United States Department of the Interior
Bureau of Land Management

Environmental Assessment
DOI-BLM-AZ-C010-2023-0025-EA

Big Sandy, Alamo, and Lake Havasu Herd Management Area
Wild Burro Gather and Population Control Plan
Environmental Assessment

Mohave, Yavapai, and La Paz Counties, Arizona

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AUGUST 2023

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CHAPTER 1 INTRODUCTION

This environmental assessment (EA) has been prepared to analyze the Bureau of Land Management's (BLM) Lake Havasu Field Office (LHFO) and Kingman Field Office (KFO) proposal to, over the next 10 years, remove excess wild burros, achieve and maintain the established appropriate management levels (AML[1]), and implement fertility control for wild burros on lands within and near the Big Sandy, Alamo, and Lake Havasu Herd Management Areas[2] (HMA) herein referred to as the Three Rivers Complex. The Wild Free-Roaming Horses and Burros Act (WFRHBA) mandates that BLM manage wild horse populations that prevent deterioration of the rangelands and help maintain a "thriving natural ecological balance" (TNEB), while allowing multiple use. BLM accomplishes this goal by identifying the "AML" for each HMA. An AML is generally a population range that allows the rangelands to maintain TNEB. Managing the HMAs as a complex means coordinating population surveys and removal efforts, thus producing more accurate and effective results and improved chances for funding (BLM 2007).

This document is tiered to the Proposed Kingman Resource Area Resource Management Plan (RMP) and Final Environmental Impact Statement (BLM 1993) and Record of Decision (BLM 1995), the Lower Gila North Management Framework Plan (MFP) (BLM 1983), and the LHFO RMP (BLM 2007).

This EA has been prepared in compliance with the National Environmental Policy Act of 1969 (NEPA) following the guidance provided in BLM Handbook H-1790-1 (NEPA, Rel. 1-1710, January 2008). 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 Three Rivers Complex covers approximately 955,000 acres of public, state, and private lands in Mohave, Yavapai, and La Paz Counties in northwestern Arizona (see **Table 1** and Appendix C Map 1). Within the Three Rivers Complex are the Big Sandy, Alamo, and Lake Havasu Herd Areas (HA)/HMAs (see Appendix C, Maps 2, 3, and 4).

The Big Sandy HA is approximately 243,000 acres, including 193,683 acres of BLM-administered land. The Alamo HA is approximately 341,000 acres, including 288,382 acres of BLM-administered land. The Lake Havasu HA is approximately 372,000 acres, including 269,812 acres of BLM-administered land.

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[1] The Interior Board of Land Appeals (IBLA) defined the goal for managing wild horse or burro populations in a thriving natural ecological balance as follows: "As the court stated in Dahl v. Clark, supra at 594, the 'benchmark test' for determining the suitable number of wild horses on the public range is 'thriving ecological balance.' In the words of the conference committee which adopted this standard: 'The goal of WH&B management ***should be to maintain a thriving ecological balance between WH&B populations, wildlife, livestock and vegetation, and to protect the range from the deterioration associated with overpopulation of wild horses and burros.'" *Animal Protection Institute of America*, 109 IBLA 115, (1989).

[2] 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.

Table 1: Three Rivers Complex HA and HMA Land Status

Surface Management Agency	Herd Area (HA) (acres)	Herd Management Area (HMA) (acres)
Bureau of Land Management	751,877	637,479
Bureau of Reclamation	12,127	12,003
Arizona State Trust Land	74,762	19,375
Private Land	77,323	30,134
US Fish and Wildlife Service (Havasu Wildlife Refuge)	21,583	50
Local or State Park	2,435	4
Military	15,074	6
Total Acreage	***955,181***	***699,051***

Management of wild burros in the Three Rivers Complex is guided by the Lake Havasu RMP and the Kingman RMP. The Kingman RMP set the AML for the Big Sandy HMA at 139 wild burros. The Lake Havasu RMP set the AML for the Alamo HMA at 160 wild burros and the Lake Havasu HMA at 166 wild burros. The AML is defined as the number of adult wild burros[3] that can be sustained within a designated HMA to achieve and maintain a TNEB in keeping with the multiple-use and sustained yield management of the area.

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 2021 indicated an overall population estimate of 1,508 to 1,851 adult burros (1680) (Appendix L). By late 2023, the population of adult wild burros living in and near the Three Rivers Complex is estimated to have grown to approximately 2,259 animals. This population is approximately 385% over AML for the complex (**Table 2**) (see Section 3.3.1 Wild Burros 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: Three Rivers Complex Herd Management Area Population

Herd Management Area (HMA)	Total Acres (BLM)	Appropriate Management Level	Estimated Population by January 2024	Excess Wild Burros	Percentage Over AML
Alamo	288,382	160	1,407	1,247	779%
Big Sandy	193,683	139	422	283	203%
Lake Havasu	269,812	166	430	264	159%
ALL	***751,877***	***465***	***2,259***	***1,794***	***385%***

Approximately 31 wild burros have been gathered and removed from the Alamo HMA under a nuisance removal since the population estimate in 2021. The removal of these 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 D, Figures 4, 5 and 8). 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 to five years unless management actions remove animals or slow population growth rates. The last gather for excess burros in the Three Rivers Complex was over 15 years ago in 2003/2004. Palatable forage species in the Big Sandy, Alamo and Lake Havasu HMA's exhibit excessive utilization and the Arizona Standards for Rangeland Health are not being achieved on the Primrose, Planet and Palmerita Allotments (Appendix O and Q). The overpopulation of wild burros, relative to AML, was determined to be a causal factor for the non-achievement of land health standards on these allotments. The current burro herd size is many 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 will be approximately 1,793 excess wild burros above the AML's within the Three Rivers Complex as of January 2024. 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 BLM's purpose for agency action is to implement actions that would achieve and maintain the wild burro population within established AML over a period of 10 years and help the BLM in achieving and maintaining a TNEB on these public lands.

The need for the action is based on the BLM's obligations established by the provisions of Section 1333(a) of the 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.

The EA follows the guidance provided in BLM Instruction Memorandum (IM) No. 2019-004. This IM guides BLM offices to analyze various wild horse and burro management actions to meet the Purpose of and Need for Action and to analyze management actions over multiple years. The 10-year timeframe of this EA enables BLM to determine the effectiveness of the Proposed Action at successfully achieving and/or maintaining population levels within AML for the Three Rivers Complex; a process at which the BLM is unlikely to be successful in a short time frame.

Factors such as weather, water availability, forage availability, animal behavior, and the administration of fertility control can all increase the amount of time needed to reach AML. The trapping and fertility control treatment application process, along with concomitant monitoring as noted in the EA, will continue up to 10 years. This time frame allows for enough trapping and fertility control treatments to determine and ensure that the herds will be maintained within AML's. For these reasons, a 10-year plan is needed to remove excess wild burros and bring the population down to AML, implement population growth suppression measures, over a sufficient period of time to reduce population growth and measurable reduce the number of excess animals that would need to be removed from the Three Rivers Complex, and provide enough time for vegetative and hydrological resources to recover and reestablish. Since vegetative and hydrological resources recovery can occur slowly, even after an immediate burro overpopulation has been addressed, management for a TNEB to allow for recovery of degraded resources will require the BLM to maintain the wild burro population within the AML and may require removal of animals above AML during the 10-year decision period to, foster rangeland resource recovery.

1.3 Plan Conformance

The proposed action and other action alternatives are in conformance with the Approved Kingman Resource Area RMP and Record of Decision (BLM 1995) (Kingman RMP), the Lower Gila North MFP (BLM 1983) and the LHFO Record of Decision and Approved 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 refers to the management of these HMA's as the Three Rivers Complex.

Kingman RMP 1995

- 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. 30, Management Common to All – "Three wild horse and burro herd management areas were identified in the Kingman Resource Area based on population inventories following passage of the Act. These are the Big Sandy, the Cerbat and the Black Mountains herd management areas. Wild horses and burros are to be managed within these areas…"
- Pg. 30, Management Common to All – "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."
- 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. 87 – "Removal of excess burros will be authorized based on forage utilization and integrated habitat studies in conjunction with forage allocation."
- Pg. 87 – "The Big Sandy Herd Management Area would he managed to support a genetically viable population of burros defined as a minimum of 50 effective breeding animals."

Lower Gila North MFP 1983

- LGN-MFP-3-RM-3.1. "Maintain a viable, color-diverse burro population of 200 animals in the Alamo HMA; however, burro numbers in the remaining herd areas should be reduced to 0 by 1986."
- LGN-MFP-3-RM-3.2. "Maintain free access for wild burros to livestock-watering facilities in the Alamo Herd Area."
- LGN-MFP-3-RM-3.3. "Maintain access to Alamo Lake for the wild burro herd in the Alamo HMA."
- LGN-MFP-3-RM-3.4. "Designate a wild-burro viewing route within the Alamo HMA and sign with on-the-ground interpretative [sic] signs. Also, post signs which provide a telephone number that citizens may call to report violations of the Wild Horse and Burro Act."
- LGN-MFP-3-RM-3.5. "Limit or modify construction of new structures within Herd Management Areas which would restrict burro movement."

