greene et al. 2013). Since the time of those studies, BLM adopted the CAWP to minimize impacts to gathered wild horses and burros. Burros are generally thought to be calmer than horses (Burden and Thiemann 2015). Burros typically calm down quickly (within a few minutes of the capture crew's arrival), whether the trap method is bait trapping or helicopter drive trapping (personal communication John Hall). The most important social groups for burros are mother-foal pairs. More transient burro social groups may be split when female burros and their foals are separated from males with whom they were temporarily associating. Regarding separating burros from temporary social groups, Boyd et al. (2016) wrote that there are "...no permanent or long-lasting bonds between any two individuals other than between an adult female and her current foal." Mothers would not be separated from their attendant foal once captured. The proposed bait and/or water trapping in this area is a low stress approach to gathering wild burros, such trapping can continue into the foaling season without harming the females or foals. Stress on the males and/or the mother/foal pairs is expected to be minor and temporary.

Indirect impacts can occur to burros after the initial stress event (capture) and could include miscarriages/or kicking bruises. Burros may potentially strike or kick gates, panels or the working chute while in corrals or traps, which may cause injuries. Additionally, the capture and release method of burros could result in capture-avoidance behaviors from the animals. Additional indirect individual impacts may include events such as the brief skirmish which occurs among jacks following sorting and release into the stud pen, which typically lasts less than a few minutes and ends when one stud retreats. Traumatic injuries usually do not result

⁶ BLM Washington Office (WO) Instruction Memorandum (IM) 2015-151, "Comprehensive Animal Welfare Program for Wild Horse and Burro Gathers" <https://www.blm.gov/policy/im-2015-151>

from these conflicts. These injuries typically involve a bite and/or kicking with bruises, which do not break the skin. Like direct individual impacts, the frequency of occurrence of these impacts among a population varies with the individual animal.

Sometimes, foals are gathered that were orphaned on the range (prior to the gather) because the mother rejected it or died, or for other unknown reasons. These foals are usually in poor, unthrifty condition. Also depending on the time of year, reproductive cycle and the individual female, the foal may have already been weaned by its mother. Any orphans encountered during gathers are cared for promptly and rarely die or need to be euthanized.

A few foals may be orphaned during gathers. This may occur due to:

- The jenny rejects the foal. This occurs most often with young mothers or very young foals,
- The foal and mother become separated during trapping, and cannot be matched,
- The jenny dies or must be humanely euthanized during the gather,
- The foal is ill, weak, or needs immediate special care that requires removal from the mother, or
- The mother does not produce enough milk to support the foal.

In private industry, domestic burros are normally weaned between four and six months of age. If a foal less than 4 months old is orphaned for some reason, BLM would immediately place the burro into foster care followed up with adoption.

Gathering wild burros during the summer months can potentially cause heat stress and dust exposure. Heat stress does not occur often, but if it does, death can result. Despite precautions to reduce/control dust, it is possible for some animals to develop complications from dust inhalation and contract dust pneumonia. This is rare, and usually affects animals that are already weak or otherwise debilitated due to older age or poor body condition. Since summer gathers pose increased risk of heat stress, contractors use techniques that minimize heat stress, such as conducting gather activities in the early morning, when temperatures are coolest, and stopping well before the hottest period of the day. The helicopter pilot also brings in the burros at an easy pace. If there are extreme heat conditions, gather activities are suspended during that time. The CAWP prohibits gathering wild burros with a helicopter (unless under emergency conditions) in temperatures over 105 degrees Fahrenheit. Most temperature related issues during a gather can be mitigated by adjusting daily gather times to avoid the extreme hot or cold periods of the day. Gathering wild burros during the fall/winter months reduces risk of heat stress, although this can occur during any gather, especially in older or weaker animals. As a result of adherence to SOPs and care taken during summer gathers, potential risks to wild burros associated with summer gathers can be minimized or eliminated.

As a measure of expected capture-related mortality, since 2009, BLM Arizona has gathered over 3,500 nuisance or excess wild horses and burros. Of these, gather-related mortality has averaged 0.1%, which is very low when handling wild animals; this rate reflects mortality at gathers and transportation. Another 0.2% of the animals captured were humanely euthanized due to pre-existing conditions and in accordance with BLM policy. This data supports that the use of helicopters and motorized vehicles are a safe, humane, effective and practical means for

gathering and removing excess wild horses and burros from the range.

Transportation to Temporary Gather Holding Facilities and Fertility Control Treatment

All fertile males selected for the purpose of sex ratio adjustment would be released back into the HMA within a few days of the completion of the gather. Female burros selected for fertility control, along with their foal (if any) would be held for approximately 30 days and may experience some stress during the holding period at the holding facility, until their re-release at the site of capture. Stress may be indicated by behaviors such as a burro's election to refrain from eating and/or drinking temporarily, nervous agitation, and kicking.

Burros could experience short-term discomfort during the identification, chipping and freeze marking processes. This process would be completed as quickly as possible, and stress on these animals is expected to last less than a few hours after processing is completed.

Transportation to Short Term Holding, Short Term Holding, and Adoption Preparation

It is expected that transportation of burros from gather sites to short term holding facilities would range from five to eight hours. Transportation time would not exceed 8 hours. During transport, potential impacts to individual burros can include stress, as well as slipping, falling, kicking, biting, or being stepped on by another animal.

Upon arrival at the short-term holding facility most wild burros begin to eat and drink immediately and adjust rapidly to their new surroundings. Recently captured wild burros, generally females, in very thin condition may have difficulty transitioning to feed. A small percentage of animals can die during this transition; however, some of these animals that do die during transition are in such poor condition that it is unlikely they would have survived if left on the range.

After the wild burros have transitioned to their new environment in the holding facility, they are prepared for adoption or sale in accordance with BLM policy. Likelihood of injury or mortality during the preparation process is low but can occur. Mortality of wild horses and burros at short-term holding facilities averages approximately 5% (Government Accountability Office 2008), and includes animals euthanized due to a pre-existing condition, animals in extremely poor condition, animals that are injured and would not recover, animals which are unable to transition to feed; and animals which die accidentally during sorting, handling, or preparation.

Use of Contraception in Wild Burro Management

Application of population growth suppression techniques (i.e. PZP, PZP-22, and GonaCon) and adjustment in sex ratios are expected to slow total population growth rates, and to result in fewer gathers with less frequent disturbance to individual wild burros and the herd's social structure. While the direct reductions in foaling rates can be estimated, population-wide indirect impacts from contraception methods may be difficult to quantify. Direct impacts are discussed in detail in Appendix D, Literature Review Effects of Fertility Control Vaccines and Sex Ratio Manipulations and would be primarily associated with the use of fertility control and longer-term reductions in fecundity in treated wild females. Treating up to approximately 50% of females with fertility control vaccine, as is proposed under Alternative A, has the potential to cause indirect impacts such as changing the age structure of the population so that there are relatively

more of the older-aged animals in the herd. This potential change in age structure is a result of non-reproducing females potentially surviving longer and having fewer foals. Shifting the herd age structure to have more older animals would not represent a failure of the vaccine, but simply would reflect the expected higher survival rate for females that are having fewer foals. Reduced herd growth would allow for longer periods of time between gathers, reduce the size and impact of gathers, and limit the loss of genetic diversity through removals. The population size in the Black Mountain HMA is currently very large, so the expectation is that current levels of observed heterozygosity would be relatively high. The herd size of potentially reproducing burros under Alternative A would include 287 fertile jacks and 191 females. Of those females, 100 could be temporarily infertile as a result of vaccination, but most of those would be expected to be periodically fertile, at times when the effects of the vaccine have worn off. As a result, the herd could contain well over 450 reproducing burros, so loss of observed heterozygosity is expected to be less than ½ of a percent per generation (Wright 1931, Hartl and Clark 2007), even if the herd is maintained within AML. BLM would continue to collect genetic samples for monitoring to periodically assess levels of observed heterozygosity.

