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

Four Mile Herd Management Area Wild Horse Gather Plan Environmental Assessment
DOI-BLM-ID-B010-2019-0028-EA

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Boise District Office
3948 Development Avenue
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Environmental Assessment # DOI-BLM-ID-B010-2018-0028-EA
Four Mile HMA – Wild Horse Gather Plan

Table of Contents

1 Introduction

This Environmental Assessment (EA) has been prepared to analyze the Bureau of Land Management (BLM) Four River Field Office's (FRFO) proposal to conduct a gather and remove excess wild horses from within the Four Mile Herd Management Area (HMA) (Map 1, Appendix A). This wild horse gather plan would allow for an initial gather and follow-up maintenance gathers to achieve and maintain appropriate management level (AML), to be conducted until policy changes occur or the affected environment changes to an extent that the analysis is no longer valid. The EA assists the FRFO in project planning, compliance with applicable laws and policy, and determining whether any significant impacts could result from the analyzed actions. This EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI).

1.1 Background

The Four Mile HMA is located in portions of Washington, Payette and Gem Counties, Idaho (see Appendix A, Map 1) and consists of 18,800 total acres (16,761 BLM acres, 925 acres of State of Idaho (IDL) lands, and 1,114 acres of private land). It is located approximately 20 miles north of Emmett, ID, within the Willow Ridge grazing allotment (ID00005), and is bordered on the east by Big Willow Creek and on the west by Four Mile Creek.

An AML is defined as the number of wild horses that can be sustained within a designated HMA to achieve and maintain a thriving natural ecological balance consistent with the multiple-use management concept for the area[1]. The BLM established an AML for the Four Mile HMA between 37 and 60 head in the 2001 Big Willow Grazing Allotment EA, EA-#ID-010-0125 (USDI BLM, 2001). The AML (upper limit of the AML range) should be the maximum number of adult horses that would not cause deterioration of the range. The AML lower limit is established at a level that allows the population to reach the upper limit (60) (over a 4 to 5-year period at the annual population growth rate).

In February 2018, the BLM surveyed the Four Mile HMA horse population and observed 128 animals. Based on the sighting probabilities of the aerial survey method using a simultaneous double-count, the BLM estimated that the population was approximately 135 horses. This method uses two observers to independently observe and record data on groups of individual horses. Sighting data are then compared using statistical modeling to estimate sighting rates for the two observers. The population by the end of 2020 is estimated to reach 221 horses based on an 18% annual growth rate.

1.2 Purpose and Need for Action

The purpose of the Proposed Action is to: (1) remove excess wild horses from within the Four Mile HMA to achieve the established AML, (2) reduce the wild horse population growth rate to

[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).

minimize the need for repeated gathers, and (3) restore a thriving natural ecological balance and multiple use relationship on the public lands. These actions are consistent with the provisions of Section 1333 (a) of the Wild Free-Roaming Horses and Burros Act (WFRHBA) of 1971 (as amended).

The need for the Proposed Action is to protect rangeland resources and to prevent unnecessary or undue degradation of the public lands associated with an excess population of wild horses within the HMA, and through adoption, provide the best opportunities for excess horses to be placed into private care, rather than removed to off-range pastures (ORP).

1.3 Decision to be Made

The BLM's authorized officer will determine if excess wild horses exist in the HMA and decide whether or not to conduct a gather to remove excess wild horses and implement population control measures. The decision would affect wild horses within the Four Mile HMA. The BLM's authorized officer would not set or adjust AML nor would it adjust livestock use.

1.4 Conformance with Applicable Land Use Plan

The Proposed Action is in conformance with the Cascade Resource Management Plan (CRMP) as amended (1988, 2015) which sets the following guidance (USDI BLM, 1988):

Wild Horses
(pg. 48): "A viable, healthy herd of wild horses will be maintained in accordance with federal law. Where levels are to be adjusted, sufficient forage will be provided by adjusting livestock AUMs. Animals being collected for adoption or removed by other appropriate means will receive care and attention. Adopted animals will be monitored in accordance with BLM policy until title for the animal is issued."

Implementation, Livestock and Wild Horse Management: (pg. 64): ... "The wild horse herd and its habitat will be monitored and "round ups" will be scheduled at intervals that ensure maintenance of objective numbers and habitat quality."

In 2001, the Big Willow Allotment Grazing Environmental Assessment (# ID-010-2000-0125) set the AML at 60 horses with a range from 37 to 60 head.

In 2015, the Idaho and Southwestern Montana Greater Sage-grouse Approved Resource Management Plan Amendment (ARMPA) amended the CRMP. The following management decisions apply:

- **WHB-1 (p. 2-26):** Manage herd management areas (HMAs) in greater sage grouse (GRSG) habitat within established AML ranges to achieve and maintain GRSG habitat objectives (USDI BLMb, 2015).
- **WHB-3 (p. 2-26):** Prioritize gathers and population growth suppression techniques in HMAs in GRSG habitat, unless removals are necessary in other areas to address higher priority environmental issues, including herd health impacts. Place higher priority on Herd Areas not allocated as HMAs and occupied by wild horses and burros in SFA followed by PHMA.

- **WHB-6 (p. 2-26)**: Develop or amend herd management area plans (HMAPs) to incorporate GRSG habitat objectives and management considerations for all HMAs within GRSG habitat, with emphasis placed on SFA and other PHMA.

1.5 Relationship to Statutes, Regulations, or Other Plans

The proposed action has been designed to conform to Federal regulations, consultation requirements, and other authorities which direct and provide the framework and official guidance for management of BLM lands within the FRFO. In addition, the proposed action is in conformance with the following:

- The Big Willow Allotment Grazing Environmental Assessment (# ID-010-2000-0125) that set the AML at 60 horses with a range from 37 to 60 head. The annual AUMs allocated for the herd range is from 440 to 740.
- The Wild Free-Roaming Horse and Burro Act (WFRHBA) of 1971 Public Law 92-195, as amended.
- BLM Wild Horses and Burros Management Handbook, H-4700-1 (June 2010).
- Section 302 (a) and (b) of the Federal Land Policy and Management Act (FLPMA) of 1976, the Public Rangelands Improvement Act of 1978 (Pub. L. 95-514, Sec. 4).
- 43 CFR 4700 – Protection, Management, and Control of Wild Free-Roaming Horses and Burros.
- 43 CFR 4100 – Grazing Administration Exclusive of Alaska 2005.

Cultural Resource Laws and Executive Orders

BLM is required to consult with Native American tribes to "help assure (1) that federally recognized tribal governments and Native American individuals, whose traditional uses of public land might be affected by a proposed action, will have sufficient opportunity to contribute to the decision, and (2) that the decision maker will give tribal concerns proper consideration," (U.S. Department of the Interior, BLM Manual Handbook H-8120-1). Tribal coordination and consultation responsibilities are implemented under laws and executive orders that are specific to cultural resources which are referred to as "cultural resource authorities," and under regulations that are not specific, which are termed "general authorities." Cultural resource authorities include: the National Historic Preservation Act of 1966, as amended (NHPA); the Archaeological Resources Protection Act of 1979 (ARPA); and the Native American Graves Protection and Repatriation Act of 1990, as amended (NAGPRA). General authorities include: the American Indian Religious Freedom Act of 1979 (AIRFA); the National Environmental Policy Act of 1969 (NEPA); the Federal Land Policy and Management Act of 1976 (FLPMA); and Executive Order 13007-Indian Sacred Sites. The proposed action is in compliance with the aforementioned authorities.