Lake Havasu RMP 2007

- Pg. 120 HB-1 "Viable, Color diverse burro populations will be maintained within the HMA, While maintaining a thriving ecological balance with other resources and consistent with other management agencies' objectives (including wildlife, riparian and upland vegetation, recreation, and others)."
- Pg. 120 HB-2 "In accordance with the Wild Free Roaming Horses and Burros Act, Non BLM administered lands including the Alamo Wildlife Area, will be excluded from HMA's. These lands will be excluded from determinations of Appropriate Management Level (AML) for burros within the HMA. Wild burros that use non-BLM lands as part of their habitat remain protected under the Wild Horse and Burro Act; therefore, any removal actions remain the responsibility of the BLM."
- Pg 120 HB-3 "The eastern boundary of the Alamo HMA will run west from the southern boundary of the Alamo Wildlife Area, and then extend south from the state land block within the Palmerita Allotment, excluding the Alamo Wildlife Area, state, and private land. This demarcation will provide protection for threatened and endangered species, riparian, and wildlife issues."
- Pg. 121 HB-6. "Management of burros in the Alamo HMA will consider and assess the fish and wildlife conservation purposes and objectives for the Alamo Wildlife Area and the mandates of the Fish and Wildlife Coordination Act and the Endangered Species Act. The purposes and objectives for the Wildlife Area are outlined in AGFD[4]'s Alamo Wildlife Area Management Plan. AGFD has indicated that they will periodically (approximately every 5 years) review and possibly revise the plan. The BLM will manage

[4] AGFD – Arizona Game and Fish Department

the burros in consultation with AGFD and USFWS[5] consistent with the Alamo Wildlife Area Management Plan. Decisions concerning burros within the wildlife area will be consistent with federal laws and regulations, including the Wild Free-Roaming Horse and Burro Act of 1971, as amended 1976 and 1978.

The BLM does not intend to maintain burros that are outside of HMA boundaries but are within the HAs, nor maintain burros that are within HA that have not been designated as an HMA. Burro use will occur within the Alamo Wildlife Area as outlined in the Alamo Wildlife Area Management Plan. Burro use may occur within the Santa Maria and Big Sandy corridors at levels developed cooperatively with AGFD and USFWS.

The BLM and AGFD will work collaboratively to provide wild burros with access to water in Alamo Lake within specific areas of the Alamo Wildlife Area. Such access will be through agreement with AGFD and compatible with the goals and objectives of the wildlife area as outlined in the Alamo Wildlife Area Management Plan.

The level of burro use that is compatible and acceptable within the Alamo Wildlife Area will be cooperatively determined by AGFD and the BLM and identified in the Alamo Wildlife Area Plan. The BLM, AGFD, and USFWS will work together to establish key monitoring areas within sensitive riparian habitat. AGFD has indicated that they believe burro use will be compatible with the purposes of the wildlife area if annual bark stripping of live trees does not exceed 3% in any of the key areas. Additional upland monitoring sites and associated levels of acceptable use may be established within the Alamo Wildlife Area if resource damage by burros is observed in those areas.

The BLM will target burro removals in sensitive habitat areas and work with AGFD and USFWS to develop other management practices (if needed) such as the construction of fencing and alternative water sources to maintain levels of acceptable burro use within the wildlife area and to protect sensitive habitats.

The BLM will evaluate all monitoring data, population data, and removal data every 5 years to assess whether the current AML continues to be appropriate for all HMAs (Havasu and Alamo). During the evaluation process, monitoring protocols and additional data needs will be analyzed. The evaluation will consider acceptable levels of use within the Alamo Wildlife Area. The evaluation and any adjustments in AML will be conducted in coordination and consultation with the AGFD and USFWS. The AGFD has stated that they will periodically re-evaluate monitoring and acceptable burro use levels within the Alamo Wildlife Area. Every effort will be made to ensure that these evaluations occur as concurrently and collaborative as feasible."

- HB-10 "The initial Appropriate Management Levels for wild burros (the number of wild burros to be managed with the HMA) in the Approved RMP are listed below. Acreages within the HMAs appear in Table 9:

  Alamo: 160
  Havasu-AZ: 166
  Havasu-CA/Chemehuevi: 108

[5] USFWS – U.S. Fish and Wildlife Service

Table 9*. Acreages within Herd Management Areas

HMA	Acreage
Alamo	189,237
Havasu AZ	268,271
Havasu-CA/Chemehuevi	24,318

*Table 9 from the LHFO RMP (BLM 2007)

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 of 1971 (as amended),
- The Federal Land Policy and Management Act of 1976 (FLPMA),
- Fundamentals of Rangeland Health (43 CFR 4180),
- Taylor Grazing Act of 1934 (as amended),
- NEPA of 1969 (as amended), and
- 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 HMAs nor adjust authorized animal unit months (AUMs) for livestock grazing within the HMAs, 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:

<u>Wild Burros</u>

- 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.

<u>Vegetation, Soils</u>

- 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 authorized 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. Population numbers used in the alternative descriptions in this EA are based on what the population is estimated to be at in January of 2024. Standard operating procedures and best management practices that would apply to the action alternatives (Alternatives A-D) are provided in Appendices E-I. Alternatives analyzed in detail include the following:

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 HMA herd sizes to AML (160 adult burros Alamo Lake HMA, 166 burros Havasu HMA and 139 burros Big Sandy HMA) 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 1,794 excess wild burros would be removed from areas in and adjacent to the HMA's (approximately 1,247 burros from the Alamo HMA, approximately 283 burros from the Big Sandy HMA and approximately 264 burros from the Lake Havasu HMA). All excess wild burros residing in areas outside of the HMA's would be gathered and removed. Once AML is reached, BLM would maintain approximately 60% males and 40 % females in each HMA to achieve a 60/40 male to female sex ratio (66 females Lake Havasu HMA, 55 females Big Sandy HMA, 64 females Alamo Lake HMA). BLM would gather up to 50% of the remaining female burros in each HMA (33 females Lake Havasu HMA, 28 females Big Sandy HMA, 32 females Alamo Lake HMA) 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 the Alternative A by adjusting the population to maintain the 60/40 sex ratio in the HMA and use fertility control vaccines to treat or booster jennies in the complex, so that up to approximately 50% of the female burros remaining in each HMA are infertile at any given time. 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 Three Rivers Complex. The combination of these actions is intended to lower the population growth rate within the complex in order to extend the intervals between removals.

Genetic monitoring samples were collected in the Big Sandy HMA in 2004 and analyzed by Texas A&M University in 2008 to determine current levels of genetic diversity (i.e., observed heterozygosity) for this herd. The analysis determined genetic variability of this herd is relatively high compared to the feral burro mean (Cothran 2008). Based on known seasonal movements of the burros within the HMA's and current herd size, it is expected that the burro herd would maintain adequately high levels of observed heterozygosity in all three HMA's within the complex, which is the measure of genetic diversity BLM uses in genetic monitoring. Genetic samples will be taken from captured burros in each area during the initial gather phase and sent for analysis. If future genetic diversity monitoring results indicate that levels of heterozygosity are lower than desirable, then BLM may choose to bring additional fertile burros into the HMA to supplement genetic diversity. Global Positioning System (GPS) radio collars may be used as part of monitoring efforts. Radio collars would not be used on jack burros.

BLM's management to achieve a TNEB is not limited to removing excess animals; it also includes measures to reduce annual population growth and to allow for recovery of degraded vegetation and hydrological resources impacted by the wild burro overpopulation. These objectives require a sufficient time frame to achieve. The Proposed Action (Alternative A) would involve three distinct types of management activities over the 10-year life of the plan. 1. Initially, the goal would be to gather and remove excess wild burros to achieve a population size as close as possible to AML within the proposed gather area either in a single first gather or with a follow-up gather(s) if all excess animals are not captured and removed in the initial gather. Based on BLM's experience over the past decades, there are a number of logistical and operational factors that can affect BLM's ability to achieve AML with a single gather, including (but not limited to): that gathers typically achieve less than a 100% gather efficiency (i.e., all wild burros in the herd cannot be gathered or observed to determine how many remain in an HMA since wild burros evade capture or remain hidden from view during a helicopter gather); a population underestimate (i.e. Hennig et al. 2022) can result in additional excess wild burros being identified in a follow-up inventory even when the targeted numbers of estimated excess wild burros has been removed; weather conditions may impede achieving the targeted removal numbers during gather operations, and limited contractor availability can impact the ability to continue with a gather until all excess animals have been removed. For this reason, if AML cannot be achieved through a single initial gather, a follow-up gather(s) may be necessary to achieve AML. 2. Over the 10-year period, the BLM would apply population growth suppression methods to reduce the herd's annual growth rate. These methods include the use of approved immunocontraceptive vaccines (with initial doses and booster doses) to gathered and released

jennies over the course of multiple gathers, along with sex ratio adjustment. Both approaches can slow population growth and help to maintain a wild burro population that is already within AML at levels that stay within or close to AML. In this way, population growth suppression methods can help to allow for resource recovery and reduce the number of excess animals that ultimately have to be removed from the public range over time. Fertility control vaccines and sex ratio adjustment measures can be applied even if AML is not reached during an initial gather. 3. Over the 10-year period, manage for a population that ensures a thriving natural ecological balance by conducting additional / maintenance gathers after the initial gather(s) to bring wild burro population back to low AML if the population grows to again exceed high AML during the 10-year plan life after low AML was achieved, and to allow for additional population growth suppression actions. Such follow-up management activities can help to provide the ecosystem with a sufficient period of time for degraded range resources to recover.