Wild Burros Remaining or Released into the HMA following Gather

Direct impacts to burros that are not gathered, or to those which are released back into the HMA after fertility treatment is administered, would consist primarily of temporary disturbance and displacement of burros in response to human activities associated with the gather and/or treatment. Typically, the natural survival instinct of wild animals to this type of disturbance is to avoid the perceived danger. These impacts would be minimal, temporary, and of short duration. BLM has instituted guidelines (CAWP) to reduce the sources of handling stress in captured animals (BLM 2015). It is difficult to compare that level of temporary stress with long-term stress that can result from food and water limitation on the range (e.g., Creel et al. 2013).

As a result of lower density of wild burros across the HMA following the removal of excess burros, competition for resources would be reduced. Because there would be lower levels of competition for forage resources, burros that remain on the HMA would have relatively more access to preferred, quality habitat. Confrontations between jacks would also become less frequent, as would fighting among wild burros at water sources. Achieving the AML and improving the overall health and fitness of wild burros could also increase foaling rates and foaling survival rates over the current conditions. Injuries and death to all age classes of animals would be expected to be reduced as competition for limited forage and water resources is decreased.

Over time, so long as the burro herd size can be maintained near AML, forage and habitat quality should improve. The reduced burro population size would help ensure that competition for forage resources would be relatively low, which should lead to the remaining wild burros being healthy and vigorous, and at less risk of death or suffering from starvation even if there are instances of drought (lack of forage and water).

The primary effects of Alternative A to the wild burro population would be to herd population dynamics, age structure or sex ratio, and subsequently to the growth rates and population size over time. Specific effects are: the expected foaling rate should decrease in proportion to the percentage of females that are successfully treated with fertility control vaccine; the expected age

structure may shift so that the ratio of older females in the herd would be relatively greater than is currently found; the expected sex ratio should have an increased male bias as a result of intentional sex bias skewing. The annual growth rate should decrease as a result of those expected changes, and the population size should be lower than it currently is, as a result of the combined effects of removals and fertility control methods.

The uncaptured wild burros would maintain their social structure (primarily in the form of mother-foal pairs) and herd demographics (age and sex ratios). No observable effects to the remaining population associated with the gather impacts would be expected except a heightened shyness toward human contact.

Environmental Effects of Alternative B

Impacts associated with Alternative B would be the same as Alternative A but would also include impacts from having a non-reproducing component (i.e., gelding). By using fertility control vaccine on females, skewing the sex ratio to have more males than females, and including some geldings in the population, the expected result could be a marginal reduction in population growth rates compared to Alternative A. The combination of fertility control vaccines, sex ratio adjustment, and gelding is expected to be more effective than relying on geldings alone, because if geldings were the only fertility control method that would probably not reduce female burro fertility rates very much, unless a large proportion of male burros in the population are gelded (Garrott and Siniff 1992). Gelding a portion of the male population could marginally reduce the population growth rate but the reduction in annual foaling rates that resulted would be difficult to predict and would be dependent on individual gelded burros' social behavior and interactions with other burros. For example, a gelded jack may or may not try to breed a cycling female. If a gelded (sterile) jack prevents a cycling jenny from mating with other jacks, then that could delay reproduction in the jenny. However, it is not uncommon for a jenny to breed with multiple jacks in a given estrus cycle. A large decrease in pregnancy rate is not expected until the proportion of geldings is high (Garrott and Siniff 1992).

In addition to the individual gather and population growth control impacts mentioned in Alternative A, the gelding procedure could lead to additional stress (defined in Alternative A as emotional distress or physical discomfort) for individual male burros. Effects of gelding are discussed in Appendix D.

Environmental Effects of Alternative C

Impacts associated with Alternative C would be similar to Alternative A, however, the sex ratios would not be adjusted. Without sex ratio adjustments, more females would need to be gathered and treated with fertility control to reduce the population growth rate to a level that would maintain the population within AML.

Environmental Effects of Alternative D

Under this alternative, impacts to burros would be those directly related to gather events and adoption preparation as described in Alternative A. No fertility control measures would be implemented. Without fertility control, the population would continue to grow at current rates (approximately 15%) and gathers and removals would need to be conducted at least annually in order to maintain the population within AML.

Environmental Effects of the No Action Alternative

The No Action Alternative would not result in gather-related or fertility-control related impacts to wild burros (with the exception of the burros under the HSUS Pilot Project and the occasional nuisance gathers), but impacts resulting from high herd densities and reduced per-capita resource availability would be exacerbated.

Under the No Action Alternative, no gathers to remove excess wild burros would occur. There would be no active management to control the size of the wild burro population or to bring the wild burro population to within AML as required to ensure a TNEB. The wild burro population would continue to increase at an average rate of 15-25% per year. Assuming a 15% per year growth rate, in two years the wild burro population would exceed 2,900 burros, which is six times over AML. Competition for the available water and forage between wild burros, domestic livestock, and native wildlife would increase.

Individual burros would be at greater risk of death by starvation and lack of water. The population of wild burros would compete for the available water and forage resources, affecting females and foals most severely. Social stress would increase. Fighting among jack burros would increase as they protect their position at scarce water sources, as would injuries and death to all age classes of animals. Potential major loss of the wild burros in the HMA due to starvation or lack of water may cause an immediate die-off in the short term. However, such mass mortality events do not typically cause a population to reach or stay at carrying capacity; usually, herds continue to grow after such events, again potentially outstripping available resources (NRC 2013).

As the HMA population would continue to increase beyond the capacity of the available habitat, even more bands of burros would leave the boundaries of the HMA in search of forage and water. This alternative may result in increasing numbers of wild burros in areas not designated for their use resulting in an increase in human interactions and therefore an increase in the occurrence of animal health safety issues.

3.3.2 Vegetation and Soil Resources: Including Invasive, Non-Native and Noxious Species Affected Environment

The vegetative community in the Black Mountain HMA is Mohave desert scrub and Grand Canyon desert shrub or eastern Mohave desert. Typical species include creosote bush (*Larrea tridentata*), white bursage (*Ambrosia dumosa*), flat-top buckwheat (*Eriogonum fasciculatum*), rayless brittlebush (*Encelia frutescens*), rayless goldenhead (*Acamptopappus sphaerocephalus*), range ratany (*Krameria erecta*), Mormon tea (*Ephedra nevadensis*), buckhorn cholla (*Cylindropuntia acanthocarpa*), barrel cactus (*Echinocactus* and *reocactus*), ocotillo (*Fouquieria splendens*), and Mojave yucca (*Yucca brevifolia*). Big galleta (*Pleuraphis rigida*) and desert needlegrass (*Achnatherum speciosum*) are common grasses on the uplands, but very little perennial grass occurs on the lower valley. The vegetative community represents multiple habitat types for wildlife species within the Black Mountain HMAs. Several invasive and non-native plant species are found in the project area with red brome being the most dominant.