Southwest Idaho is the homeland of two culturally and linguistically related tribes: Northern Shoshone and the Northern Paiute. In the latter half of the 19th century, a reservation was established at Duck Valley on the Nevada/Idaho border west of the Bruneau River. The Shoshone-Paiute Tribes residing on the Duck Valley Reservation today actively practice their culture and retain aboriginal rights and/or interests in this area. The Shoshone-Paiute Tribes assert aboriginal rights to their traditional homelands as their treaties with the United States, the Boise Valley Treaty of 1864 and the Bruneau Valley Treaty of 1866, which would have extinguished aboriginal title to the lands now federally administered, were never ratified.

Other tribes that have ties to southwest Idaho include the Bannock Tribe and the Nez Perce Tribe. Southeast Idaho is the homeland of the Northern Shoshone Tribe and the Bannock Tribe. In 1867, a reservation was established at Fort Hall in southeastern Idaho. The Fort Bridger Treaty of 1868 applies to BLM's relationship with the Shoshone-Bannock Tribes. The northern part of the BLM's Boise District was also inhabited by the Nez Perce Tribe. The Nez Perce signed treaties in 1855, 1863 and 1868. BLM considers off-reservation treaty-reserved fishing, hunting, gathering, and similar rights of access and resource use on the public lands it administers for all tribes that may be affected by a proposed action.

1.6 Scoping and Issue Development

The interdisciplinary team (IDT) identified several issues through internal and external scoping, field review, and consideration of published and collected information regarding the HMA and its surrounding landscape. On June 20, 2019, BLM released a scoping information package detailing the purpose and need for action, preliminary issues, and potential alternatives for action to the public for comment. One comment was received during the 30-day scoping period. Incorporating stakeholder feedback, the FRFO IDT identified the issues below for analysis to inform the decision-maker of possible management outcomes.

1.6.1 Issues

Wild Horses:

- What would be direct effects of the alternatives on wild horses?
- What would be the effects of the population suppression methods being considered in the alternatives have on wild horse behavior?

Vegetation:

- What would be the effects of the alternatives on upland and riparian vegetation?

Soils:

- What would be the effects of the alternatives on soil erosion potential within the HMA?

Livestock Grazing Management:

- What would be the effects of the alternatives on livestock grazing management and associated ranch operations?

Wildlife:

- What would be the effects of the alternatives on big game species (Elk, Mule Deer, and Pronghorn Antelope)?
- What would be the effects of the alternatives on habitat for greater sage-grouse?

1.6.2 Issues Considered but Dismissed from Analysis

Cultural Resources:

Cultural resource impacts were initially raised as a potential issue for analysis. However, the proposed disturbance areas (Appendix A - Map 2) were surveyed in 2009, and BLM determined that the proposed alternatives would have no adverse effect on historic properties. The BLM will provide the Idaho State Historic Preservation Office (SHPO) with a copy of this EA as consultation. Cultural resources will not be discussed further in this EA.

2 Description of the Alternatives

This chapter of the EA describes the Proposed Action and Alternatives, including any that were considered but dismissed from detailed analysis.

2.1 Alternatives Considered but Dismissed

Increasing AML

Under this alternative, the BLM considered increasing the AML level. This alternative was not brought forward for detailed analysis because it would be outside of the purpose and need, and would be inconsistent with the Purpose and Need, and the WFRHBA which directs the Secretary to immediately remove excess wild horses and to manage for multiple uses. Wild horse numbers in excess of AML would result in insufficient water and forage within the HMA. An increase in wild horse AML is therefore unsustainable.

Natural Population Controls

Under this alternative, the BLM considered natural population controls without administering fertility controls or removing wild horses. This alternative would rely on natural means, such as natural predation and weather, to control the wild horse population. This alternative was eliminated from further consideration because it would be contrary to the WFRHBA which requires the BLM to protect the range from deterioration associated with an overpopulation of wild horses through removal of excess animals. Relying on natural controls to achieve a desirable AML has not been shown to be feasible; otherwise, the wild horse population trend in the HMA would not be increasing rapidly. Wild horse populations in the Four Mile HMA are not substantially regulated by predators, as evidenced by the approximate 18% annual increase in the wild horse populations within the HMA. In addition, wild horses are a long-lived species with documented foal survival rates exceeding 95% and, like other large mammals (Wolff, 1996), are not a true self-regulating species. This alternative would allow for a steady increase in the wild horse populations which would exceed the carrying capacity of the range and would be expected to cause damage to the rangelands, as well as potential degradation of resources which wildlife depend upon; until severe range degradation or natural conditions that occur periodically (blizzards or extreme drought) cause a catastrophic mortality of wild horses in the HMA.

Removing or Reducing Domestic Livestock

Under this alternative, no wild horses would be removed from the HMA. Instead, livestock would be removed from the HMA to provide adequate forage for excess wild horses. This alternative does not meet the purpose and need to manage wild horses within AML established in the 2001 Big Willow Grazing Allotment EA. It is also inconsistent with the WFRHBA, which directs the Secretary to remove excess wild horses. Livestock grazing can only be reduced or eliminated if BLM follows regulations at 43 CFR Part 4100 (2005) and must be consistent with multiple use allocations set forth in the land-use plan. Such changes to livestock grazing cannot be made through a wild horse gather decision and are only possible if BLM first revises the land-use plans to allocate livestock forage to wild horses and to eliminate or reduce livestock grazing. Under this alternative, the wild horse population would continue to increase at 18% per year, causing damage to all affected resources.

Catch, Treat, and Release

Under this alternative, the BLM considered catching wild horses, treating them on site with fertility control and then releasing the horses back into the HMA. Under this alternative, no excess wild horses would be removed. BLM completed population modeling to analyze the potential impacts associated with conducting gathers about every 2-3 years over the next 10-year period to

treat captured mares with fertility control. Over this ten-year period, the population would be expected to increase to 398 head with PZP and 314 head with GonaCon. Even with the application of contraceptives, the population is anticipated to increase by 3-6% annually. Thus, the population would continue to exceed AML; this alternative would not meet the Purpose and Need for the Action and would be contrary to the WFRHBA. Therefore, the alternative was dismissed from further analysis.

2.2 No Action Alternative

The No Action Alternative provides a comparison to the Proposed Action and assesses the effects of not conducting management plan activities to reduce the number of wild horses. Under the No Action Alternative, no gathers, trapping, or fertility treatments would occur. Over a 10-year period, the population would be expected to increase to 1,268 head.