Based on BLM's experience over several decades, it is expected that gather efficiencies and other factors discussed above, as well as limitations in off-range corral space availability or annual budget appropriations may not allow for the attainment of AML during a single initial gather (i.e. if not enough burros are successfully captured and removed to reach AML). If AML is not achieved with the first gather, the BLM would return to the gather area to remove remaining excess burros above AML in one or, if necessary, more follow-up gathers. Multiple gathers may be used over a 10-year period to gather a sufficient number of wild burros as to implement (in a phased manner) the population growth suppression component of the Proposed Action, which includes sex ratio adjustment (so that the herd may sometimes be composed of as many as 60% males and as few as 40% females) and fertility control treatments (PZP[6] vaccines, GonaCon-Equine vaccine) for wild burros remaining in the HMA. Because continued management of the HMA's wild horse population at AML over the 10-year period is necessary to allow degraded range resources to recover and to achieve a thriving natural ecological balance, BLM would maintain the population at AML through additional removals and population growth suppression actions (during follow-up gathers) if the population should again exceed AML after low AML was reached.

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.

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 50% of the male burros remaining in each HMA would be gelded and released. BLM would conduct follow-up gathers as necessary over a 10-year period to maintain approximately 50% geldings in the HMA's. 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 F.

[6] PZP – ZonaStat-H Porcine Zona Pellucida

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 to from 50 % to 70% females to allow for the increased number of females remaining in the HMA's. 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 (69.5 males and 69.5 females, Big Sandy HMA) at AML (139), (80 males and 80 females, Alamo HMA) at AML (160) (83 males and 83 females, Lake Havasu HMA) at AML (166) with no fertility control or sex ratio adjustments, 232 females could have foals. Using the standard estimated 15% annual growth rate, this equates to approximately 69 burros (465*0.15=69) 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. There would be no active management to control the size of the wild burro population, control growth rates, or manage the wild burro populations at AML. The wild burro population would likely continue to increase at an approximate rate of 15% per year. By January 2026, the wild burro population could exceed 2,900 (see **Table 3**), which would be 541% 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)

HMA	AML	January 2023 Pop Est.	January 2024 Pop Est.	Estimated Over AML (2024)	January 2025 Pop Est.	January 2026 Pop Est.	Estimated Over AML (2026)
Alamo	160	1,250	1,407	1,247	1,616	1,858	1,698
Big Sandy	139	367	422	283	485	558	419

HMA	AML	January 2023 Pop Est.	January 2024 Pop Est.	Estimated Over AML (2024)	January 2025 Pop Est.	January 2026 Pop Est.	Estimated Over AML (2026)
Lake Havasu	166	374	430	264	495	569	403
All	***465***	***1,991***	***2,258***	***1,794***	***2,596***	***2,985***	***2,520***

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 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 G, H, and BLM Handbook 4700-1 Wild Horse 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).

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 commonly 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's with the most severe resource impacts, and nuisance burros on private lands within and outside the HMA.

Implementation of any action alternative would allow the herd to continue to grow. Excess wild burros over AML would be removed to maintain the herd at or near AML. After achieving AML within the HMAs, 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 circumstances/factors make it impossible to remove all of the estimated 1,794, excess burros at one time. As a result, multiple gathers (combination bait and helicopter) would likely need to occur potentially over several years before AML is reached. The number of excess burros may be higher than the 1,794 as the additional foal crops would

need to be added, should the attainment of AML take several years. The amount of time to get the population to at 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 BLM proposes to gather and remove approximately 1,000 wild burros beginning in the Spring/Fall of 2024, dropping the herd size to an estimated 1,258 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. While BLM currently estimates an additional 793 wild burros would need to be gathered, BLM would continue to remove burros from the Three Rivers Complex, HMA's based on survey results until AML is reached (Big Sandy HMA 139 wild burros Alamo HMA at 160 wild burros and the Lake Havasu HMA at 166 wild burros), for a total of approximately 1,794 animals (not including the foals eligible to be weaned 6 months or older from the 2024 foal crop).

- The BLM would begin with an initial gather to remove excess wild burros to achieve AML. Because it is not expected that achievement is possible in a single gather, BLM would conduct follow-up gather(s). Several factors such as initial herd size, animal condition, herd health, weather conditions, or other considerations could affect scheduling of the initial gather and the necessity to conduct follow-up gathers to achieve AML.

- The subsequent maintenance gather activities would be informed by ongoing monitoring and conducted in a manner consistent with those described for the initial gather.

- Genetic diversity samples would be used to monitor genetic diversity in the complex. 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 Three Rivers Complex herd to augment genetic diversity throughout the HMA's.

- 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 Three Rivers Complex boundary, such as near the Lake Havasu City limits and National Wildlife Refuges.

- 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).

- GPS radio collars may be used as part of monitoring efforts. Radio collars would not be used on jacks.

- BLM will continue rangeland health and population monitoring for the HMA's in accordance with the Kingman and Lake Havasu RMP's.

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 will 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 I, 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 and animals that no longer meet the age requirement or have been on the vaccine too long.

- Over the course of multiple gathers over the 10-year time period, BLM would

treat/retreat females with fertility control to help meet herd management objectives.

- Preliminary data from the Humane Society of the U.S. (HSUS) Pilot Project indicates that burros can be vaccinated successfully in a remote setting via darting (Kahler and Boyles-Griffin 2022). In that project, all the fertility control vaccine treated mares were captured and received at least their first (primer) dose of vaccine via hand-injection, in a chute. For PZP-ZonaStat-H vaccination, it is expected that annual vaccinations would be required to maintain a given burro's infertility. For GonaCon-Equine vaccination, two does may be expected to confer several years of infertility (Baker et al. 2018). The HSUS Pilot Project appeared to confirm that burros can be successfully darted in a remote setting. BLM or its authorized designee 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), BLM may choose remote delivery rather than capture for booster vaccines. After the initial gather, the BLM could use a population modeling software such as PopEquus (Folt et al. 2023; assuming that model's capabilities will be expanded to include burro population projections) to help inform expectations about how many animals in future gathers or actions should be removed, or jennies treated, in order to achieve herd management goals. 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. Both dart-based delivery and hand-injection delivery of fertility control vaccines are 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 E).

- A total of 88 fertility control treated animals in the complex. BLM would continue to treat and maintain approximately 88 females in the complex 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 thriving natural ecological balance or resource management objectives.

2.9.2 Use of Bait and/or Water Trapping Only

The Three Rivers Complex contains six wilderness areas for a total of approximately 282,473 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 Three Rivers Complex. 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's based on many years of data collection, resource monitoring, and multi-agency planning efforts. The current AMLs are based on established biological and cultural resource monitoring protocols and land health assessments and were approved in the Kingman RMP and Lake Havasu RMP. Delay of a gather until the AML's can be reevaluated is not consistent with or required by the WFRHBA, Public Rangeland Improvement Act of 1978, FLPMA, or the existing RMP's. Monitoring data collected within the HMA's does not indicate that an increase in AML's 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 AMLs were reevaluated at this time, it would be highly unlikely that AML's would be increased enough to accommodate the current population due to the current Rangeland health standards not being met (see vegetation and soil resources section 3.3.2). Additionally, severe resource degradation would continue occur during the time it takes to recalculate AMLs, and large numbers of excess animals would ultimately need to be removed from the complex in order to achieve AML's 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's 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 thriving ecological balance.

Once the current AMLs have been achieved and maintained, and future data suggests that adjustments in the AMLs 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 complex. For the reasons stated above, this alternative was eliminated from further consideration.

2.9.4 Remove or Reduce Livestock within the Three Rivers Complex

This alternative would remove or reduce authorized livestock grazing instead of gathering and removing wild burros within the HMAs. 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 burros. 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 Three Rivers Complex 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's 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 HMA's to be Managed Principally for Wild horses or Burros

Under 43 CFR 4710.3-2, this action would require amendment of the Kingman and Lake Havasu RMP's, 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 HMA's and HAs would violate BLM policies and other federal regulations.

Relocating nuisance wild burros to other areas within the complex 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 Three Rivers Complex located in northwestern Arizona, occupies Parts of Mohave, Yavapai and La Paz Counties. The Havasu, Alamo, and Big Sandy HA/HMA are being managed as the Three Rivers Complex because of known animal migration behavior. The Big Sandy HA/HMA is administered by the Kingman Field Office. The Alamo and Lake Havasu HMA are administered by the Lake Havasu Field Office. The Big Sandy HMA is bordered by the Alamo HMA on the south and extends to the confluence of Copper Creek and Burro Creek and from one to ten miles west of the Big Sandy River. The Havasu HA/HMA runs south from Interstate 40, surrounds Lake Havasu City and meets the Alamo HMA on the southeast side of the area. The Alamo HA/HMA surrounds Alamo Lake, adjoins both the Big Sandy HA/HMA to the north and Lake Havasu HA/HMA to the west. Major Physical features of the Three Rivers Complex include the Santa Maria and Big Sandy Rivers, Alamo Lake, Bill Williams River, Lake Havasu, Colorado River, and adjoining mountain ranges. BLM administers livestock grazing on 34 allotments that fall within the boundaries of the three HMA's (refer to 3.3.6 Livestock Grazing).

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 Three Rivers Complex range is Elephant Mountain within the Big Sandy HMA at 5,236 feet. The Alamo and Lake Havasu HMA are much lower in elevation, with Alamo Lake at approximately 1100 feet and Lake Havasu Approximately 450 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.

Six wilderness areas (Arrastra Mountain, Upper Burro Creek, Rawhide Mountain, Swansea, and Aubrey Peak) exist within the HMA's (see Appendix C, Map 5). The Wilderness areas exhibit a rugged topography and support a wide variety of animals, including a desert bighorn sheep.