The BMEMP vegetation objectives established proper use factors or utilization limits for key species within key areas (areas between 0.25 -0.75 miles from permanent water sources). Utilization limits, established for relatively abundant plant species, were set at a level to ensure that other, more palatable, but less abundant species are not over utilized (see Table 6 below). The BMEMP identified that utilization limits should result in reduced grazing and browsing pressure on more palatable species, allowing for increased seed production and seedling establishment. Utilization limits also ensure that adequate and suitable perennial and ephemeral forage and cover remain available for soil and watershed protection. Limiting utilization on key species within key areas should represent a decrease in overall utilization within the ecosystem and maintain and increase native plant species diversity and abundance while staying at or below the utilization limits at all study sites. The initial forage allocation ratios applied in the Kingman RMP (1995), are big game 40%, burros 30% and cattle 30%. Forage is allocated to animal units⁷ at the ratio of cattle 1:1, bighorn sheep 5:1, deer 4:1, and wild burros 2:1.

Burros can be more destructive to the range than cattle due to their differing digestive systems and grazing habits. Wild burros can exploit poor quality forage (reviewed in Douglas and Hurst 1993), as they have a similar digestive system to horses. However, the equine digestive system requires that horses and burros consume 20-65% more forage than a cow of equal body mass (Hanley 1982, Menard et al. 2002). Unlike cattle, wild horses and burros use their flexible lips and upper front incisors to trim vegetation more closely to the ground (Symanski 1994, Menard et al. 2002, Beever 2003). As a result, areas grazed by horses and burros may retain fewer plant species and may be subject to higher utilization levels than areas grazed by cattle or other ungulates. Although seeds can pass through the horse digestive systems without being digested, this potential benefit has negative consequences when invasive species germinate from feces (i.e., King et al. 2018); germination of invasive species from burro feces can be assumed to be comparable. During times of greatest physiological stress (increased temperature, decreased precipitation), horses and burros can monopolize access to water sources, leaving limited time for other species. This raises concern for native species in water-limited environments (Hall et al. 2016) such as those which exist throughout the HMA.

Monitoring data shows that utilization levels within the Black Mountain HMA exceed the limits established in the BMEMP. The data shows severe to heavy use throughout the HMA, including in areas where there has been no cattle grazing. Very few key areas⁸ had light to slight use. Wild burros have been a contributing factor for riparian areas not meeting proper functioning condition, where Arizona Standards (Standard #2) are used for Rangeland Health evaluations. Some springs monitored show a downward trend and may be non-functional, or functional but at risk. Monitoring reports of riparian areas identify high use by wild burros and cattle (foraging and trampling), as contributing factors to a downward trend at some of these areas.

⁷ Animal Unit: One mature (1000-pound) cow or its equivalent based on an average daily forage consumption of 26 pounds of dry matter. Animal Unit Month: The amount of forage necessary for the sustenance of one cow or five sheep for one month. (BLM 1995)

⁸ Key areas are defined in Coulloudon et al. (1999): “Key areas are indicator areas that are able to reflect what is happening on a larger area as a result of on-the-ground management actions. A key area should be a representative sample of a large stratum, such as a pasture, grazing allotment, wildlife habitat area, herd management area, watershed area, etc., depending on the management objectives being addressed by the study. Key areas represent the “pulse” of the rangeland.”

Utilization data using the Range Utilization Key Forage Plant Method was collected (November through May) for the years of 2015 and 2018 and shows utilization levels increased on key plant species at key areas over that time period. Data collected for 2015 and 2018 indicated severe (81-100%), heavy (61-80%), and moderate (41-60%) levels of utilization on key plant species with only limited key areas at light (21-40%), slight (6-20%) and no use (0-5%) categories. By 2018, the average utilization across all key areas was at or above the utilization limits set in the BMEMP for all plant species listed in Table 6. Average use across all key areas for 2015 and 2018 and highest use levels observed⁹ are listed below for each key species (see Table 6).

Table 6: Black Mountain HMA Utilization and Proper Use Factors for Key Plant Species

Common Name	Scientific Name	Utilization Limit	Average Utilization Across All Key Areas (2015)	Average Utilization Across All Key Areas (2018)	Highest Use Levels Observed
White bursage	<i>Ambrosia dumosa</i>	20%	29%	51%	74%
Flattop buckwheat	<i>Eriogonum fasciculatum</i>	15%	16%	30%	57%
Big galleta	<i>Hilaria rigida</i>	35%	66%	58%	86%
Mormon tea	<i>Ephedra nevadensis</i>	40%	23%	40%	98%
Globe mallow	<i>Sphaeralcea ambigua</i>	40%	22%	54%	81%
Desert rock-pea	<i>Lotus rigida</i>	30%	50%	54%	54%
Chuckwalla's delight	<i>Bebbia juncea</i>	15%	3%	35%	53%

Source: BMEMP (BLM 1996) and BLM field data.

In 2015, sixty-five percent (17) of the 26 key areas observed had use levels on one or more key species above the utilization limits set in the BMEMP. About 34% (9) of the key areas had use levels on one or more key species that fell within the severe to heavy use category.

Approximately 38% (10) of the key areas had use levels on one or more key species that fell within the moderate to light use category. Roughly 26% (7) of the key areas had use levels on key species that fell within the slight to “No Use” category.

In 2018, eighty-seven percent (28) of the 32 key areas observed had use levels on one or more key species above the utilization limits set in the BMEMP (see Appendix C, Figure 6 Utilization map). About 53% (17) of the key areas had use levels on one or more key species that fell within the severe to heavy use category. Approximately 38% (12) of the key areas had use levels on one or more key species that fell within the moderate to light use category. Roughly, 9% (3) of the key areas had use levels on key species that fell within the slight to “No Use” category.

⁹ “Highest use levels observed” is the highest value recorded on each key forage species during BLM monitoring at one or more key areas for 2015 and 2018.

The dominant soils are shallow with surface textures of extremely cobbly loam and extremely stony loam. Subsoil textures are extremely gravelly loam. Soil available water capacity is very low. Soils in the lower valley range from shallow to deep but are generally shallow to a plant root-restricting lime-cemented layer (caliche soil layer) and also range from sandy loam-to-loam (Natural Resources Conservation Service 2015).

Environmental Effects of Alternatives A, B, C, and D

Traps, bait stations, or temporary holding facilities would be located in previously disturbed areas or open desert washes if possible, in order to minimize impacts. Up to one acre of vegetation could be affected at each location as a result of the installation and operation of the bait traps/stations. Impacts to vegetation could result from the trap sites, including the helicopter wing traps and bait traps. Crushing and trampling of some of the vegetation in the bait trapping locations may occur but is expected to be short-term (1 month or less) and intermittent. Additionally, the bait traps would be checked twice a day; thus, animals would not be in the traps for more than a day. Areas receiving less than one month of bait trap use would not inhibit the reproductive capabilities of individual plants and vegetation would recover during the next growing season. Vegetation is expected to recover within a year. Rehabilitation may be implemented as needed at trap sites.

Future remote fertility control treatment (darting) would not affect vegetation, as these actions would be conducted from a vehicle parked on a road, trail or wash, or by hiking or riding horseback, and/or stopping to observe burros with binoculars. Vehicles traveling through the area may potentially translocate local noxious and invasive weed seeds through the area, especially if they pass through or park in areas where the weed species are present. Project design features would minimize this effect and include that project personnel would be trained to recognize and avoid areas with noxious and invasive weeds during their travels.

The removal of excess burros within the Black Mountain HMA to within AML and maintaining the population at AML would reduce vegetation grazing and browsing pressure in the HMA. Reduced pressure should bring key forage species in the key areas back to near or below the Utilization Limits (proper use factors) set forth in the BMEMP. Vegetation conditions should approach the goals and vegetation objectives presented in the BMEMP, allowing range conditions to improve.