2.3 Proposed Action

The Proposed Action would use a combination of management practices to manage wild horses in the Four Mile HMA to initially capture approximately 198 wild horses (90% of the estimated population - 220) by helicopter gather, removal of approximately 184 wild horses, and application of fertility control on approximately 8 mares resulting in a low AML of 37 wild horses in the HMA. The management practices are composed of gather activities, fertility control, and management after capture. Implementation could begin as early as the summer of 2020, depending on available funding, and BLM would continue to periodically gather excess wild horses to maintain AML, or to apply fertility control (i.e. GonaCon, PZP) boosters. Fertility control booster doses may also be administered via remote darting. Practices would occur to achieve the conditions described below:

- Management practices as listed below would occur to reduce the population to the low end of AML of 37 head.
- A sex ratio of 50:50 would be maintained within the HMA.
- In order to maintain/increase genetic diversity (observed heterozygosity) on the Four-Mile HMA, 1-2 young mares from a different HMA in a similar environment, would be released at least every generation (about 10 years), into the fenced Four Mile HMA.
- Wild horses outside the HMA (in adjacent public lands) would also be removed on an as needed basis subject to the conditions described below. Current and future numbers of "stray" horses outside the HMA are unknown and cannot be accurately predicted/determined due to multiple causal factors (e.g. gates left open by public, range improvement failure, weather, fire, behavior).
- The horse population size would be monitored frequently in accordance with BLM policy.
- Implementation of management actions would begin after issuance of a Decision and would continue until policy changes require analysis of additional management actions.

2.3.1 Gather Activity

Horses may be captured using the methods described below. All actions would follow the Comprehensive Animal Welfare Program Standards for Wild Horse and Burro Gathers (BLM 2015) described in Instruction Memorandum IM-2015-151 (Appendix G)

a. Helicopter Drive Trapping Method

A temporary corral would likely be constructed to trap, sort and load wild horses at one of the sites labeled on Appendix A - Map 2. If the BLM or contractor wants to use a site that is not identified on Appendix A - Map 2, a cultural inventory would be conducted, and the site would only be used after approval from the cultural specialist and field manager. The corral area would disturb approximately 0.25 acres, the location would be determined based on the proximity to the horses at the time. The corral would consist of a trap with two wings and multiple pens.

During the initial gather, the BLM would use a contractor to perform the gather activities in cooperation with the BLM. The contractor would be required to conduct all helicopter operations in a safe manner and in compliance with Federal Aviation Administration (FAA) regulations 14 CFR § 91.119, BLM IM No. 2015-051 and BLM IM No. 2013-058. Helicopter drive trapping involves use of a helicopter to herd wild horses into a temporary trap. The CAWP SOPs outlined in Appendix G would be implemented to ensure that the gather is conducted in a safe and humane manner, and to minimize potential impacts or injury to the wild horses.

Utilizing the topography, traps would be placed in areas with high probability of horse access. This should assist with capturing excess wild horses residing nearby. Traps consist of a large catch pen with several connected holding corrals, jute-covered wings and a loading chute. The jute-covered wings are made of fibrous material, not wire, to avoid injury to the horses. The wings form an alley way used to guide the horses into the trap. Trap locations are changed during the gather to reduce the distance that the animals must travel. A helicopter is used to locate and herd wild horses to the trap location. The pilot uses a pressure and release system while guiding them to the trap site, allowing them to travel at their own pace. As the herd approaches the trap the pilot applies pressure and a 'Judas' horse is released guiding the wild horses into the trap. Once horses are gathered, they are removed from the trap and transported to a temporary holding facility where they are sorted. During helicopter drive-trapping operations, BLM would assure that an Animal and Plant Health Inspection Service (APHIS) veterinarian or contracted licensed veterinarian is on-site or on-call to examine animals and make recommendations to BLM for care and treatment of wild horses. BLM staff would be present on the gather at all times to observe animal condition, ensure humane treatment of wild horses, and ensure contract requirements are met.

Implementation could begin as early as the summer of 2020, depending on available funding, and BLM would continue to periodically gather excess wild horses to maintain AML, or to administer fertility control (i.e.. GonaCon, PZP) boosters. After the initial gather, the target removal number for additional gathers would be adjusted according to population inventories for the HMA. Gathering and handling wild horses would follow the Comprehensive Animal Welfare Program (CAWP) for Wild Horse Gathers (see Appendix G).

Helicopter gathers on the Four Mile HMA typically require 3 to 4 days to capture most of the horses within the HMA. Under difficult conditions, it could take up to 2 weeks. Helicopter staging areas, vehicle, and trailers parking would occur within previously disturbed areas (e.g., gravel pits or similar) within appropriate flight distance to the HMA.

b. Bait/Water Trapping Method

During subsequent gathers (likely beginning 2+ years after the initial helicopter gather), wild horses would be gathered using the bait and/or water trapping method, primarily during hotter summer months. This would be used to increase the amount of time in between helicopter gathers to periodically remove excess wild horses, as well as treating wild horses with contraception (PZP, GonaCon, etc.) and releasing them back to the HMA to maintain AML and reduce population growth. Gathering of the excess wild horses utilizing bait/water trapping would occur until the target number of animals are removed. Traps would consist of portable panels set up at water sources (troughs) frequented by wild horses. Generally, bait/water trapping is most effective when a specific resource is limited, such as water during the summer months. For example, Four Mile wild horses sometimes rely heavily upon artificial water sources or springs, so traps could be placed around commonly utilized water troughs. Other water troughs in the pastures would be turned off, ensuring that the horses are utilizing the water troughs where the traps have been constructed. Certified weed-free hay or other attractants (such as mineral or processed cubes) may be used to lure horses to the area. Prior to any wild horses being captured, the trap or bait may be placed to accustom wild horses to their presence. When a band of horses or individuals enters the trap, the gate would be closed by BLM or contract personnel and the trap would be monitored at least once daily while the gate is set. Potential bait trap areas are identified on Appendix A - Map 2. If the BLM or contractor wants to use a site that is not identified on Appendix A - Map 2, a cultural inventory would be conducted, and the site would only be used after approval from the cultural specialist and field manager.

c. Timing Restrictions

The following timing restrictions would apply to gather activities described above in section a:

- March 1 to June 30 – No helicopter gather activities would occur (unless it is an emergency) during foaling season. This restriction also covers sensitive timeframes for sage grouse, and long-billed curlew.
- November 15 to February 29 – Helicopter gather could occur during this timeframe if the activity would not impact big game based on an evaluation by a biologist following guidelines in Appendix C.

2.3.2 Fertility Control

These are actions to limit the reproductive rate of the herd, thereby reducing the frequency that the herd would need to be captured and removed from the HMA. For specific information on the use of contraception, see (Appendix D). The two ways that BLM administers fertility control to wild horses are:

a. Darting free-roaming horses

i. Darting involves one or two people stalking a herd or an individual horse or setting up a blind at a waterhole to wait for horses. When a target mare is in range, a hypodermic dart containing an approved fertility control vaccine as identified in Appendix D that prevents fertilization would be injected.

ii. Darting activities would occur at any time of the year. The application is targeted, so the disturbance to wildlife and the wild horses is negligible.

b. Injection of gathered horses

i. Horses gathered following a helicopter or bait/water trapping are injected using a syringe with a fertility control vaccine as identified in Appendix D.