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	Yes	No	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	Yes	No	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)	**Yes**	**Yes**	Trap site locations would be located outside of any ACEC to the best ability. If trap sites must be placed in an ACEC, they will be placed in a disturbed site, void of vegetation to avoid any potential conflicts with sensitive habitat or specific cultural resources. ACEC locations are depicted on Map 5 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 and Lake Havasu RMP's) within the gather area. **Impacts to ACEC values, pertaining to wildlife are analyzed in the document.**	**3.3.5 Wildlife Resources**
Special Status Species	**Yes**	**Yes**	**Analyzed in document.**	**3.3.2 Vegetation and Soil Resources 3.3.5 Wildlife Resources**
Cultural Resources	Yes	No	A number of known cultural resources exist within the Three Rivers Complex that would be avoided during the gather in accordance with gather SOPs. Trap sites	--

Resource or Use	Present Yes/No	May Be Affected Yes/No	Rationale for Non-analysis	Analyzed in Section
			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	No	No	There are no low-income, minority, or tribal populations within the area that would experience disproportionate impacts from implementing any of the alternatives.	--
Farm Lands (Prime and Unique)	No	No	Resource not present.	--
Fire Management	No	No	No impacts to fire management activities would occur.	--
Fish Habitat	Yes	No	Project area does contain suitable fish habitat; however, trapping would not occur in these areas.	--
Floodplains	Yes	No	While floodplains exist within the project area, they will not be impacted by the proposed activities.	--
Forestry Resources and Woodland Products	No	No	Resource not present	--
Human Health and Safety	**Yes**	**Yes**	**Analyzed in document.**	**3.3.7 Human Health and Safety**
Land Use Authorizations	Yes	No	Lands and realty authorizations would not be affected as existing roads would be utilized.	--
Lands with Wilderness Characteristics	Yes	No	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	**Yes**	**Yes**	**Analyzed in document.**	**3.3.6 Livestock Grazing**

Resource or Use	Present Yes/No	May Be Affected Yes/No	Rationale for Non-analysis	Analyzed in Section
Migratory Birds	**Yes**	**Yes**	**Analyzed in document.**	**3.3.5 Wildlife Resources**
Mineral Resources	Yes	No	Mining/minerals actions would not be impacted by the alternatives as no gathers would occur in active mining areas, without mine operator's permission.	--
Native American Religious Concerns/ Traditional Values	Yes	No	The Three Rivers Complex has 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	**Yes**	**Yes**	**Analyzed in document.**	**3.3.2 Vegetation and Soil Resources**
Paleontological Resources	Yes	No	The alternatives would not impact paleontological resources as there would be minimal surface disturbance associated with any alternative.	--
Recreation	Yes	No	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 HMAs and HAs. Activities would take place over a short duration (typically less than 12 hours in any location) and be in conformance with the Kingman RMP (BLM 1995) and Lake Havasu RMP (BLM 2007) for the management of recreational resources. Users of public lands would still have access to use their public lands with little to no interruption. Although users may be temporarily displaced, there are public lands located nearby that provide similar or substantially the same opportunities as those available on temporarily inaccessible public lands. Therefore, recreational opportunities are not affected nor are the beneficial outcomes for which BLM is managing.	--
Socioeconomics	Yes	No	The action alternatives would not contribute to the local populations or tax-base of local communities on a	--

Resource or Use	Present Yes/No	May Be Affected Yes/No	Rationale for Non-analysis	Analyzed in Section
			long-term basis, therefore there would be negligible impacts to socioeconomics.	
Soil Resources	**Yes**	**Yes**	**Analyzed in document.**	**3.3.2 Vegetation and Soil Resources**
Threatened or Endangered Species	Yes	No	Activities would occur outside of Threatened, Endangered, Proposed, or Candidate Species, or to Critical Habitat.	--
Travel and Transportation Management	Yes	No	All vehicular or off-highway vehicle travel would be along existing or designated roads, trails, and navigable washes. No cross-country travel would be authorized under any alternative and therefore no impacts would occur to the existing transportation network or decisions associated with that network.	--
Vegetation Resources	**Yes**	**Yes**	**Analyzed in document.**	**3.3.2 Vegetation and Soil Resources**
Visual Resources	Yes	No	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	No	No	The alternatives would not use or introduce any hazardous or solid wastes.	--
Water Resources	**Yes**	**Yes**	**Analyzed in document.**	**3.3.3 Water Resources**
Water Quality (Surface/ Ground)	No	No	The project would not impact water quality (Surface/Ground)	--
Wetlands/ Riparian Zones	Yes	No	Activities would not occur within wetland or riparian zones. Riparian resources are addressed in the water resources section.	--
Wild and Scenic Rivers	Yes	No	Proposed but undesignated wild and scenic river (WSR) segments (Big Sandy, Burro Creek, and Santa Maria River) occur within the project area as identified in the Kingman RMP (BLM 1995). Gather operations would indirectly take place within the confines of the segments (e.g., low helicopter overflights or gather	--

Resource or Use	Present Yes/No	May Be Affected Yes/No	Rationale for Non-analysis	Analyzed in Section
			personnel within segments) but activities would not impact any of the identified WSR values (free-flowing, water quality, tentative classifications, and outstandingly remarkable values) of the identified segments.	
Wild Horses and Burros	**Yes**	**Yes**	**Analyzed in document.**	**3.3.1 Wild Burros**
Wilderness	**Yes**	**Yes**	**Analyzed in document.**	**3.3.4 Wilderness**
Wildlife	**Yes**	**Yes**	**Analyzed in document.**	**3.3.5 Wildlife Resources**

3.3 Resources/Issues Brought Forward for Analysis

The potential impacts to the resources and resource uses listed in **Table 4** above were evaluated by the IDT to determine if detailed analysis would be necessary. Through this process, the IDT determined the following resources warrant detailed analysis in this EA.

3.3.1 Wild Burros

Affected Environment

Burros were first introduced to the Three Rivers Complex in Arizona by miners and prospectors in the early 1860s as work animals. Over time, some of these burros escaped or were released and a feral population was established. 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; periodic die-offs could occur when resource availability is extremely low (NRC 2013). Across the desert southwest, mountain lions are thought to be the only predator that predates on wild burros with any frequency, but that frequency is thought to be low (reviewed in Douglas and Hurst 1993). Lundgren et al. (2022) documented that mountain lions kill feral burros in Death Valley National Park. Lundgren et al. (2022) advocated for not eliminating wild equids from landscapes, but that is not a consideration on HMAs, where the BLM aims to have herd sizes of wild horses and burros that are at or above the low level of AML. BLM does not have the legal authority to regulate or manage mountain lion populations, and it is not clear whether there are any mountain lions in the Three Rivers Complex that specialize on burros as prey. Regardless, the frequency of predation by lions has apparently not slowed down the burro herd growth rate in Three Rivers Complex in recent years. Therefore, it is not thought that mountain lion density is high enough in the Three Rivers Complex 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 wolves or bears are not known to exist in the complex. No information exists to suggest that disease would

substantially reduce burro herd growth in the Three Rivers Complex now or in the future. Further review on the interactions between wild burros and their environment, including a review of scientific papers noting positive and negative ecological effects of wild burros, is included in Appendix E. 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 for wild burros as part of its multiple-use and sustained yield mission.

The Three Rivers Complex wild burro population was most recently surveyed by helicopter in 2021 with BLM personnel in cooperation with the AGFD. Two helicopters were used to survey this area due to its large size. Surveys were conducted using methods recommended by BLM policy (BLM 2010) and the National Academy of Sciences Review (NRC 2013) with detailed field methods described in Griffin et al (2020). Data collected during the surveys (Appendix C Map 6) was analyzed by the BLM using standard methods for analysis of simultaneous double-observer data (Ekernas and Lubow 2019). The survey indicated a total population estimated a total population of 1,731 with a 90% confidence interval from 1,651 to 2,012 (includes adults and foals). Of the 1,731 total burros, 1,599 were estimated to be adults and 133 as foals. There were 287 unique groups of burros recorded throughout the HMA, with group sizes ranging from one to 21 burros (see Appendix C, Map 6).

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 Three Rivers Complex herd. This rate reflects the addition of new animals to the herd (i.e., births and immigrants) as well as mortalities and emigrants.

It is estimated that the Three Rivers Complex wild burro population will be approximately 2,259 adult burros by early 2024 (see **Table 2**). This number is based on the estimated number of adults and foals that were present in mid-November 2021, 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 expected new herd growth, minus the number removed.

Table 5: Population Estimates

Year	Population Estimate (Adults)	Net Recruitment	Burros Removed
2021, Fall (survey estimate)	1,599	132	0
January 2022	1,731	260	0

Year	Population Estimate (Adults)	Net Recruitment	Burros Removed
January 2023	1,991	299	31
January 2024	2,259		

Based upon all information available at this time, the BLM has determined that there will be a minimum of approximately 1,794 adult wild burros over AML by January 2024 (see **Table 3**) within the Three Rivers Complex. That is the estimated number of adult burros that will 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 Three Rivers Complex (See Appendix D, Figures 1, 3, 6, and 7).

A population inventory flight is not planned prior to the initial gather contemplated under the action alternatives since the complex is known to be at least 1,000 wild burros over AML. A population inventory flight would be conducted after the initial gather, to gain a more precise and updated estimate of herd size at that time. 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 by BLM staff 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 93, 95 and Alamo Road causing public safety concerns for the public and motorists along the highways (see Appendix D, Figures 4 and 5).