Removing excess wild burros from the Black Mountain HMA and managing wild burros at the AML would result in improved vegetative conditions by increasing cover in the uplands. Reduction in vegetative use would allow recovery to individual plants and overall plant populations. Habitat quality would increase, promoting more cover and forage. Increased cover and quality would provide protection to the soil and reduce erosion and invasive species.

Environmental Effects of the No Action Alternative

No direct impacts from gather operations would occur to vegetative resources. There would not be a concentration of human activities or ungulates at the proposed bait/trap locations to cause the crushing or removal of vegetation. Continuation of nuisance gathers on private property and the HSUS Pilot Project are not anticipated to have impacts to vegetation because they would be located on private property or disturbed areas with minimal vegetation. The potential for red

brome or other invasive species to increase as a result of bait trapping, bait stations, or temporary holding facilities would not occur. Habitat conditions for all vegetation species would continue to deteriorate as wild burro numbers above the established AML would further reduce herbaceous vegetative cover and increase invasive species and noxious weeds. High HMA burro numbers would likely lead to continued over-utilization on vegetative resources, causing more decadence in plant species and increasing bare ground. The number of areas experiencing severe utilization by wild burros would increase over time. This would be expected to result in increased damage to vegetation resources throughout the Black Mountain HMA. High utilization on vegetation would reduce reproductive capabilities and may cause loss of species. Reduced vegetation and increased bare ground could cause soil erosion and increase potential for invasives to establish.

3.3.3 Water Resources

Affected Environment

The Black Mountain HMA contains springs and seeps with medium discharge rates and limited amounts of available water. Many of these springs are not a perennial water source with many being subsurface and only identifiable by riparian type plant species associated with springs. BLM resource staff observations have noted that riparian vegetation near seeps and springs has been heavily impacted by burros. Current monitoring and observation of spring resources shows a large reduction in functional and available spring-related vegetation.

Environmental Effects of Alternative A, B, C and D

Removing excess wild burros from the Black Mountain HMA and managing wild burros at AML would result in improved water resource conditions by improving riparian vegetation at spring sites. Spring sources should improve with reduced use on vegetation, leading to increased water capacity and quality. Increases to spring-related vegetation would facilitate infiltration of water and cycling of nutrients and moderating soil temperatures. This process would enhance water and nutrient availability to plants and extend the duration of flow (BLM 1996).

Environmental Effects of the No Action Alternative

Trampling and trailing damage by wild burros in and around springs would be expected to increase, resulting in larger, more extensive areas of bare ground. Springs would continue to deteriorate as wild burro numbers would remain above the established AML further reduce vegetative cover, increasing soil erosion and the potential for invasive species to establish, resulting in continued reductions to spring functionality. High HMA population numbers would likely lead to reduced spring flows and eventually put functional springs at risk and non-functional status.

3.3.4 Wildlife Resources

As described in Section 3.1, there are two ACECs within the Black Mountain HMA. Both ACECs have important wildlife values and management prescriptions in both the Kingman RMP and the Lake Havasu RMP provide for the protection and prevention of irreparable damage to the relevant characteristics and important values of these areas.

General Wildlife Species

Typical wildlife found in the project area are javelina (*Pecari tajacu*), white-winged dove (*Zenaida asiatica*), western burrowing owls (*Athene cunicularia hypugaea*), Sonoran desert tortoise (*Gopherus morafkai*), Mojave desert tortoise (*Gopherus agassizii*) coyote (*Canis latrans*), Merriam's kangaroo rat (*Dipodomys merriami*), white-throated woodrat (*Neotoma albigula*), black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), mule deer (*Odocoileus hemionus*), western diamondback rattlesnake (*Crotalus atrox*), common side-blotched lizard (*Uta stansburiana*), Gambel's quail (*Callipepla gambelii*), mourning dove (*Zenaida macroura*), great horned owl (*Bubo virginianus*), desert bighorn sheep (*Ovis canadensis*), and mountain lion (*Puma concolor*). The Black Mountains support a desert bighorn sheep population (see Appendix C, Figure 13 Bighorn Sheep Habitat) and low densities of mule deer.

Environmental Effects of Alternative A, B, C and D

Removing excess wild burros from the Black Mountain HMA, and managing wild burros at AML, would result in improved habitat conditions for all wildlife species by increasing herbaceous vegetative cover. Increased vegetative cover would increase habitat quality, promoting more cover and forage for wildlife species. High quality habitat could result in increased wildlife populations, reproductive succession, and reduce competition for food and water resources. Removal of excess burros would reduce the displacement of wildlife from their natural and home ranges. There would be less trampling which would directly benefit burrowing wildlife species, reducing destruction of their burrows and burrowing communities. Reduced burro numbers would reduce competitive stress on native wildlife and improve habitat conditions. In turn, management objectives for ACEC values pertaining to wildlife species (including desert bighorn sheep) would be maintained and goals of the RMPs for these areas would be achieved.

Helicopter flights, bait trap stations and activities, and human presence may temporarily displace wildlife while in operation, but no long-term impacts to species would occur once the gather operations cease. Wildlife could be displaced for 15 minutes to 12 hours at any location during helicopter trapping operations and/or the checking of traps and/or while trapped animals are treated with fertility control or removed. If traps are set close to water at existing range improvements, wildlife may not come in and drink due to the trapping activities. Once these activities cease, wildlife is expected to move back into these areas.

Environmental Effects of the No Action Alternative

No direct impacts from gather operations on wildlife or their habitat would occur from the No Action Alternative. Habitat or wildlife would not be disturbed by trapping and holding activities. Continuation of nuisance gathers on private property and the HSUS Pilot Project are not anticipated to have impacts to wildlife. As habitat and forage decreases along with continued trampling that would result from the population remaining over AML, wildlife would not have the resources they need, potentially leading to a higher mortality in wildlife species within the area and reduction of wildlife.

Special Status Species - Migratory Birds

Affected Environment

Migratory birds found in the project area are typical of bird species that occupy the Mohave desert scrub plant community. These species include the cactus wren (*Campylorhynchus brunneicapillus*), curve-billed thrasher (*Toxostoma curvirostre*), black-throated sparrow (*Amphispiza bilineata*), loggerhead shrike (*Lanius ludovicianus*), common raven (*Corvus corax*), red-tail hawk (*Buteo jamaicensis*), lesser nighthawk (*Chordeiles acutipennis*), and black-tailed gnatcatcher (*Polioptila melanura*). All special status species with potential to occur in the project area are discussed in Appendix I.

Environmental Effects of Alternatives A, B, C, and D

Impacts to migratory birds are the same as those described for general wildlife.

Environmental Effects of the No Action Alternative

Impacts to migratory birds are the same as those described for general wildlife.

Special Status Species – Desert Tortoise

Affected Environment

Desert tortoise are a special status species that occur with the Black Mountains HMA. Desert tortoise inhabit the entire ecosystem, however, tortoise are uncommon across most of the Black Mountains except for within habitat pockets on the west and east sides of the Black Mountain HMA (see Appendix C, Figure 7 for desert tortoise classifications). In 2015 the Arizona Game and Fish Department performed a study on the tortoise species in the Black Mountains. The results found that this species is a hybrid species, but dominantly Mojave. At this time, the species southeast of the Colorado River are not treated as threatened or endangered. The BLM identified general areas of Category I, II, and III Desert Tortoise Habitat (Category I is the highest quality habitat). Approximately 0.4% (3,882.4 acres) of the HMA is Category I, 3.8% (38,024.5 acres) is Category II, and 40.9% (410,081.7 acres) is Category III. Special status species (other than birds) that may occur, but would not be impacted by the project, are addressed in Appendix I.