2.3.3 Management after Gather

Horses may be released back into the HMA, enter the BLM adoption program, enter an off-range corral (ORC), or enter an off-range pasture (ORP). Removal criteria, treatment and handling procedures after a gather at ORC's are described in Appendix E.

a. Release – Captured horses may be released back into the HMA, after a holding period at a BLM ORC, to maintain the population within the HMA. Horses to be released typically include healthy mares and/or stallions. However, animals that exhibit exceptional characteristics may be chosen for release outside of the selective removal priorities on a case-by-case basis. Weak, unhealthy, and unthrifty animals would not be selected for release back into the Four Mile HMA.

b. Adoption and Sale Program - To maximize adoption potential, younger horses would be removed before older ones and enter BLM's adoption and sale program, which would include holding at an ORC. Horses are auctioned and taken to private facilities to be trained and used by adoptees. The BLM conducts site visits to ensure the needs of the wild horses are being met, and the horses are healthy. If adoptees opt to discontinue the adoption, the animals are returned to the BLM holding facilities for future adoptions. The BLM adoption would follow the process outlined in 43 CFR Subpart 4750.

c. Off Range Pasture (ORP) – Gathered animals that have been removed as excess animals but have not been adopted or sold may enter an ORP where they would live in a pasture setting with abundant food and water.

Population monitoring and tracking of effectiveness would occur as described in Appendix B.

2.3.4 Required Design Features

Implementation of management actions would begin after issuance of the Decision and would continue until policy changes require analysis of additional management actions. Additional design features are described in Appendix G (Wild Horse Gather SOPs).

- A BLM Contracting Officer's Representatives (COR) and Project Inspectors (PI) would monitor gathers. The CORs and PIs would be responsible for ensuring contract personnel abide by the contract specifications in the Comprehensive Animal Welfare Program (USDI BLM, 2015a - IM No. 2015-151).
- Population estimates for the HMA would be updated as population surveys are conducted in the future. Genetic monitoring would occur, following gathers and/or trapping, and would be implemented, following IM 2009-062 (USDI BLM 2009a), as recommended in the H-4700-1, handbook, and/or future updated policy guidance.
- In order to maintain/increase genetic diversity (observed heterozygosity) on the Four-Mile HMA, 1-2 young mares from a different HMA in a similar environment, will be released at least every generation (about 10 years), by adding them into the fenced HMA.
- Fertility control monitoring would be conducted in accordance with the population-level fertility control treatment SOPs in Appendix B and IM 2009-090 (USDI BLM 2009b).

- A BLM contract veterinarian, Animal and Plant Health Inspection Service (APHIS) veterinarian, or other licensed veterinarian would be on call or on site as the helicopter gather is started and then as needed for the duration of the helicopter gather to examine animals and make recommendations to the BLM for the care and treatment of wild horses to ensure humane treatment.
- Additionally, animals transported to a BLM ORC are inspected by facility staff and the BLM contract veterinarian to observe health and ensure the animals have been cared for humanely.
- Monitoring of animal health and rangeland forage condition and utilization as well as aerial population surveys would continue. Aircraft would be used to conduct population inventory flights as needed. Flights would typically occur during the winter months.
- Data including sex and age distribution, condition class information (using the Henneke rating system), color, size and other information may also be recorded, along with the disposition of the animal (removed or released).
- Trucks and trailers used to haul wild horses would be inspected prior to use to ensure horses can be safely transported. Wild horses would be segregated by age and sex when possible and loaded into separate compartments. Mares and their un-weaned foals may be shipped together. Transportation of recently captured wild horses is limited to a maximum of 10 hours.
- Access throughout the HMA would be achieved by use of 4x4 vehicles and other off-highway vehicles (OHVs). Vehicles would be utilized on existing roads and trails in the HMA. On a case by case basis, the use of OHVs off existing roads and trails may be allowed for administrative purposes; however, such use shall be made only with the approval of the authorized officer.
- The Comprehensive Animal Welfare Plan (CAWP) established in IM-2015-151 (USDI BLMa, 2015) would be followed to ensure safe and humane gathers.
- Only weed-free hay would be used at gather sites.
- BLM would coordinate with the livestock operator at least 30 days prior to initiating gather activities to ensure that gather activities would not disrupt authorized livestock grazing operations.
- BLM would repair any range improvements that are damaged as a result of gather activities.

3 Affected Environment, Environmental Consequences and Cumulative Affects

This section provides a description of the general environmental setting and resources within that setting that would be affected by the Proposed Action and No Action alternatives. In addition, the section presents an analysis of the direct, indirect, and cumulative environmental impacts likely to result from implementation of the alternatives.

Analysis Assumptions

Impacts would be similar during each gather activity over time, as it is a repeatable action, with similar impacts. All other impacts are comparable from one removal gather to the next, with only the numbers of horses removed or treated changing.

3.1 General Setting

The landscape within and surrounding the HMA is characterized by foothills, structural benches, and alluvial fan terraces. The climate of the region is a semi-arid cold desert, characterized by cold winters (Below 32 degrees Fahrenheit) and hot dry summers (80 degrees and above Fahrenheit). Elevations range between 3000 to 5200 feet. Precipitation averages 16 inches in the low elevations to 23 inches at higher elevations. Most of the precipitation comes in the form of snow in winter months with episodic rain events throughout the year.

3.2 Wild Horses

3.2.1 Affected Environment

Wild horses in the HMA are descendants of domestic horses that were released into the wild in the 1800s and early 1900s. For many years, local residents captured the wild horses and bred them with a variety of private stock. Wild horses in the HMA represent a variety of colors and coat patterns, including grey, bay, sorrel, black, appaloosa, and pinto. Adult horses in the HMA weigh an average of 1,000 pounds and stand between 14 and 15.5 hands, with some individuals standing 16 hands and weighing over 1,200 pounds. Animals in the herd are healthy, with high reproductive rates.

Wild horses have a long lifespan (20-30 years), a reproductive rate between 15% and 22% (approximately 18 % in the HMA), adapt well to a variety of habitats and have few natural predators. The AML in the Four Mile HMA is set between 37 to 60 horses and forage is allocated accordingly at 440-740 Animal Unit Months (AUMs). The Big Willow Allotment Environmental Assessment (#ID-010-0125) indicates that when the total horse population begins to approach the upper limit of 60 animals (high AML) (720 AUMs), resource conditions decline, especially in riparian areas. Winter range is the limiting factor for the HMA therefore, AUMs are based on available forage accessible during winter months.

In 2014, 2016, and 2018, simultaneous double-count aerial surveys were conducted using methods recommended by BLM policy (BLM 2010, IM 2010-057) and a recent National Academy of Science (NAS) review (NAS 2013). For a summary of the population estimates from those surveys and estimates between surveys see Table 1.