Wild burros gathered from the Big Sandy 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 Big Sandy samples were most genetically similar to burro samples from the Black Mountain HMA (Cothran 2008). Cothran referred to the genetic samples from the 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 Big Sandy" AML is 139 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." In fact, since 2004 the burro population size in the Three Rivers complex has been far greater than 139, such that the rate of loss of genetic diversity would be expected to be lower than Dr. Cothran's comments imply. Observed heterozygosity for the Big Sandy samples 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, which may actually be an underestimate of genetic effective population size for this complex considering the complex-wide AML of 465, then heterozygosity loss per generation would only be approximately 0.2%. In keeping with guidelines in the BLM wild horse and burro herd management handbook (BLM 2010), fertile wild burros from other HMAs could be introduced into Three Rivers Complex HMA's in the future if genetic monitoring results 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 Three Rivers Complex 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 Three Rivers Complex can be considered part of a larger metapopulation (NRC 2013) that has demographic and genetic connections with other BLM-managed herds. Relative to wild burro movement distances, the north end of the Havasu HMA is extremely close to the Black Mountain HMA. So, it is probable that there is genetic interchange among wild burros, happening without human intervention, from the south end of Black Mountain HMA through the entirety of the Three Rivers Complex. The 2013 National Academies of Sciences report included additional evidence that shows that the Big Sandy herd, which is part of the Three Rivers Complex herd, is not genetically unique, with respect to other wild burro herds. Appendix F of the 2013 NRC report shows the estimated 'fixation index' (Fst) values between 25 pairs of samples from wild burro herds that had been genotyped up to that time. Fst 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 Fst indicate that a given pair of sampled herds has a shared genetic background; the lower the Fst value, the more genetically similar are the two sampled herds. Values of 0.10 indicate only a modest level of differentiation; Fst values for the Three Rivers Complex HMA wild burro herd had pairwise Fst values that were less than 0.10 with 12 of the 24 other sets of samples (NRC 2013). 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 Three Rivers Complex 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 that remain on the range, and the rangeland resources they depend on. 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 Three Rivers Complex boundaries to achieve the AML in each of the HMA's (Big Sandy HMA 139, Alamo HMA 160, and the Lake Havasu HMA 166). All wild burros residing outside the HMA boundaries 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. Taking into consideration the planned level of fertility control (with half of the jennies effectively contracepted in any given year), and sex ratio adjustments, there should be at least 92 potentially fertile females in the complex at any time. This implies that, given an expected foaling rate of approximately 68% (Ransom et al. 2016) there should be at least approximately 60 foals born per year. Compared to a herd with no fertility control vaccine applied and no sex ratio skewing, this would be approximately a 60% 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,
- Handling for the purpose of attaching GPS radio collars (a subset of jennies), 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 Gathers[7]. 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 AZ Wild Horse and Burro Lead). 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 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

[7] BLM Washington Office (WO) IM 2015-151, "Comprehensive Animal Welfare Program for Wild Horse and Burro Gathers" https://www.blm.gov/policy/im-2015-151

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 body 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.

Across all BLM burro gathers in 2010-2019, total gather-related mortality averaged less than 0.1%, which is very low when handling wild animals (Scasta 2020); this rate reflects acute mortality at gathers. Another 0.2% or less of the burros captured were humanely euthanized due to pre-existing conditions and in accordance with BLM policy (Scasta 2020). Data summarized by Scasta (2020) supports the conclusion that the use of helicopters, motorized vehicles, and bait/water traps are all 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 transporting operations would be conducted in accordance with the CAWP for WHB gathers and facilities.

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. GPS radio collars could be affixed to a small number of wild burro jennies that are intended to go back to the range. The number would be no more than 100 over the 10-year time period of this decision, and no more than 40 fit to jennies after any given gather. Fitting would take place at temporary holding facilities, or at an off-range prep facility corral with a padded chute. That process could entail transient stress as animals must be briefly restrained for proper radio collar fitting. Radio collars are not expected to cause long-term physical damage, and any use would include periodic visual observation, to ensure that collars are not causing injuries.

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 E, Literature Review Effects of Fertility Control Vaccines, Sex Ratio Manipulations, Sterilization, and Equids on Rangeland Ecosystems. Direct effects 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 Three Rivers Complex 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 280 fertile jacks and 185 females. Of those females, 93 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 465 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 herds are 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's 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's 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's 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.

GPS Radio Collars and Tail Tags

To facilitate the BLM's monitoring of released wild burros, United States Geological Survey (USGS) staff or other similarly qualified personnel may, at the direction of the authorized officer, fit lightweight GPS radio collars to wild burros before such animals are released back to the Three Rivers Complex. If funding and logistics allow for this, it would allow for detailed wild burro monitoring in this herd. Telemetry-based monitoring would allow the BLM to learn more about wild burro movement patterns, survival, and foaling in the complex. Collars would only be fit onto jennies that are 3 years or older, and which are in good body condition at the time of fitting (i.e., BCS of 4 or more). Having radio collars on jennies could allow the BLM or other cooperating institution, to periodically locate the animals with telemetry and check whether they have a foal. Detailed information about wild burro movements in the complex. of the type that GPS telemetry can provide, is not currently available. The location data from the telemetry devices could inform the BLM about natural resources that the wild burros use throughout the year.

Collars would be fit onto fewer than 100 burros over the 10-year period, with no more than 40 attached after any given gather. The GPS radio collars (< 1 kg) would be programmed to collect one or more locations per day. The collars are designed to prevent negative impacts to burro welfare and are expected to detach within 3 years. Collars are solid-battery powered and will include a very-high frequency (VHF) transmitter to facilitate unit location and recovery.

Based on numerous studies that have used modern radio collars with remote releases to study the ecology of wild ungulates and equids in particular, the current design of these devices have minimal effects on the animals wearing them. For example, from March 2015 into 2020 researchers at the US Geological Survey conducted a preliminary study on captive wild horses and burro jennies to determine proper fit and wear of radio collars (Schoenecker et al. 2020). The condition of wild horses and burros wearing radio collars was compared to non-collared controls and documented with photographs. There was almost no impact in terms of rubbing or wear from radio collars and behavior of collared and uncollared mares or jennies did not differ. Although they are unlikely, there are some possible effects from the use of collars on horses or burros. All collars would have two independent mechanisms to cause the collars to be mechanically released from the animals: a drop-off mechanism set to release on a pre-determined date (usually 24-36 months after placement) and a triggerable drop-off mechanism that can be engaged with an ultra high frequency (UHF) signal. On stallions, on rare occasions, a collar over an ear has been

observed, so no stallions or jacks would be collared. There have been no reports that the BLM is aware of, of a wild horse or burro being caught by the collar on vegetation. All collared jennies would be monitored visually every 4-6 weeks, to confirm that no abrasions are occurring. Collars may be fitted too tightly, or a burro might grow, tightening the collar. If these situations are observed, the UHF remote-release function would be deployed remotely. If the remote-release drop-off failed, the collar could be removed after capturing the animal through approved methods part of the Proposed Action. Serious neck abrasions or sores have not been reported in the wild where wild horses or burros have been collared recently (e.g., Collins et al. 2014; Schoenecker et al. 2020). See Appendix P for further details on GPS collar fitting and expected potential effects to animals with collars.

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 E.

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 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 more than 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's 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's population would continue to increase beyond the capacity of the available habitat, even more bands of burros would leave the boundaries of the HMA's 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 and 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 communities in the Three Rivers Complex are composed of several Major Land Resource Areas within the Western Range and are described by the United States Department of Agricultural Handbook 296. These resource areas include the Mojave Basin, Mogollon Transition South, Mogollon Transition North, and Sonoran Basin and Range. Common plant species within these areas and within feral burro habitat include Creosote bush (*Larrea tridentata*), White Bursage (*Ambrosia dumosa*), Four-winged Saltbush (*Atriplex canescens*), Acacia spp. (*Senegalia spp.*), Mesquite spp. (*Prosopis spp.*), Ocotillo (*Fouquieria splendens)*, Paloverde spp. (*Cercidium spp.*), Desert Ironwood (*Olneya tesota*), Smoketree (*Psorothamnus spinosus*), Flat-top Buckwheat (E*riogonum fasciculatum*), Triangle-leaf Bursage (Ambrosia deltoidea), Desert Wolfberry (*Lycium fremontii*), Brittlebush (*Encelia farinosa*), Burroweed (*Isocoma spp.*), and Desert Broom (*Baccharis sarothroides*). Big Galleta (*Pleuraphis rigida*), Desert Needlegrass (*Achnatherum speciosum*), Black Grama (*Bouteloua eriopoda*), Blue Grama (*Bouteloua gracilis*), and Spike Muhly (*Muhlenbergia wrightii*) are common perennial grasses on the uplands and lower elevations where burro habitat occurs. Succulent and cacti species include Yucca spp., Saguaro cactus (*Carnegiea gigantea*), cholla spp. (*Cylindropuntia spp*.), and

Prickly Pear spp. (*Opuntia spp.*). The vegetative community represents multiple habitat types for wildlife species within the Three Rivers Complex HMAs. Several invasive and non-native plant species are found in the project area with red brome being the most dominant.

The Arizona Standards for Rangeland Health of 1997 (Standards) are useful criteria to determine soil and vegetation conditions and the causal factor(s) for any potential rangeland degradation. Standards set goals for the desired condition of biological and physical components and characteristics of rangelands including 1) Upland Health, 2) Riparian – Wetland Health, and 3) Desired Resource Conditions. Soil and vegetation monitoring data from Key Areas or other monitoring plots are evaluated to determine the achievement of Standards at each monitoring location and/or the area the monitoring location represents. Monitoring data and observations at monitoring sites can be used to determine the causal factor(s) for areas failing to achieve Standards.

LHFO RMP doesn't establish vegetation utilization objectives for general grazing (livestock, burros, wildlife) within the Alamo and Lake Havasu HMA. However, the KFO RMP establishes utilization objectives through the Hualapai-Aquarius Final Grazing EIS where 50% of the available forage is allocated for livestock, wild burros, and wildlife and the remaining 50% for plant maintenance, watershed health, and soil protection. Of the 50% allocated for use 40% is for big game, 30% for wild burros, and 30% for livestock. Forage is allocated to animal units[8] 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.