Environmental Effects of Alternatives A, B, C, D

Desert Tortoise

Approximately 0.5 to 1.0 acre of Category 3, and potentially Category 2 desert tortoise habitat could be impacted if a trap site is located in desert tortoise habitat. The installation of temporary corrals and the concentration of burros and possibly cattle could potentially trample vegetation for tortoise habitat at these locations. Most activities would be located at previously disturbed sites. During gather operations and any follow-up treatments, encounters with desert tortoise may occur. The BLM mitigates impacts to Sonoran and Mojave desert tortoise species in accordance with BLM Manual 6840 and the Cooperative Conservation Agreement. Appendix J provides these mitigation measures and includes guidelines for handling Sonoran Desert Tortoise that are consistent with the Arizona Game and Fish Department's Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects (Revised September 22, 2014). All workers would be given guidelines prior to gather operation. No desert tortoise burrows would be disturbed as trap sites would be located away from these areas. Once AML is reached, habitat

quality would increase as described in the general wildlife section above, promoting more cover and forage for desert tortoise. Additionally, reduced burro numbers would reduce competitive stress on tortoise once AML is reached.

Environmental Effects of the No Action Alternative

No direct impacts from gather operations on desert tortoise would occur as no gather operations would take place under this alternative. Continuation of nuisance gathers on private property and the HSUS Pilot Project are not anticipated to have impacts to desert tortoise. However, habitat conditions for desert tortoise would continue to deteriorate as wild burro numbers above the established AML would further reduce vegetative cover. Continued over-utilization would occur to vegetative resources and would reduce habitat quality, cover and forage by causing more decadence in plant species thereby increasing bare ground. Reduced vegetation and increased bare ground would cause soil erosion and potential for invasives to take over. As habitat and forage decreases, there would be a potential for declines in desert tortoise populations and eventual damages to the overall ecosystem.

3.3.5 Livestock Grazing

Affected Environment

Livestock grazing has occurred in the Black Mountains for more than 100 years (BLM 1996). There are sixteen grazing allotments administered by the BLM KFO, which occur entirely or partly within the HMA (See Table 7 and Appendix C, Figure 15). Of these sixteen allotments, six are designated for ephemeral use only where livestock grazing is permitted on a seasonal basis only in years of abundant annual forage production; AUMs are not assigned for ephemeral use.

Palatable forage in the Black Mountain HMA is degraded and rangeland health is not meeting BLM land health standards in the Fort MacEwen Allotment and the Big Ranch Allotment Unit B (see Appendix K, Evaluation of Standards for Rangeland Health White Hills).

Table 7: Allotment Information

Allotment Name	Forage Availability	Active Perennial AUMs	Acreage/Percent of Allotment within HMA
Big Ranch A	Perennial/Ephemeral Use	5397	54092; 31.2%
Big Ranch B	Ephemeral Use	n/a	210572; 47.6%
Fort MacEwen A	Perennial/Ephemeral Use	1186	61378; 99.9%
Fort MacEwen B	Ephemeral Use Only	n/a	45083; 100%
Quail Springs	Perennial/Ephemeral Use	2527	15285; 34.4%
Cerbat	Perennial/Ephemeral Use	1016	7719; 29.9%
Mud Springs	Perennial/Ephemeral Use	889	25691; 100%
Gediondia	Perennial/Ephemeral Use	552	20743; 100%

Allotment Name	Forage Availability	Active Perennial AUMs	Acreage/Percent of Allotment within HMA
Black Mountain	Perennial/Ephemeral Use	1247	80631; 100%
Mineral Park	Perennial/Ephemeral Use	680	2294; 12.9%
Happy Jack Wash	Perennial/Ephemeral Use	876	11345; 28.1%
Portland Springs	Ephemeral Use Only	n/a	41071; 91.7%
Thumb Butte	Ephemeral Use Only	n/a	28075; 78.0%
Boriana B	Ephemeral Use Only	n/a	11822; 100%
Curtain	Ephemeral Use Only	n/a	3250; 100%
Cook	Perennial/Ephemeral Use	269	4583;100%

Environmental Effects of Alternatives A, B, C, and D

Under the project action alternatives, burros would be captured using bait traps in temporary corrals and/or helicopter drive trapping. Livestock near helicopter gather activities would be temporarily disturbed or displaced by the helicopter and the increased vehicle traffic during the gather operation. Typically, livestock move back into the area once gather operations cease.

Livestock throughout the Black Mountain HMA could be affected by bait trapping activities since cattle could be attracted to the bait trap areas because of the alfalfa hay. Livestock could be caught in these traps. The intensity of impacts would vary by individual and could be indicated by behaviors such as agitation. Impacts to livestock are expected to be minimal. Bait traps would be visited daily. Communication and locations would be coordinated between BLM and the permittee(s) to determine the process(es) for releasing livestock from traps. Removal of excess wild burros would result in an increase in forage availability and quality, and reduced competition between livestock and wild burros for available forage and water resources. The reduced burro population numbers would reduce burros utilizing and damaging existing range improvements and associated infrastructure (water pipelines, troughs, etc.).

Environmental Effects of the No Action Alternative

Livestock would not be displaced or disturbed due to gather operations under the No Action Alternative; however, there would be continued competition with wild burros for limited water and forage resources. Heavy utilization levels would continue occur and have negative effects on vegetation plant communities and range conditions over time. Livestock grazing would be impacted by continued deteriorating range conditions; forage consumed by wild burros reduces the forage available to livestock grazing.

3.3.6 Human Health and Safety

Affected Environment

Wild burros are found outside the HMA and inhabiting areas within local communities, such as Bullhead City, Golden Valley, and along Highways 66, 68, 93 and 95, causing public safety

concerns. Numerous reports about burros being hit by vehicles or spotted on the highway have been brought to the attention of the BLM staff (See Appendix C, Figures 10-12). In 2018-2019 over 30 wild burros were struck and killed by traveling motorists on highways in and adjacent to the HMA, including Bullhead City Parkway, State Route 68 near Bullhead City, U.S. Highway 66, Griffith Road and local roads within the community of Golden Valley. After becoming habituated to humans, burros spend more time near well-traveled roads and sometimes remain near or on the roadways foraging or in search of a handout. The wild burros along roadways create public safety issues; burros have been struck and severely injured or killed, injured people, and caused significant damage to private property. In response to public safety concerns, the BLM has removed numerous nuisance wild burros along highways and on private property in these areas. However, as the wild burro population exceeds AML, groups of burros continue to expand into these areas in search of additional forage and water resources causing ongoing safety concerns.

Wild burros currently travel into areas frequented by the public, such as Oatman, Bullhead City, Katherine's Landing, Willow Beach, and Golden Valley. Burros may travel to these areas for a variety of reasons. Several private property owners within the HMA feed and water the wild burros daily. Burros have become accustomed to receiving the food and water provided by the landowners. After becoming accustomed to receiving food and water, burros can become gentler and habituated to the area. This has caused an increase in the number of human interactions with the wild burros, reducing the burros' natural avoidance of humans and creating an increased likelihood of nuisance complaints and chances of injury to wild burros or members of the public.

Environmental Effects of Alternatives A, B, C, and D

Achieving and maintaining AML would reduce competition for resources and the burros would not need to roam as far for water and forage; fewer burros would approach humans for food. Thus, roadway encounters are expected to decrease which should improve motorist safety as well as reduce the number of burros who approach people for a handout in other areas.