Table 1. Summary of Population Estimates

Year	Survey Date	Population Estimate*
2009	Remaining after 2009 gather.	37
2010	Estimate	39
2011	Estimate	46
2012	Estimate	54
2013	Estimate	65
2014	Estimate	78
2014	June, 2014	81 (71 adults, 10 foals)
2015	Estimate	85
2016	February, 2016	112
2017	Estimate	134
2018	February, 2018	135
2019	Estimate	159

Year	Survey Date	Population Estimate*
**With the exception of the 2014 Survey, all Estimates and Surveys are prior to the foaling season. Therefore, calculating the 2019 estimate before the 2019 foaling season with an expected 18% growth rate results in an estimated 187 wild horses. Using the same calculation, an estimated 221 wild horses will be on the Four-Mile HMA after the 2020 foaling season (after June 30, 2020).*		

Since 2003 (see Table 2), approximately 149 horses, have been removed during two previous gathers conducted in 2003 and 2009. Table 2 provides summary of gathered horses, removed horses, and those treated with PZP 22.

Table 2. Four Mile Herd Management Area Gather

Year	Number of Horses Gathered	Number of Horses Removed	Number of Horses PZP 22 Treated & Returned
2003	57	37	20
2009	123	112	11

Seventeen blood samples were taken during the 2003 gather to create baseline data to establish the current level of genetic diversity for the HMA. No unusual alleles were found in the herd (Cothran 2004). There was no strong indication of Iberian background in the samples from western Idaho (Cothran 2004). Genetic resources are lost slowly over periods of many generations, depending on a herd's genetic effective population size (Hartl and Clark 2007); this herd is part of a larger metapopulation with a larger effective population size than the number of animals in Four Mile HMA alone. Although the genetic diversity, as measured by observed heterozygosity, was relatively low (Cothran 2004), this herd is closely related to horses in three other nearby BLM-managed herds in Idaho (Black Mountain HMA, Sands Basin HMA, and Hard Trigger HMA; Cothran 2004). Cothran analyzed samples from the four HMAs together but reported results for each herd separately (Cothran 2004; Table 2). His report states "These herds should be monitored closely due to the low variation and the low AML for each herd unit. If the herds are in contact and do exchange breeding individuals, this will help in the long-term maintenance of variation but not in increasing current variation levels due to the high similarity of the four herds. Introduction of a small number of individuals should be considered. A good strategy could be to introduce small numbers into each HMA preferably of unrelated individuals for each HMA (i.e., individuals introduced into Four-Mile be unrelated to those put into Sands Basin)" (Cothran 2004). Since the 2004 report, horses from Idaho and other HMAs have been introduced to improve the genetic variability of the herd.

The 2013 National Academies of Sciences report included additional evidence that shows that the Fourmile HMA herd is not genetically unusual, with respect to other wild horse herds, and that supports the interpretation that Four Mile HMA horses are components in a highly connected metapopulation that includes horse herds in many other HMAs. Specifically, Appendix F of the 2013 NAS report is a table showing the estimated 'fixation index' (Fst) values between 183 pairs of samples from wild horse herds. 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 Fst

under approximately 0.05 or lower indicate virtually no differentiation, values of 0.10 or lower indicate very little differentiation, and only if values are above about 0.15 are any two sampled subpopulations considered to have evidence of elevated differentiation (Frankham et al 2010). Fst values for samples from the four Idaho HMAs (results from Black Mountain, Fourmile, Hardtrigger, and Sands Basin HMAs are shown collectively as "Idaho, ID" in the NAS 2013 table) had pairwise Fst values that were less than 0.05 with 36 other sets of genetic samples (including from herds in California, Colorado, New Mexico, Nevada, Oregon, Utah, and Wyoming), which indicates an extreme genetic similarity to a fairly large number of other herds.

3.2.2 Environmental Consequences

Population Modeling Summary

The Wild Horse Population Model (WinEquus version 1.40) was used to estimate the population growth and size of herds over a 10-year period. Additional information concerning population modeling and the individual test runs can be found in Appendix F. Population modeling was completed for the alternatives to analyze how the alternatives would affect wild horse populations. Modeling evaluated the No Action Alternative where current management would continue as it has been since 2009, and the Proposed Action, which would authorize removal of excess wild horses through helicopter drive trapping, bait trapping, and the use of fertility control and maintaining the sex ratio. The primary objective of modeling was to identify if either of the alternatives are likely to crash the population or cause extremely low population numbers or growth rates. Results of population modeling show that minimum population levels and growth rates (18%) would be within reasonable levels and adverse impacts to the population would not be likely under the Proposed Action.

3.2.2.1 No Action Alternative

Under this alternative, the risks to horses due to gathering, handling, and transport would be eliminated. However, based on the 18% annual population growth rate for the HMA, the No Action Alternative (no gather or removal). Results from WinEquus for the No Action Alternative indicate that the HMA population would grow to approximately 1,268 head in 10-years (2030).

The long-term health and sustainability of the wild horse population is dependent upon sustaining healthy rangelands. According to the Natural Resources Conservation Service, a horse typically consumes 3% of its normal body weight daily, for example, a 1,000-pound horse would consume 30 pounds of forage daily. Taking no action would be inhumane, as wild horses would die of starvation and lack of adequate available water as the population exceeded supportable levels. Taking no action would also be contrary to the WFRHBA, which requires the BLM to protect the range from the deterioration associated with overpopulation, remove excess animals from the range so as to achieve appropriate management levels, and to preserve and maintain a multiple-use relationship in that area. As populations increase beyond the capacity of the available habitat, more bands of horses would leave the boundaries of the HMA in search of forage and water. This alternative would result in increasing numbers of wild horses in areas not designated for their use, would be contrary to the WFRHBA and would not achieve the stated objectives for wild horse herd management areas, to "prevent the range from deterioration associated with overpopulation," and "preserve and maintain a thriving natural ecological balance and multiple use relationship in that area."

Though it may require many years for the population to reach catastrophic or self-limiting levels, the No Action Alternative poses the greatest risk to the long-term rangeland health of the Four-Mile HMA. As per the National Research Council (NAS 2013, page 76), "It can be expected—on the basis of logic, experience, and modeling studies cited above—that because horses or burros left to "self-limit" will be food-limited, they will also have poorer body condition on the average. If animals are in poorer condition, mortality will be greater, particularly in times of food shortage resulting from drought or severe winter weather. Indeed, when population growth rate is zero, mortality must balance natality. Whether that is acceptable to managers or the public is beyond the purview of the committee, but it is a biological reality."

BLM would continue to periodically introduce new wild horses to the herd, to prevent or reduce risk of inbreeding. Genetic data within the HMA would continue to be monitored for measures of genetic diversity (i.e., observed heterozygosity) as part of ongoing herd management, and BLM will continue to use results of genetic monitoring reports in evaluations of the impact of management decisions.