Wild burros have also been a contributing factor for riparian areas not meeting proper functioning condition, as defined by AZ Standards for Rangeland Health (Standard #2). Some springs show a downward trend and may be non-functional or functional but at risk. Following

[8] Animal Unit: One mature (1000–pound) cow or its equivalent based on an average daily forage consumption of 26 pounds of dry matter. BLM 1995

Animal Unit Month: The amount of forage necessary for the sustenance of one cow or five sheep for one month. (BLM 1995)

the Bill Williams Complex and Bishop allotment (2022) Rangeland Health Assessment and Evaluation Report (RHA), a Determination Document (DD) identifies wild burros as one of the causal factors for non-achievement of Standards within the Alamo and Lake Havasu HMAs (Appendix O). Three of the five allotments assessed in this RHA that make up the majority of the HMAs were authorized for ephemeral use only and had not been authorized for grazing in 30 to 40 years. Therefore, the majority of the riparian damage observed can be attributed to wild burros.

In 2023, the Palmerita Ranch Allotment RHA was completed (Appendix Q). The determination document showed standard three was not achieved. Extended drought, increased OHV use and Wild burros were determined to be the causal factors for the non-achievement. The RHA recommends steps be taken to reduce overpopulations of burros in the Alamo and Big Sandy HMA.

Utilization data using Range Utilization Key Forage Plant Method was collected for the Big Sandy HMA in 2016, 2018 and 2023. Utilization data collected in the Big Sandy HMA, not covered by a RHA, shows moderate to heavy use on key species at some key areas. Therefore, some areas within this HMA could be failing to achieve Standards and wild burros may be a causal factor for non-achievement.

Data collected at 11 key areas in 2016 showed heavy (61-80%), moderate (41-60%) light (21-40%) and slight (1-20%) levels of utilization on key plant species, with 72% of key areas at slight or light levels of utilization, 18% of key areas with moderate levels of utilization and 1% showing heavy use on key plant species.

In 2018, data was collected at four key areas where three of the four key areas showed severe (81-94%) use on perennial grass species. Utilization of palatable shrub species on the same sites showed heavy (61-80%) and light (21-40%) use indicating a depletion of desirable grass species. Precipitation in 2018 was lower than average (Table 7).

Data collected at 11 key areas in 2023 show heavy (61-80%), moderate (41-60%) light (21-40%) and slight (1-20%) levels of utilization on key plant species (See Appendix C Map 7). Four of the eleven key areas monitored showed heavy use on perennial grass species (Appendix C Map 7), four of the key areas at moderate levels of utilization on perennial grass species and three of the key areas at light or slight levels of utilization on key on perennial grass species. No key areas fell within the “No Use” category for 2023.

Average use across all key areas for 2016, 2018, and 2023 are listed below for each key species (see **Table 6**). Additionally, bark Stripping of undesirable forage species not monitored for utilization was observed on Ocotillo and Palo Verde at Key areas within the Big Sandy HMA (See Appendix D Figure 6 and 7).

Table 6: Big Sandy HMA Utilization for Key Plant Species

Common Name	Scientific Name	Average Utilization Across All Key Areas (2016)	Average Utilization Across All Key Areas (2018)	Average Utilization Across All Key Areas (2023)	Highest Use observed from 2016 to Present
Flattop buckwheat	*Eriogonum fasciculatum*	22%	32%	11%	35%
Big galleta	*Hilaria rigida*	45%	84%	48%	87%
Mormon tea	*Ephedra nevadensis*	39%	17%	38%	40%
Globe mallow	*Sphaeralcea ambigua*	42%	11%	71%	76%
Desert Trumpet	*Eriogonum inflatum*	31%	0%	20%	31%

Data from the Western Regional Climate Center was used to determine the annual precipitation for the Big Sandy HMA. Data was pulled for three weather stations (Alamo Dam, Wikieup and Bagdad) and the total precipitation for calendar years 2016, 2018 and 2023 are displayed in ***Table 7*** below.

Table 7: Precipitation Data for the Big Sandy HMA (general area)

Weather Station/ Rain Guage	2016 Precipitation total	2018 Precipitation total	2023 Precipitation total (as 0f 8/15/2023	20 Year Average	Station Average
Alamo Dam	6.94	6.59	5.26	7.45	8.75 (38 years)
Wikieup	11.31	7.3	7.4	7.21	10.11 (59 years)
Bagdad	17.76	9.92	10.5	13.05	14.11 (74 years)

The amount of precipitation is directly correlated to the amount of forage available for use. All three stations show the average rainfall over the past 20 years is significantly less than the total station average. This indicates that the potential for forage production may be declining.

The soils are highly variable, ranging from very shallow and rocky to very deep depending on location (i.e., mountain slopes vs valley bottoms). Soils are typically well draining to somewhat excessively draining and have very low available water capacity (Natural Resources Conservation Service 2015). Excessive utilization and hoof action from the over population of burros can create soil compaction and reduce reproductive capabilities of vegetation and destruction of biocrust creating more bare ground and expose soils making them susceptible to erosion (Belnap et al. 2001).

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

Traps, bait stations (for applying fertility control remotely), 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 gathering of excess wild burros to bring the population to AML, within the Three Rivers Complex, would help the area make progress towards achieving Standards where they are currently not being achieved. Managing wild burros at AML is expected to reduce utilization of key forage species, reduce hoof action on soils, reduce the potential spread of invasive species, and reduce impacts to riparian areas which include T&E habitat. The reduction of these impacts would increase vegetation cover and forage availability, improve soil health, reduce erosion, improve riparian and watershed health, and improve wildlife habitat in the long term.

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 of 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 resulting in the non-achievement of Standards throughout the Three Rivers Complex HMA. High utilization on vegetation will 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 Three Rivers Complex contains riparian resources in the presence of semi-perennial rivers and 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 functioning seeps and springs has been heavily impacted by burros (See Appendix D Figure 3). Current monitoring and observation of spring resources shows a large reduction in functional and available spring-related vegetation. The river systems are highly vegetated and contain Threatened and Endangered (T&E) species and their habitat but are not currently impacted by burro use.

Environmental Effects of Alternative A, B, C and D

Removing excess wild burros from the Three Rivers Complex 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.

Environmental Effects of the No Action Alternative

Trampling and trailing (See Appendix D Figure 2) 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. Reduced water availability from springs would increase grazing pressure within the river systems leading to degradation on riparian and T&E species habitat.

3.3.4 Wilderness

Affected Environment

The Three Rivers Complex to include the Alamo, Big Sandy, and Lake Havasu HMAs includes portions of the Arrastra Mountain (67,725 acres), Aubrey Peak (13,520 acres), Rawhide Mountains (37,589 acres), Swansea (15,887 acres), and Upper Burro Creek (4,980 acres) Wilderness areas while the herd area (project area) includes portions of the Arrastra Mountain (46,488 acres) and Tres Alamos (2,045 acres) Wilderness areas. Arrastra Mountain, Aubrey Peak, Tres Alamos, and the Upper Burro Creek Wilderness are managed by the KFO while the Rawhide Mountains and Swansea Wilderness are managed by the LHFO. The Aubrey Peak, Tres Alamos, and Upper Burro Creek Wilderness areas all have approved Wilderness Management Plans (WMPs) that address management of burros and therefore have identified the minimum tool necessary for population estimates and gather operations as outlined below:

- Aubrey Peak – Actions 1G and 1H address management of burros (BLM 1997a) to include (1G) “Allow for census flights for wild burros every three years and lasting about three days. The flights would occur during April or May and result in brief periods when

the helicopter would be over wilderness"; and (1H) "Allow for flights for capturing wild burros every three years. They would occur during the summer and last about two days."

- Tres Alamos – Management action 9 addresses management of burros (BLM 2000) to include "Conduct aerial census of wild burro population once every three years. This may include approximately 15 minutes of low level (less than 500 feet) helicopter flight. Low level helicopter flights associated with wild burro removals *may* occur in the area but are not anticipated to intrude within the boundaries of the wilderness area."
- Upper Burro Creek – Actions 1C and 1D address management of burros (BLM 2005a) to include (1C) "Conduct low-level helicopter census flights for wild burros every three years. These flights would occur during a three-day period between March and May. Census flights are conducted at 200 feet above ground level on north-south transect lines one half mile apart. Total flight time within wilderness during census operations would be less than two hours"; and (1D) "Conduct periodic capture and removal of excess wild burros. Capture operations would involve the use of a helicopter flying at extremely low altitude. Capture sites and equipment (portable corrals, trailers, vehicles, etc.) would be located outside wilderness. The helicopter would be used to herd animals to capture sites outside wilderness boundaries. Duration of this operation would be about two days and would occur every three or four years during the spring or summer months."

The Arrastra Mountain, Rawhide Mountain, and Swansea Wilderness do not have a WMP and therefore management of burros has not been addressed with respect to the Wilderness Act of 1964 or subsequent designation acts. Irrespective of the status of WMPs, all these wilderness areas are managed by KFO and LHFO to preserve wilderness character, manage wilderness for public purposes of recreational, scenic, scientific, education, conservation, and historic use while preserving wilderness character, and effectively manage uses permitted under Section 4(c) and 4(d) of the Wilderness Act of 1964 while preserving wilderness character.