At any time, users may encounter activities associated with the proposed action alternatives in the Black Mountain HMA. The presence of BLM personnel could provide an opportunity for public education and outreach. Appendix G describes the protocol for observing gather operations.

Public safety as well as that of the BLM and contractor staff is always a concern during helicopter gather operations and is addressed through the implementation of Gather Observation Protocols and Ground Rules (see Appendix G) that have been used in recent gathers to ensure that the public remains at a safe distance and does not impede gather operations. Appropriate BLM staffing (public affair specialists and law enforcement officers) would be present to assure compliance with visitation protocols at the site. These measures minimize the risks to the health and safety of the public, BLM staff and contractors, and to the wild burros themselves during the gather operations.

During bait/water gather operations (due to this type of operation luring wild burro to bait) spectators and viewers would be prohibited as it would directly interfere with the ability to safely capture wild burros. Only essential personnel (Contracting Officer Representative (COR)/Project

Inspector (PI), veterinarian, contractor, contractor employees, etc.) would be allowed at the trap sites during trapping operations, thereby minimizing the risks to the health and safety of the public, BLM staff and contractors. Visitors would be allowed to view wild burros once they are removed to the temporary holding facilities.

Public land users could come across one of the bait traps in the absence of project personnel and interact with either equipment or trapped burros. Since wild burros are not used to human contact and can be easily startled, there is a risk of someone being bitten, kicked, or charged by a burro if they entered the corral while it was occupied by animals and project personnel were not present.

No effects to human health and safety are expected as a result of the burros being darted with fertility control vaccines because SOPs (as described in the HSUS Pilot Project EA) instruct operation personnel to take precautions with regards to any darting of burros where the public could be at risk. Although there is a very high percentage rate of dart recovery by project personnel for darts administered in the field using opportunistic darting (Kirkpatrick 2008), the public could be exposed to unrecovered darts that have been fired and left in the field unintentionally. The chances of a dart being left unrecovered in the field are expected to be rare (i.e., less than 3% in some cases; SCC 2000), and the chance of a member of the public encountering an unrecovered dart are believed to be even rarer. Furthermore, the fertility control vaccines are made with naturally occurring proteins that begin to degrade if not stored on ice or kept in a cool environment. Other factors that minimize danger to the public include the expectation that most of the vaccine in a dart would be expelled, and that protein degradation causes any remaining vaccine to be ineffective, most likely within one day under warm conditions. Although any sharp metal object may be hazardous, the impacts to the public from encountering a dart in the field are expected to be minimal. The ingredients are not expected to cause contraceptive effects unless injected.

Environmental Effects of the No Action Alternative

Wild burros would continue to inhabit areas within local communities in search of additional forage and water resources, increasing the number of interactions between burros and the public. The increasing population would likely cause a higher frequency of burros being struck by vehicles on the highways and local roadways and individuals being kicked or bitten in areas where burros are habituated. No effect to Human Health and Safety from gather operations is expected if the No Action Alternative is implemented. No effects from the continuation of nuisance gathers and the HSUS pilot project are anticipated.

CHAPTER 4 CUMULATIVE EFFECTS ANALYSIS

Cumulative effects are impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions (RFFAs). Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. The cumulative effects study area (CESA) is the Black Mountain HMA and adjacent areas (see map in Appendix C, Figure 2). Only those resources directly or indirectly affected by the action alternatives are considered for cumulative effects.

4.1 Past, Present, and Reasonably Foreseeable Future Actions

Past actions considered are those whose impacts to one or more of the affected resources have persisted to present day. Present actions are those occurring at the time of this evaluation and during implementation of the action alternatives. RFFAs include actions that are permitted, known or could reasonably be anticipated to occur within the analysis area for each resource, within a timeframe appropriate commensurate with the expected impacts from the action or alternatives.

Past and Present Actions

Past actions include establishment of wild burro HMAs, establishment of AML for wild burros, wild burro gathers, mineral extraction, livestock grazing, range improvement projects such as water sources and fencing, development of transportation and infrastructure, housing and commercial development (such as golf courses), and recreational activities. Some of these activities have increased the presence of invasive plants and noxious weeds.

Mining activity has occurred within the Black Mountains since the late 1860s. The area mines primarily produced gold and silver with minor production of copper and lead (Keith, et. al, 1983). Many of these operations ended prior to current reclamation requirements and it is unlikely that any of these mining-related disturbances were reclaimed, although natural re-vegetation over time has partially reclaimed some disturbances. Presently mining is occurring on private property at the Moss and Gold Road Mines, near Oatman Arizona.

Recreation activities in the Black Mountain HMA include off-highway vehicle use, camping, hiking, recreational shooting, hunting for both large and small game, rock hounding, wildlife watching/photography, and wild burro watching/photography. Visitor use levels are highest in the fall, winter and spring, and low to moderate in the summer.

Livestock grazing has occurred in the area for over 100 years. Prior to the TGA of 1934, livestock grazing practices resulted in major impacts to soil resources and the vegetation communities they supported. As a result, livestock grazing activities prior to the TGA had significant impacts on the vegetation resources within the impact assessment area by eliminating or greatly reducing the primary understory plants.

A series of livestock grazing decisions since the TGA, and as required by FLPMA and the PRIA, have resulted in reductions in livestock numbers and changes in grazing management practices to promote rangeland health within grazing allotments.

The focus of wild burro management has also expanded to place more emphasis on achieving rangeland health as measured through the Arizona Standards for Rangeland Health. BLM Resource Advisory Councils developed standards and guidelines for rangeland health (BLM 1997) that are the basis for grazing administration on public lands within Arizona. Adjustments in numbers, season of use, grazing season, and allowable use are based on evaluating progress toward reaching the standards.

Approximately 4,000 wild burros have been removed from the Black Mountain HMA in the last 30 years. Small nuisance burro gathers are continuing to occur to address the public safety concerns as well as address private landowner complaints in and outside the HMA.

The BLM in cooperation with the HSUS is currently conducting a four-year pilot project, from August 2017 to August 2021, to test the feasibility of remotely delivering PZP in a field setting. The HSUS is attempting to re-locate treated female burros and remotely booster them in the field via dart gun. Treated females would be monitored to determine how effective the technique is in maintaining contraception.

Reasonably Foreseeable Future Actions

To achieve and maintain AML within the Black Mountain HMA, wild burro gathers, and removals would still be necessary for the foreseeable future. Frequency of the gathers would depend on the wild burro population at that time.

Additional RFFAs include continuing livestock grazing in the allotments within the area, development of range improvements, new or continuing infestations of invasive plants, noxious weeds, and pests and their associated treatments, and recreational activities. Additionally, there is continued development of mineral extraction, including a proposed expansion at the Moss Mine. A mining plan has been submitted to BLM for the expansion of the Moss Mine open-pit, waste rock dumps and other facilities onto 496 acres of public land surrounding their 254-acre patented claim block. As part of this mining plan, extensive mineral exploration drilling is planned for targets on the company's unpatented mining claims. Drill roads and pads are expected to cause up to 110 acres of additional disturbance.

Other metallic mineral properties in the Black Mountains could become exploration targets in the near future, which may cause additional surface disturbance. Now that the price of gold is nearly \$1,500 per ounce, interest in these underexplored prospects is increasing.