3.2.2.2 Proposed Action

Gathers – General Effects

Impacts to wild horses would occur on both the individual level and on the population as a whole. Individual impacts include stress or potential injuries associated with gathering, sorting, and handling of animals. Population impacts include changes in herd dynamics or population numbers. Genetic monitoring that would take place as a result of the proposed action would allow BLM to determine what the current status of genetic variability is in the herd, and whether additional introductions could be necessary. To ensure safe and humane gathers, BLM would follow the procedures outlined in the Comprehensive Animal Welfare Plan (CAWP) established in IM-2015-151 (USDI BLM, 2015), which would minimize potential stress and injury to wild horses. This policy includes SOPs (Appendix G) such as time of year and temperature ranges for helicopter gathers to reduce physical stress to the horses while being herded toward a trap; maximum distances to herd horses based on climatic conditions, topography, and condition of horses; and handling procedures once the animals are in the trap.

Wild horses are usually very fit and in good health when not stressed by lack of food, water, and are able to endure the physical requirements of a gather. The environmental conditions and the overall health and well-being of the wild horses is continually monitored through both summer and winter gathers to adjust gather operations as necessary to protect the wild horses from gather-related health issues. For these reasons, flexibility in gather operations is an inherent part of all gathers. Individual effects to wild horses from gathers (aerial gathers and bait trapping) include stress and potential physical injury. Stress is associated with the capture, handling, and transportation of the animals. The intensity of these effects varies by individual, behaviors range from nervous agitation to physical distress.

Gathers involve a risk of injury or death to the wild horses. Gather-related mortality averages about 0.5 percent or less (helicopter gather) (GAO 2008, Scasta 2020), which is considered very low when handling wild animals. According to Government Accountability Office data (GAO 2008), these low mortality rates affirm that the use of helicopters and motorized vehicles has proven to

be a safe, humane, effective, and practical means for the gather and removal of excess wild horses from the range.

During a Gather

BLM staff would coordinate with the contractor or in-house BLM team completing the gather on a daily basis to determine animal locations in proximity to gather sites, and to discuss terrain, animal health, gather distances and other logistics to ensure animal health and safety. Injuries would be examined and treated by a veterinarian at the sorting/holding corrals, as needed. BLM staff are on site at all times to observe the gather, monitor animal health, and coordinate the gather activities by in-house BLM gather teams or contractors. BLM staff, contractor, and crew are attentive to the needs of all wild horses captured during gathers to ensure their health and safety.

Wild horses in the HMA have relatively easy access to water, so horses are well hydrated when moving to capture sites. Temperature-related issues during a gather would be mitigated by adjusting daily gather times to avoid the extreme hot or cold periods of the day. If forage or water is limiting, animals may need to travel long distances between water and forage and may become easily dehydrated. To minimize the potential for distress during summer gathers, capture operations are generally limited to early morning hours in the summer months when temperatures are cooler. For aerial gathers, the distance animals must travel to the trap is also shortened to minimize potential stress. The BLM and contractor ensure there is plenty of clean water for the animals to drink once captured. A supply of electrolytes is kept on hand to apply to the drinking water if necessary. Electrolytes help to replace the body fluids that may be lost during capture and handling.

Helicopter Drive Trapping Method

Helicopter pilots allow wild horses to travel at their own pace for most of the distance to the gather location. The pilots would hold all necessary certifications and credentials and have the specific experience needed to ensure excessive pressure is not imposed on wild horses until the horses enter the wings of the capture site. Additional pressure is required to move the horses safely into the capture site and prevent them from turning back or trying to disband at the last minute. This is to avoid the need to re-gather or to rope the horses from horseback, which could expose them to additional stress or injury. Foals separated during the gather process are safely grouped and transported to the sorting/holding facility to be reunited with their mothers. During the six weeks before or after the peak foaling period (mid-May), the BLM does not gather wild horses with a helicopter unless it is an emergency. This three-month period between April 1 and June 30 is when a majority of foals are born.

Individual animals would experience physical and psychological stress for short periods during aerial gather operations. Heart rates would be elevated, especially during the final move into a capture site. However, animals would be moving at a walk/trot during most of the gather and would not be moving more than 8 to 10 miles, with the majority traveling 5 to 6 miles. While wild horses in the HMA are habituated to low levels of human activity associated with recreation and livestock management, higher levels of disturbance related to gather operations could cause anxiety in individuals. Because all phases of the process would be carried out according to BLM policy, individual stress would be minimized. Animals would be expected to recover from stress within 24 hours of entering the capture site.

Potential injuries when being herded to traps by a helicopter may include bruises, scrapes, or cuts to feet, legs, face, or the body from rocks and brush. Rarely (because of their experience with the locations of fences in the HMA) wild horses encounter barbed wire fences and receive wire cuts. If injuries do occur, these injuries are treated onsite and the onsite veterinarian would examine the animal to determine if additional treatment is required.

Bait Trapping
Bait trapping gathers would cause lower levels of stress and potential for injury to wild horses initially because horses have grown accustomed to the trap area as a food source. However, following either gather technique, the same types of effects to wild horses are anticipated and described in detail below.

After Capture
Other injuries may occur after a horse has been captured and is within the trap site corral or temporary holding facility, or during transport between facilities, or during sorting and handling. Injuries could be sustained by wild horses captured through any trapping method (aerial and ground gather or bait trapping), as the animals need to be sorted, aged, transported, and otherwise handled following their capture; these injuries are usually a result of kicks and bites from other horses, or from collisions with corral panels or gates. These injuries are generally not fatal and are treated at the ORC.

Temporary Holding Facilities
Wild horses gathered may be temporarily held at the capture site's sorting/holding facility, where they would be sorted into different pens based on sex, age and other variables. The horses would be fed certified weed-free quality hay and fresh water while in the sorting/holding facility. Mares and their dependent foals (if encountered) would be kept in pens together and marked similarly for identification. Horses identified for retention in the HMA and for fertility control treatment would be transported to the Boise BLM ORCs until the fertility control treatment and booster could be implemented and then be released back onto the HMA.

At the ORC, a licensed veterinarian would provide recommendations to the BLM regarding care, treatment, and if necessary, euthanasia of the recently captured wild horses. Any animals affected by a chronic or incurable disease, injury, lameness or serious physical defect (e.g., severe tooth loss or wear, club foot, and other severe congenital abnormalities) would be humanely euthanized using methods acceptable to the American Veterinary Medical Association (AVMA) in accordance with IM- 2015-070 (USDI BLM 2009c), which establishes BLM's criteria for humane euthanasia of wild horses, and IM 2015-151 (USDI BLMa, 2015), which provides BLM's procedures for euthanasia during gather operations.

Transportation of Wild Horses Selected for Removal
Wild horses selected for removal from the range are transported to the Boise BLM ORC by straight deck semi-trailers or gooseneck stock trailers. Vehicles are inspected by the BLM COR or PI prior to use to ensure wild horses can be safely transported and the interiors of the vehicles are in sanitary and safe condition. Wild horses are segregated by age and sex and loaded into separate compartments. Transportation of recently captured wild horses is limited to a maximum of 10

hours. During transport, potential effects to individual horses can include stress, as well as slipping, falling, kicking, biting, or being stepped on by another animal. Unless wild horses are in extremely poor condition, it is rare for serious injury or die during transport. A small number of mares may be shipped with foals.