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

Conducting population surveys and subsequent gathers when surveys indicate burros are above AML within the Three Rivers Complex would result in improved ecological function of the wilderness areas. This would improve wilderness character and fulfill the BLM's objectives for management of wilderness as outlined in BLM Manual 6340, Management of BLM Wilderness. Wilderness character would be temporarily denuded in the Aubrey Peak, Tres Alamos, and Upper Burro Creek Wilderness areas during census and gather operations as outlined in the respective WMPs for that area. All census and gather operations in these areas shall follow the action objectives contained in the applicable WMP as outlined in the affected environment above.

Since the Arrastra Mountain, Rawhide Mountain, and Swansea Wilderness areas do not have a WMP to address census and gather operations, the minimum tool to complete these activities would follow existing policy found in BLM Manual 6340, Management of BLM Wilderness as outlined below:

- BLM Manual 6340 (BLM 2012) addresses burro management in HMAs when management of the population requires activities prohibited by Section 4(c) of the Wilderness Act as outlined in Alternative A, B, C, and D. Any prohibited activities used to manage burro populations would be documented through a Minimum Requirements Analysis Framework (MRAF) process to determine if use of those prohibited activities is the minimum tool prior to conducting census or removal operations.

Wilderness character in these wilderness areas would only be denuded by low-level overflights associated with census and gather operations. Per previous WMPs, these operations should only take place in the Spring and Summer months to minimize wilderness character impairment to visitors during the Fall and Winter months. There would be no significant impact to wilderness character in any of these wilderness areas as the census and gather operations would take place over a short-duration and during low visitation months. All activities conducted over wilderness would be documented through a report submitted to the KFO or LHFO Outdoor Recreation Planners to determine impacts to wilderness character from operations. The report shall include the dates and times of flights, flight time spent over wilderness, and what areas of the wilderness the helicopter flew over.

Environmental Effects of the No Action Alternative

Burros would continue to be above AML and therefore overutilization of forage within wilderness areas would continue to diminish ecological function of the area increasing impacts to wilderness character over time. Not conducting population survey flights or gather operations would impact the untrammeled, natural, and unique, supplemental, or other features of value within each of the wilderness areas incrementally which could lead to adverse ecological impacts diminishing other important characteristics of these wilderness areas. These impacts, while not directly significant, could become significant with time and management inaction could lead to deteriorated wilderness conditions requiring more heavy-handed direct manipulation of the wilderness environment in the future to restore natural conditions. Conversely, taking no action would have no direct impact on wilderness character resulting from census and gather operations to manage burro populations.

3.3.5 Wildlife Resources

Affected Environment

General Wildlife Species

Typical mammals found in the project area are coyote (*Canis latrans*), bobcat (Lynx rufus), raccoon (*Procyon lotor)*, skunk (Mephitidae family), Kit fox (*Vulpes macrotis*), Merriam's kangaroo rat (*Dipodomys merriami*), White-throated woodrat (*Neotoma albigula*), White-footed mouse (Peromyscus leucopus), Black-tailed jackrabbit (*Lepus californicus*), Desert cottontail (*Sylvilagus audubonii*), Harris's antelope squirrel (*Ammospermophilus harrisii*), and bat spp... Common avian species include Western Burrowing owls (*Athene cunicularia hypugaea*), Red-tailed hawk (*Buteo jamaicensis*), Cooper's hawk (*Accipiter cooperii)*, Golden eagle (*Aquila chrysaetos*), Prairie falcon (*Falco mexicanus*), Common raven (*Corvus corax principalis),* Turkey vulture (*Cathartes aura*), Western Meadowlark (*Sturnella neglecta)*, Ladder-back woodpecker (*Dryobates scalaris*), Ash-throated flycatcher (*Myiarchus cinerascens*), Canyon

wren (*Catherpes mexicanus*), and Greater roadrunner (*Geococcyx californianus*). Reptile species include Sonoran Desert tortoise (*Gopherus morafkai*), Western Diamondback rattlesnake (*Crotalus atrox*), Gopher snake (*Pituophis melanoleucus*), King snake (*Colubridae* family), Common Side-blotched lizard (*Uta stansburiana*), Western Whiptail lizard (*Cnemidophorus tigris*),and Ornate Tree lizards (*Urosaurus ornatus*). Some common invertebrates include Tarantulas (*Aphonopelma spp.*) and Scorpions spp. and other arthropods. Common game species found are White-winged dove (*Zenaida asiatica*), Mourning dove (*Zenaida macroura*), Gambel's quail (*Callipepla gambelii*), Javelina (*Pecari tajacu*), Mule deer (*Odocoileus hemionus*), White-tailed deer (*Odocoileus virginianus*), Desert Bighorn sheep (*Ovis canadensis*), and Mountain lion (*Puma concolor*).

Area of Critical Environmental Concern (ACEC)

There are eight ACEC's within the project area and they include Crossman Peak Scenic (44,005 acres), Swansea Historic District (5,559 acres), Three Rivers Riparian (17,374 acres), Aubrey Peak Bighorn Sheep Habitat (1,090 acres), McCracken Desert Tortoise Habitat (974 acres), Poachie Desert Tortoise Habitat (5,290 acres), Burro Creek Riparian and Cultural (10,979 acres), and the Clay Hills Research-Natural Area (1,117 acres). ACEC's will be avoided of project activities to the best ability. If actions occur within an ACEC, the BLM biologist will provide guidance and potential surveys if needed. All sensitive resources managed within the ACEC's would be avoided.

Desert Bighorn Sheep (Ovis canadensis)

The Three Rivers Complex covers bighorn sheep habitat within and outside of ACEC's and designated wilderness. Bighorn sheep share similar habitat conditions and may be present during project operations. Mitigation will be followed according to designated ACEC and wilderness prescriptions. Any actions occurring outside of ACEC'S, or designated wilderness will be consulted with internal resources and cooperating agencies. See Appendix C, Map 8 for bighorn sheep habitat.

Environmental Effects of Alternative A, B, C and D

Removing excess wild burros from the Three Rivers Complex, and managing wild burros at AML, would result in improved habitat conditions for all wildlife species by increasing herbaceous vegetative cover and reduce pressure at water available sites. 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 decrease competitive stress on native wildlife and improve habitat conditions.

Gather operations/transport 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. If traps will be set close to water, seasonal mitigation will be in place to reduce impacts to migratory birds and species of concern.

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 and wildlife would not be disturbed by trapping and holding activities. Continuation of nuisance gathers on private property 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. Habitat quality would continue to decline and wildlife would not have the resources needed, potentially leading to a higher mortalities and reduction of wildlife reproductive capabilities.

Special Status Species

Affected Environment

Some 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 (avian and non-avian) with potential to occur in the project area are discussed in Appendix J. BLM sensitive species list for Arizona are provided in Appendix M.

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 within the Three Rivers project area. Primary threats to tortoise in Arizona are habitat destruction, fragmentation, and degradation. BLM manages desert tortoise as Sensitive Species through the BLM Manual, Section 6840 to implement measures to conserve tortoise and its habitat by minimizing or eliminating threats affecting the status of the species or to improve the condition of its habitat. KFO's land use plan has classified tortoise habitat and prescribed allowable uses within tortoise habitat, managing appropriate levels of use and best management practices for grazing and other activities. (CCA, 2015)

The BLM identified general areas of Category I, II, and III Desert Tortoise Habitat (See Appendix C Map 9) with Category I as the highest level of protection determined by habitat detailed in Table 1 in the Desert Tortoise Report for Compensation, Appendix N. There is approximately 34,345 acres of Category I (17,173 acres in HA's and 17,172 acres in HMA's), 308,470 acres of Category II (166,619 acers in HA's and 141,851 acres in HMA's), and 538,812

acres of Category III (180,965 acres in HA's and 357,847 acres in HMA's). Activities occurring within Category I habitat would be avoided. If activities must occur within Category I habitat during active season, the BLM wildlife biologist will survey prior to disturbance. Guidelines for Handling Desert Tortoise will be given out to all personnel (Appendix K).

Environmental Effects of Alternatives A, B, C, D

Desert Tortoise

Approximately 0.5 to 1.0 acre of desert tortoise habitat could be impacted if a trap site needs to be located within one of the three categories. 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 Sonoran Desert tortoise may occur. Appendix K provides 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. High burro density is associated with lower desert tortoise density, even after controlling for other environmental covariates (Berry et al. 2020). 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 reducing the chances for tortoise recovery.

3.3.6 Livestock Grazing

Affected Environment

There are nine allotments administered by BLM LHFO that fall within the Alamo and Lake Havasu HMA's. However, the Planet, Primrose, and Alamo Crossing allotments, which are authorized for ephemeral grazing only, represent the majority of the HMA. These allotments have not had active grazing in the last 30-40 years.

There are twenty-five grazing allotments administered by the BLM KFO, which occur entirely or partly within the Big Sandy HMA (See **Table 8** and Appendix C, Map 10). Of these twenty-five allotments, three are designated for ephemeral use only where livestock grazing is approved only in years with abundant annual forage production; AUMs are not assigned for ephemeral use.