4.2 Wild Burros

Cumulative Effects of Alternatives A, B, C, and D

Recreation, increased use of the public lands, increased home building and development of golf courses have offered increased resources for wild burros, making water and forage available when the natural resources are unavailable. These activities have allowed the burro population to grow faster than without these resources. Burros are becoming more accustomed to humans and more skilled at getting food and water handouts. While contact with humans has increased the burros' access to food and water, collisions with automobiles has resulted in numerous injuries and fatalities to burros. Increased contact with humans imperils the "wild and free-roaming" character of the burros, which is surely part of their charm, as well as part of BLMs management responsibility. Additionally, some burros habituated to tourist areas have become morbidly obese due to excess treats.

Benefits from a reduced wild burro population would include fewer animals competing for limited forage and water resources. The proposed project should lead to more stable wild burro populations, healthier rangelands, healthier wild burros, and fewer multiple use conflicts in the area over the short and long-term. As discussed in Section 3.3.1, there is no expectation that

there would be undue loss of genetic diversity if the herd is maintained near AML. Even if the number of breeding animals is slightly lower than AML, as a result of fertility control measures in Alternatives A, B, or C, the number of breeding animals is not expected to be so low as to cause rapid loss of heterozygosity in the herd of wild burros in the Black Mountain HMA. If at any time in the future genetic diversity appears to be decreasing to unacceptable levels, wild burros can be introduced from other HMAs to augment genetic diversity. Over the next 15-20 years, continuing to manage wild burros near the established AML would achieve a TNEB and multiple use relationship on public lands in the area. When considered with other past, present, and RFFAs, the action alternatives would not result in significant adverse impacts to burros.

Cumulative Effects of the No Action Alternative

Under the No Action Alternative, the wild burro population within the HMA could exceed 3,800 burros by 2024. Continued and expanded movement outside the HMAs would be expected as greater numbers of burros search for food and water for survival, thus impacting larger areas of public lands and threatening public safety as wild burros cross highways in search of forage. Past wild burro management (or lack thereof) has contributed to the wide distribution and abundance of wild burros throughout the CESA, within and outside the HMA. Numerous burro mortalities due to vehicle strikes have resulted from burros looking for forage near roadsides. Heavy to severe utilization of the available forage would continue to be expected and the water available for use would become increasingly limited. Ecological plant communities would continue to be damaged to the extent that they would no longer be sustainable, and the wild burro population would be expected to crash; this result would be expedited under drought conditions. As wild burro populations continue to increase within and outside the HMA, rangeland degradation would likely intensify on public lands. Also, as wild burro populations increase, concerns regarding public safety along highways increase as well as conflicts with private land. Wild burros that reside along highways would continue to come on to the highways in many areas during the evenings or early mornings looking for forage along the pavement, posing a hazard to motorists. All these trends indicate less than ideal conditions for the burros and their individual and collective health. Drought could result in poor health and potential starvation.

Emergency removals could be expected in order to prevent individual animals from suffering or death as a result of insufficient forage and water. During emergency conditions, competition for the available forage and water increases. This competition generally impacts the oldest and youngest burros as well as lactating females first. These groups could experience substantial weight loss and diminished health, which could lead to their prolonged suffering and eventual death. If emergency actions are not taken when emergency conditions arise, the overall population could be affected by severely skewed sex ratios towards males as they are generally the strongest and healthiest portion of the population. An altered age structure would also be expected.

Impacts of the no action alternative include foregoing the opportunity to improve rangeland health and to properly manage wild burros in balance with the available forage and water and other multiple uses. Attainment of site-specific vegetation management objectives and Standards for Rangeland Health would not be achieved. AML would also not be achieved.

4.3 Vegetation and Soil Resources: Including Invasive, Non-Native and Noxious Species *Cumulative Effects of Alternatives A, B, C and D*

When considered with other past, present, and RFFAs, cumulative effects of the action alternatives could add to vegetation damage and invasion of invasive species in bait trap and holding areas. Roads, housing, mining, golf courses, increased off-highway vehicle use, etc. have reduced habitat quality and increased invasive species. Removing excess burros and managing the population at AML would reduce foraging impacts to vegetation by lowering utilization, minimizing impact from hoof activity and reduce compaction to soils. Appropriate burro populations would remove pressure off vegetative reproduction by limiting overgrazing and leaving individual plants with reproductive capabilities.

Past and present impacts to soil resources in the HMAs have resulted from wildlife and wild burro use, livestock grazing, off-highway vehicle use and recreation, exploration, and other mining activities. Reclamation of areas disturbed from past actions and natural revegetation have helped minimize impacts to soil resources through improved vegetation cover and stabilization to varying degrees. Impacts to soil resources from RFFAs are considered to be similar to those described for present actions. Impacts from the action alternatives would include soil compaction and disturbance erosion during the occasions the BLM conducts gathers. The cumulative impact on soil resources from the incremental impact of the action alternatives when added to the past actions, present actions, and RFFAs would be minor and intermittent.

Degraded soils and depleted vegetation would be furthered stressed by congregations of burros within traps, impacts from helicopter landings, and transportation to and observation of the gather(s). However, these stresses would be short-term and pale in comparison to the effect caused by previous grazing pressures. The cumulative effects of Alternatives A, B, C, and D would positively affect long-term management goals to maintain rangeland health and healthy wild burro populations. This would minimize trailing as well as reduce the probability of invasive species being transported to new locations. Removing excess burros and managing the population at AML would also lower the amount of herbivory native perennial species, which compete with invasive species.

Cumulative Effects from the No Action Alternative

When considered with other past, present, and RFFAs, cumulative effects of the No Action Alternative would result in reduced habitat as overgrazing and trampling would continue to occur in high-populated burro areas. The cumulative effects from the No Action Alternative would incrementally increase damage to soil resources. Vegetation would continue to be degraded by overgrazing, reducing forage and habitat value for all native species. Riparian vegetation would be at great risk, as high use would continue, which eventually could lead to a loss of water sources. Cumulative effects of the No Action Alternative would result in foregoing the opportunity to improve rangeland health and the attainment of site-specific vegetation management objectives and Standards for Rangeland Health would not be achieved. Above AML range use of the project area by wild burros, in combination with other past, present, and RFFAs, would continue to adversely impact soil and vegetative health, promoting establishment and spread of non-native species in the future.

4.4 Water Resources

Cumulative Effects of Alternatives A, B, C and D

The action alternatives, when considered with other past, present, and RFFAs in the CESA would improve riparian vegetation near seeps and spring sources. Lowering the year-round use levels and hoof concentration on riparian vegetation would reduce pressure on riparian vegetation water sources. This in turn would facilitate riparian vegetation growth which in turn facilitates an infiltration of water and cycling of nutrients and moderating of soil temperatures. Overall there would be an improvement in water resource conditions by improving riparian vegetation at spring sites. Spring sources should improve with the reduced use on vegetation, leading to increased water capacity and quality.

Cumulative Effects from the No Action Alternative

If wild burro numbers are not reduced beyond the small nuisance gathers, continued trampling and trailing by wild burros in and around springs would be expected to increase, resulting in larger, more extensive areas of bare ground. Spring sources and riparian vegetation would continue to deteriorate as wild burro numbers would remain above the established AML further reducing vegetative cover, increasing soil erosion and the potential for invasive species to establish. The continued pressure to these riparian areas and spring sources would further diminish spring functionality and even further reductions in spring flows would be expected. This could eventually put functional springs at risk and even in a non-functional status.