Indirect Effects of Gathers

Individual effects that occur to individual wild horses after the initial event may include miscarriages in mares, increased social displacement, orphaned foals, and conflict between dominant stallions (typically a brief skirmish that occurs among older stallions following sorting and release into the stud pen). These effects occur intermittently during wild horse gather operations. Observations following capture indicate the rate of miscarriage varies but can occur in about 1 to 5 percent of captured mares, particularly if the mares are in very poor body condition or health. Injuries between stallions typically involve a bite or kick with bruises that do not break the skin. Traumatic injuries usually do not result from these conflicts.

Gathered Foals

It is not uncommon for a small number of foals to be encountered in a gather during any month of the year. If newborn foals or foals too young to wean are gathered, they are matched with their mothers after being gathered. Fall and winter gathers are less stressful to foals than summer gathers due to their being older and more self-sufficient. Young foals in summer months may be more prone to dehydration and complications from heat stress. Additionally, handling, sorting, and transporting can be a stress to young animals, however, BLM staff on site take every precaution to assure that horses are handled and maintained to mitigate such impacts.

A few foals may be orphaned during a gather. This occurs if: the mare rejects the foal, the foal becomes separated from its mother and cannot be matched following sorting, the mare dies or must be humanely euthanized during the gather, the foal is ill or weak and needs immediate care that requires removal from the mother, or the mother does not produce enough milk to support the foal. On occasion, foals are gathered that were previously orphaned on the range (prior to the gather) because mothers rejected them or died. These foals are usually in poor condition. Every effort is made to provide appropriate care to orphan foals. Orphans encountered during gathers are cared for promptly and rarely die or have to be euthanized. Most foals gathered would be over four months of age and some would be ready for weaning from their mothers. In private industry, domestic horses are normally weaned between four and six months of age. Electrolyte solutions may be administered, or orphan foals may be fed milk replacer as needed to support their nutritional needs. Orphan foals may be placed in foster homes in order to receive additional care. Despite these efforts, some orphan foals may die or may be humanely euthanized as an act of mercy if the prognosis for survival is very poor.

Wild Horses Remaining or Released into the HMA following Gathers

The 2020 post-gather goal would be for 37 wild horses to remain within the HMA. Approximately 184 excess wild horses would be removed during an initial gather. Wild horses that are not captured may be temporarily disturbed and move into other areas during gather operations. Mares and stallions released back into the HMA would be selected to maintain a diverse age structure, herd characteristics and body type (conformation). As per the Wild Horse and Burro Handbook (H-4700-1), 1-2 young mares from a different HMA in a similar environment may be introduced

as needed to increase genetic diversity within the Four Mile HMA. Genetic monitoring would occur, following gathers and/or trapping, and would be implemented, following IM 2009-062 (USDI BLM 2009a), as recommended in the H-4700-1, handbook, and/or future updated policy guidance.

With the exception of changes to herd demographics, direct population-wide impacts from previous gathers have proven to be temporary in nature, and most if not all impacts to individual wild horses will recover within hours to several days of release. No observable effects associated with these impacts would be expected within one month of release except a heightened awareness of human presence. There is the potential for the horses that have been desensitized to vehicles and human activities to return to areas where they were gathered if released back into HMA's. No observable effects to the remaining population from the gather would be expected.

By maintaining wild horse population size within the AML, there would be a lower density of wild horses across the HMA, reducing competition for resources within the wild horse herd and with wildlife, allowing wild horses to utilize their preferred habitat. Maintaining population size within the established AML would be expected to maintain forage quantity and quality and promote healthy populations of wild horses in a thriving natural ecological balance and multiple-use relationship on the public lands in the area. Populations managed within AML would be more resilient to the effects of drought or hard winters compared to populations exceeding AML.

Population management would reduce the need for emergency gathers and increase stability and health of the herd over the long term. Maintenance of the population within AML would reduce resource conflicts and ensure the horses remain in better health than if their population were constrained by available forage. The National Academy of Science (NAS) National Research Council (2013) concluded that free-ranging horse populations are growing at high rates because their numbers are held below levels affected by food limitation and density dependence. Regularly removing horses holds population levels below food limited carrying capacity. Thus, population growth rate could be increased by removals through compensatory population growth from decreased competition for forage (pg. 5).

This report also concluded that population responses to density dependence, due to food limitation, will increase the number of animals that are in poor body condition and dying from starvation (NAS, 2013). The report further indicates rangeland health, as well as food and water resources for other animals which share the range, would be affected by resource limited horse populations, which would be in conflict with the legislative mandate that BLM maintain a thriving natural ecological balance (NAS, 2013).

Achieving the AML and improving the overall health and fitness of wild horses could also increase foaling rates and foaling survival rates over current conditions. The primary effects to the wild horse population that would be directly related to proposed gather activities would be to herd population dynamics, age structure or sex ratio, and subsequently reduced growth rates and population size over time.

The National Selective Removal Criteria (Appendix E), which prioritizes removal of wild horses under 5 years of age, would be followed to the extent possible, however it is expected that the

majority of released and non-gathered animals would consist of all age groups greater than 5 years of age.

The effects of successive removals on populations causing shifts in herd demographics favoring younger horses (5 to 15 years) would also have direct effects on the population. However, these impacts are not thought of as adverse to a population. They include development of a population which is expected to be more biologically fit, more reproductively viable, and more capable of enduring stresses associated with traumatic natural and artificial events.

The genetic effective population size (Ne) is a measure of the total number of mares and stallions which contribute genetically to the next generation. Ne, is a reflection of the number of individuals that are contributing to the maintenance of genetic diversity (reviewed in NRC 2013); this number can be difficult to measure directly but is related to the numbers of breeding males and females in a herd. If a herd consists of 20 breeding mares and 30 breeding stallions, then a simplified calculation of Ne (Hartl and Clark 2007) would lead to an estimate of $\widehat{N}$e=48. However, actual Ne is usually lower than the numbers of breeding animals present would imply, so the BLM Wild Horse and Burro Handbook suggests considering other options for maintaining genetic diversity when herd size must be held at below about 150 animals due to habitat limitations or other considerations (BLM 2010). The handbook (BLM 2010) includes suggestions that can be considered for maintaining genetic diversity in small herds such as this one; these suggestions do not represent a specific, legally-binding, BLM policy. One suggestion is to introduce at least 1-2 mares from other similar HMAs every 10 years. A population with an age structure involving high numbers of relatively immature animals (less than 5 years of age) will have a lower value of Ne than a similar sized population with a larger component of breeding-age animals (greater than 5 years of age). Through implementation of the BLM selective removal policy, wild horses 5 to 10 years of age would be the priority for release back to the range. Most or all wild horses under five years of age would be removed, resulting in a potential increase to the Ne in the HMA, compared to a hypothetical scenario where primarily older animals are removed. Due to the most recent report from Cothran (2004) stating a low genetic diversity was present, at least 1-2 young mares from different herds will be released at least once per generation, as recommended in the BLM WHB management handbook (2010).