Table 8: Allotment Information

Allotment Name	Forage Availability	Active Perennial AUMs	Acreage/Percent of Allotment within HMA
Planet	Ephemeral Use	0	147523; 83.0%
Primrose	Ephemeral Use	0	92794; 94.1%
Alamo Crossing	Ephemeral Use	0	18144; 99.6%
La Cienega	Perennial/Ephemeral Use	2340	3717; 5.32%
Bateman Spring	Perennial/Ephemeral Use	540	7415; 35.8%
Artillery Range	Perennial/Ephemeral Use	1646	37338; 48.1%
Gibson Cattle Co.	Perennial/Ephemeral Use	1202	10454; 99.4%
DOR	Ephemeral Use	0	1233; 99.4%
Chino Springs	Ephemeral Use	0	16057; 98.5%
Greenwood Community	Perennial/Ephemeral Use	494	11390; 67.9%
Arrastra	Perennial/Ephemeral Use	1995	12792; 51.2%
Burro Creek Ranch	Perennial/Ephemeral Use	1674	16670; 48.4%
Black Mesa Unit A	Perennial/Ephemeral Use	360	5286; 66.9%
Bagdad	Perennial/Ephemeral Use	1741	21995; 85.3%
Greenwood Peak Community	Perennial/Ephemeral Use	1827	39561; 99.2%
Groom Peak	Perennial/Ephemeral Use	265	5558; 86.3%
Chicken Springs	Perennial/Ephemeral Use	3744	499; 0.45%
Hot Springs	Perennial/Ephemeral Use	52	460; 43.6%
Francis Creek	Perennial/Ephemeral Use	14786	26371; 23.3%
Palmerita Ranch	Perennial/Ephemeral Use	927	7047; 19.4%
Santa Maria Community	Perennial/Ephemeral Use	2328	8; 0.01%
Big Sandy	Perennial/Ephemeral Use	6942	62; 0.01%
Burro Creek	Perennial/Ephemeral Use	880	40:0.65%
Wikieup	Perennial/Ephemeral Use	684	45; 0.53%
Gray Wash	Perennial/Ephemeral Use	373	498; 4.76%

Allotment Name	Forage Availability	Active Perennial AUMs	Acreage/Percent of Allotment within HMA
Santa Maria Ranch	Perennial/Ephemeral Use	2880	29; 0.11%
Black Mesa Unit B	Perennial/Ephemeral Use	2352	20; 0.09%
Hancock	Perennial/Ephemeral Use	907	401; 1.09%
Crossman Peak	Ephemeral Use	0	45209; 44.0%
Harcuvar	Perennial/Ephemeral Use	4266	11259; 13.9%
Alamo	Unavailable	0	38176; 98.6%
Havasu Heights North	Unavailable	0	8700; 85.8%
Havasu Heights South	Unavailable	0	35948; 99.3%

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 Three Rivers Complex 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, coordination, and cooperation between BLM and the permittee(s) would be established to determine the process(es) for moving livestock during gathers and 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 to 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.

3.3.7 Human Health and Safety

Affected Environment

Wild burros are found outside the HMA and inhabiting areas within local communities, such as Lake Havasu City and along Highways 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 D, Figures 4 and 5). In 2018-2019 over 30 wild burros were struck and killed by traveling motorists on highways in and adjacent to the HMA, including highway 93, State Route 95 near Lake Havasu City. 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 Lake Havasu City and Alamo Lake. Burros may travel to these areas for a variety of reasons. Burros have become accustomed to receiving food and water provided by 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 Three Rivers Complex. The presence of BLM personnel could provide an opportunity for public education and outreach. 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 H) 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 Officers Representative/Project Inspector, 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, DOI-BLM-AZ-C010-2016-0004-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., <3% in some cases; Science and Conservation Center 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 will 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. 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 Three Rivers Complex and adjacent areas (see Appendix C, Maps 1-4). Only those resources directly or indirectly affected by the action alternatives are considered for cumulative effects.

4.1 Past, Present Actions, 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. Reasonably foreseeable future actions (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 Three River Complex since the early 1860s. There are multiple mining districts that historically produced manganese, copper, gold, silver, lead, zinc, and tungsten (Keith, et al., 1983). Many of these operations ended prior to current reclamation requirements and it is likely that most of these mining-related disturbances have not been reclaimed, although natural re-vegetation over time has partially reclaimed some disturbances. Presently, the Kingman and Lake Havasu field offices occasionally receive mining notices (43 CFR 3809) for exploration level activities in these areas, which require reclamation once the activities cease.

Recreation activities in the Three Rivers Complex 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. Visitors use levels are high 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 Taylor Grazing Act (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 Public Rangelands Improvement Act of 1978, 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 3,800 wild burros have been removed from the Three Rivers Complex since 2004. 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’s.

Reasonably Foreseeable Future Actions
To achieve and maintain AML within the Three Rivers Complex, 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 interest in mineral exploration in the Big Sandy Area which includes two proposed exploration plans (43 CFR 3809) by Big Sandy Inc. and Zenolith USA. Both exploration plans are currently under review and if approved, the exploration activities could entail construction of drill roads and drill pads that may cause up to 180 acres of additional disturbance. Other mineralized properties in the Three Rivers Complex could become exploration targets in the future, which may cause additional surface disturbance. All authorized mining activities require reclamation bonds.

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 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 have 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 BLM's 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 will 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 Three Rivers Complex. 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 thriving natural ecological balance and multiple use relationship on public lands in the area. When considered with other past, present, and reasonably foreseeable future actions, 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 complex could exceed 3,000 burros by 2026. 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 at springs and livestock waters would become increasingly limited. Ecological plant communities would continue to be damaged near riparian areas 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 of 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 Riparian, Invasive, Non-Native and Noxious Species

Cumulative Effects of Alternatives A, B, C and D

When considered with other past, present, and reasonably foreseeable future actions, 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. Lowering use levels and hoof concentration on riparian vegetation would reduce pressure on riparian vegetation water sources.

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 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 on native perennial species and increase perennial plant production, reducing the ability of invasive species to out compete native species.

Cumulative Effects from the No Action Alternative

When considered with other past, present, and reasonably foreseeable future actions, 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 use of the project area by wild burros, in combination with other past, present, and reasonably foreseeable future actions, 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 reasonably foreseeable activities 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 of the No Action Alternative

When considered with other past, present, and reasonably foreseeable future actions, the No Action Alternative would result in, 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 Wilderness

Cumulative Effects of Alternatives A, B, C and D

The action alternatives, when considered with other past, present, and reasonably foreseeable activities in the CESA, would not substantially impact wilderness character within any of the designated wilderness areas in the CESA. Past actions which had an impact on wilderness character such as establishment of HMAs and HAs, pressure from recreational use, grazing, historic mineral use, management actions derived from WMPs, and designation of Wilderness as part of the 1990 Arizona Desert Wilderness Act have all played a role on shaping the current wilderness character resource within each of the wilderness areas in the CESA.

The action alternatives when considered with past activities in the CESA serve to implement the actions of the HMAs as it related to AML which is a net improvement of the current condition of overall wilderness character within the CESA and does not cause cumulatively significant impacts. As AML increases, the pressures on the natural environment increase commensurate within the wilderness areas which degrades the ecological function of the wilderness area leading to incremental impacts over time within the wilderness area due to inaction as it relates to management of burros.

Present activities within the CESA are like those of the past with an increased recreational pressure from off-highway vehicle (OHV) use that degrades wilderness character at concentrated points within the wilderness areas and less of a focus on proactive management through revised WMPs or other planning documents as had occurred in the past. Present activities when considered with the action alternatives does not cause individually insignificant impacts that lead to significant cumulative impacts as the action alternative serve to implement the AMLs for the HMAs which aids in restoring ecological function and ultimately wilderness character.

Reasonably foreseeable activities within the CESA as it relates to impacts on wilderness character would be predominately related to increased recreational pressure due to anticipated surrounding urban population increases, potential for increases in burro populations, and increases in grazing pressure if additional grazing permits were issued. Considering the action

alternatives related to reasonably foreseeable activities, there would be no significant impact on wilderness character as action alternatives serve to implement the AMLs outlined for the HMAs.

Cumulative Effects of the No Action Alternative

When considered with other past, present, and reasonably foreseeable future actions, the No Action Alternative would result in similar impacts as those defined in the cumulative effects of the action alternatives discussion. There would be no difference in the impacts of the No Action Alternative when considered with past or present activities. Impacts related to reasonably foreseeable action when compared to the No Action Alternative would be substantially different in that the BLM would not have the ability to conduct gathers within the CESA leading to degradation of wilderness character into the future due to the anticipated overpopulation of burros within the area. Increases in AML would likely happen incrementally and over time if no gathers occurred leading to degraded wilderness character, but this would not be a significant impact.

4.6 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 reasonably foreseeable activities 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 complex 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 reasonably foreseeable future actions, 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 reasonably foreseeable future actions, 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 having an effect on 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.

4.7 Livestock Grazing

Cumulative Effects of Alternatives A, B, C and D

When considered with other past, present, and reasonably foreseeable future actions, 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 Taylor Grazing Act, FLPMA, and Public Rangelands Improvement Act. 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 complexes 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 reasonably foreseeable future actions, 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 reasonably foreseeable future actions 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.

4.8 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 reasonably foreseeable future actions, 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's 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 reasonably foreseeable future actions, the No Action Alternative could result in increased impacts to human health and safety.

CHAPTER 5 CONSULTATION AND COORDINATION

List of Persons, Groups, or Agencies Consulted

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
Yavapai-Apache Nation
Yavapai-Prescott Indian Tribe
Zuni Tribe

CHAPTER 6 LIST OF PREPARERS

Table 9: BLM Resource Specialists

Name	Title
Evelia Castro Marroquin	GIS Specialist
Chad Benson	Wild Horse and Burro Specialist
Joelle Acton, Ford Mauney	Wildlife Biologists
Matt Driscoll, Sabrina Bice	Outdoor Recreation Specialists
August Potor	Archaeologists
Leah Knighton	Rangeland Management Specialists
Doug Whitbeck	Arizona Rangeland Management Lead
	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
Samantha Carrasco	Associate District Manager
	National Wild Horse and Burro Program On-range Branch Chief
John Hall	Arizona Wild Horse and Burro Program Lead

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Appendix Q - Determination Document and Rangeland Health Assessment for the Palmerita Ranch Allotment