4.5 Wildlife Resources: Including Migratory Birds and Special Status Species

Cumulative Effects of Alternatives A, B, C and D

The action alternatives, when considered with other past, present, and RFFAs in the CESA, could impact wildlife by causing habitat disturbance and temporary displacement of animals at the trapping, bait, and temporary holding locations. Other activities in the area have decreased habitat quality and reduced the number of top predators essential to maintaining healthy populations. Additionally, human activity associated with gather activities may cause temporary disturbance to wildlife, but once active gather operations have concluded, wildlife would no longer be displaced and would be expected to return to the area. Reduced burro populations would minimize competition for forage and habitat for native wildlife. Species displaced by presence of burros would inhabit their natural ranges without added pressure, thus potentially increasing native populations. Water sources are limited in the Black Mountains so with less burros on the range, wildlife would have less competition for water and impacts to water sources would be reduced. Native species and populations should recover and/or improve as forage values would increase with reduced grazing. When considered with other past, present, and RFFAs, the action alternatives would not result in significant adverse impacts to wildlife.

Cumulative Effects of the No Action Alternative

When considered with other past, present, and RFFAs, the No Action Alternative would result in continued pressure on the rangeland resources, which would negatively impact wildlife habitat and forage availability. Burro numbers would continue to increase allowing a continuation of over utilization on vegetation, reducing forage and habitat values for native species. Water resources would be over-utilized and could begin to lose functionality. Reduced vegetative and water sources would decrease native species occurrences and populations. Loss of habitat and

water resources would decrease the potential for migratory bird breeding and nesting, therefore affecting migratory bird ranges and populations. Special status species would be affected from reduced habitat, forage, and water availability as well. The No Action Alternative would result in foregoing the opportunity to improve rangeland health and the attainment of site-specific vegetation management objectives and Standards for Rangeland Health would not be achieved.

4.6 Livestock Grazing

Cumulative Effects of Alternatives A, B, C and D

When considered with other past, present, and RFFAs, the action alternatives would not result in significant adverse impacts to livestock grazing. The largest impact to livestock grazing was the overgrazing that occurred prior to implementation of the TGA, FLPMA, and PRIA. Overgrazing resulted in erosion and loss of forage. Rangeland health conditions are improving but the extreme overpopulation of wild burros is impacting availability of water and forage.

Experience has shown that wild burro gather operations have few direct impacts to cattle grazing. Livestock located near gather activities would be temporarily disturbed or displaced by the helicopter and the increased vehicle traffic during the gather operation. Some cattle could get caught in the bait traps which could increase animal stress until they are released. Typically, livestock would move back into the area once gather operations cease. Competition between livestock and wild burros for water and forage resources would be reduced as the burro numbers are reduced to AML. Under Alternative A and other action alternatives, forage availability and quality would improve over time since the wild burro population would be gathered in increments and growth rates would be less. Impacts from activities proposed would be potential trampling of forage from both human and animal activities around trap sites. Trampled areas may be less productive than non-trampled areas, leading to reduced rangeland health when considered with other impacts to rangeland from human-caused disturbance.

Once all gathering operations have concluded, livestock may no longer be stressed from bait trapping activities. Removing excess burros and managing the population at AML would minimize competition for forage between livestock and burros. The Black Mountains water sources are limited and with less burros there would be less competition for water and less grazing pressure around water sources, which could reduce impacts to springs and riparian vegetation. Fewer burros or reduced grazing pressure should help improve the health upland plant communities over time.

Cumulative Effects from the No Action Alternative

When considered with other past, present, and RFFAs, cumulative effects of the No Action Alternative would result in increased demand on forage from livestock and burros.

Burro numbers would continue to increase, allowing over-utilization of vegetation to continue which could have a negative effect on the health of plant communities over time. Water resources would also continue to be over-utilized which could affect functionality of riparian resources associated with these resources. Impacts to vegetative and water sources could affect authorized livestock number on grazing allotments within the HMA over time. Cumulative effects from the No Action Alternative when considered with other past, present, and RFFAs would incrementally increase damage to rangeland ecosystems. With unchecked population

growth and no planned gathers, rangeland resources would become degraded at an accelerated rate. Livestock would continually be reduced to accommodate the increasing wild burro numbers.

4.7 Human Health and Safety

Cumulative Effects from Alternative A, B, C, and D

Infrastructure, roads, development, and increased recreation and use of the public lands has resulted in increased potential for impacts to human safety from vehicle collisions, accidents near mining areas, or from recreation-related accidents. When considered with other past, present, and RFFAs, cumulative effects of removing excess burros and managing the population at AML would result in fewer impacts to Human Health and Safety, since the potential for collisions with wild burros on roadways would decline. However, there would be an extremely low risk due to encountering a lost dart or for injury should someone enter a trap when staff is not present.

Cumulative Effects from the No Action Alternative

Continued and expanded movement outside the HMA would be expected as greater numbers of burros search for food and water for survival, thus impacting larger areas of public and private lands and threatening public safety as wild burros cross highways in search of these resources. The potential for burro and vehicle collisions would increase, resulting in increased potential for injury and/or death to humans and animals along highways. When considered with other past, present, and RFFAs, the No Action Alternative could result in increased impacts to human health and safety.

CHAPTER 5 CONSULTATION AND COORDINATION

List of Persons, Groups, Tribes, and Agencies Contacted/Consulted

- Arizona Game and Fish Department
- Chemehuevi Indian Tribe
- Colorado River Indian Tribes
- Fort McDowell Yavapai Nation
- Fort Mojave Indian Tribe
- Hopi Tribe
- Hualapai Tribe
- Moapa Band of Paiutes
- Navajo Nation
- Salt River Pima-Maricopa Indian Community
- Arizona State Historic Preservation Officer
- U.S. Fish and Wildlife Service
- Yavapai-Apache Nation
- Yavapai-Prescott Indian Tribe
- Zuni Tribe

CHAPTER 6 LIST OF PREPARERS

Table 8: BLM Resource Specialists

Name	Title
Tanner Browne	GIS Specialist
Chad Benson	Wild Horse and Burro Specialist
Marissa Humphreys	Wild Horse and Burro Intern
Joelle Acton, Ford Mauney	Wildlife Biologists
Matt Driscoll, Caroline Kilbane	Outdoor Recreation Specialists
James Collis, Matthew Nelson	Archaeologists
Mike Blanton, Eric Duarte	Rangeland Management Specialists
Valerie Gohlke	Public Affairs Officer
Paul Griffin	Research Coordinator for the Wild Horse and Burro Program
Angelica Rose	Planning and Environmental Coordinator
Amanda Dodson	Kingman Field Manager
Ryan Chatterton	Associate District Manager
Alan Shepherd	National Wild Horse and Burro Program On-range Branch Chief
John Hall	Arizona Wild Horse and Burro Program Specialist
Nancy Favour	Planning and Environmental Specialist

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Appendix B – List of References

Appendix C – Maps and Figures

Appendix D – Literature Review: Effects of Fertility Control Vaccines, Sex Ratio Manipulations and Spaying/Neutering

Appendix E – Standard Operating Procedures for Field Castration (Gelding) of Wild Horse and Burro Males

Appendix F – Standard Operating Procedures for Wild Horse and Burro Gathers

Appendix G – Wild Horse and Burro Gather Observation Protocol

Appendix H – Standard Operating Procedures for Population-level Fertility Control Treatments

Appendix I – Special Status and Threatened and Endangered Species with Potential to Occur in Project Area

Appendix J - Arizona Game and Fish Department's "Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects"

Appendix K – Evaluation of Standards for Rangeland Health White Hills (includes Fort MacEwen Allotment and the Big Ranch Allotment Unit B).

Appendix L – Response to Public Comments