Population Growth Controls (Fertility control treatments)

Implementation of the Proposed Action would allow for healthy range conditions and healthy animals over the long term by pairing gathers with population growth controls. Reduced population growth rates achieved through fertility control treatments would be expected to: extend the time until AML is exceeded, increase the intervals between gathers, and reduce disturbance to individual animals and herd social structure over the foreseeable future. Modeling suggests that average population growth rates under the median trial for the Proposed Action, which includes both gathers and fertility control, would be 2.4% (GonaCon) and 4.1% (PZP-22). According to the modeling, if follow-up gathers could be implemented on a yearly basis, population control measures may be adequate to maintain the population within the existing AML.

The BLM and other land managers have mainly used three fertility control vaccine formulations for wild horse mares on the range: ZonaStat-H, PZP-22, and GonaCon-Equine (see Appendix D). As other formulations become available, they may be applied in the future in accordance with

applicable BLM policy. BLM Handbook 4700-1, IM 2009-090, and Appendix B identify the SOPs for fertility control vaccine application. Although the handbook and IM state that application of fertility control on HMAs with post-gather herd size that are estimated to be greater than 50 animals would provide the greatest beneficial impacts, applying fertility control can reduce population growth rates in any herd. The IM requires that treated mares be identifiable via a visible freeze brand, micro-chipping or individual color markings, so that their vaccination history can be known/tracked. The IM calls for follow-up population surveys to determine the realized annual growth rate in herds treated with fertility control vaccines. For PZP and GonaCon Direct Effects (see Appendix D).

The expected demographic effects of fertility control vaccine application would be to reduce the growth rate of the herd. This would not necessarily cause a problematic loss of genetic diversity, given the apparent fact that horses in the Fourmile HMA are part of a larger metapopulation, which always has the potential for BLM to introduce animals from other HMAs. In terms of genetic diversity loss attributable to fertility control vaccine use, vaccine use should reduce the average number of foals per mare, but would not necessarily prevent treated mares from giving birth to some number of foals, either before treatment causes infertility, or at some point after the effects of treatment have worn off. Fertility control vaccines are expected to have limited duration of effects, unless multiple doses are given to the same animal. For example, if a mare receives 4 or more doses of ZonaStat PZP vaccine, she may become infertile for many years (Nunez et al. 2018). The specific number of doses required to cause long-term infertility depends on the type of fertility control vaccine that is administered. Mares that do not receive enough vaccine doses to stay infertile typically return to fertility. Because treated mares may live longer lives, the generation time of potentially breeding mares could increase – the net effect of a longer generation time can be to increase genetic effective population size (i.e., Gross 2000). While the exact changes in observed heterozygosity as a result of fertility control vaccine use would be hard to predict, ongoing monitoring of genetic diversity will allow BLM to introduce new animals from other HMAs as needed to maintain a observed heterozygosity at levels that should prevent undue risks of inbreeding.

3.3 Vegetation and Sensitive Status Plants

3.3.1 Affected Environment

The project area is within the sagebrush-steppe ecosystem is comprised of several ecological sites in the 12 to 16-inch precipitation zone. The area is characterized by scattered stands of bitterbrush, sagebrush species, and rabbitbrush. The lower elevations and the flats are dominated by annual grasses with patches of invasive forbs. In contrast, upper elevations and steep slopes are generally dominated by perennial bunchgrasses. Repeat photographs at permanent trend plots indicate little change in the plant communities over the past three decades. Most of the HMA has a reduced shrub overstory and some lower elevation areas have been invaded by cheatgrass and medusahead in the understory. Some islands of native perennial vegetation are present in less accessible, steep or rugged areas. The native vegetation is characterized by bluebunch wheatgrass with scattered antelope bitterbrush and basin big and low sagebrush.

The only known sensitive plant species on BLM managed land in this area is Packard's desert parsley (*Lomatium packardiae*), a BLM Type 2 species. This species is associated with sparsely vegetated badlands, located on the eastern perimeter of the HMA.

Riparian resources within the Four-Mile HMA include approximately one-mile of Big Willow Creek, a perennial stream. The plant community type along Big Willow Creek is mountain alder/redosier dogwood, which represents the potential natural plant community. Domestic livestock and wild horses do not impact this stream as it is largely confined in a narrow valley with very steep banks. No evidence of past or present use by wild horses or domestic livestock was encountered along any segment of this stream.

Four-Mile Creek has a mostly seasonal flow regime and is dominated by arroyo willows and mesic upland grasses and forbs. However, short segments of this stream have perennial flows which support wetland obligate plant species including several species of sedges and rushes. Also, Pacific and arroyo willows and various introduced tree species including box elder, locust, and apple trees also occur here.

Coonrod Gulch and George Way Gulch have entirely seasonal stream flows. No obligate hydric plant species were present in these streams. These streams are functioning within their capability given the seasonal flow regimes. Grazing impacts from wild horse and domestic livestock use are apparent in the upper George Way Gulch, and Coonrod Gulch watersheds. Wild horse use in George Way and Coonrod Gulches occurs mostly in early to mid-spring.

Noxious weeds present in localized patches throughout the HMA include: Rush skeleton weed, scotch thistle, Russian knapweed, whitetop, and yellow starthistle.

3.3.2 Environmental Consequences

3.3.2.1 No Action Alternative

Overstocking for a prolonged period by wild horses would degrade the native perennial vegetation. Although wild horses generally avoid slopes greater than 30% and require access to water, they have been observed on steep slopes and great distances from water (Ganskopp and Vavra 1983, Hampson et al. 2010). Unchecked population growth would result in severe degradation of perennial vegetation which would take decades to recover, if at all, and would prevent the area from meeting the applicable rangeland health standards. Upland would be trampled and grazed, eventually reducing their ability to reproduce and cycle nutrients. Overgrazed riparian species would not provide adequate stream bank stability and shading. Springs and streams would be heavily trampled and pugged, and not support perennial vegetation. Long-term overstocking would lead to the reduction of preferred species and an increased use of less preferable species.

The Big Willow Creek stream channel and floodplain characteristics are mostly geologically controlled by coarse rock and bedrock and are nearly 100% vegetated and stable. Over the long-term, the increasing horse population may result in formation and redistribution of new wild horse bands in the HMA. However, as wild horse cannot access the segments of Big Willow Creek due to geologic features, it is not anticipated that the increased horse population would have any negative short- or long-term effect on this stream.

Over the short through long-terms, combined use by domestic livestock and wild horses could negatively affect the functioning condition of intermittent springs, seasonal streams, and first field watersheds. This would include short segments of Four-Mile Creek inside the western HMA boundary fence, and the upper segments of George Way and Coonrod Gulches, particularly in spring when these seasonal streams have surface water available

Weedy annual forbs, such as tall tumble mustard, Russian thistle, though not a problem currently, would likely increase in population, filling the niches opened by the reduction of grasses (Piemesel 1951). Exotic annual grass species would then infiltrate the weedy areas and a long-term exotic annual grass-fire cycle would likely establish (Stewart and Hull 1949). Such a cycle would not be limited to the annual grass-dominated areas only; thus, the entire area would have an increased likelihood of burning at a frequency that would generally exclude perennial vegetation from reestablishing (D'Antonio and Vitousek 1992).

Overgrazing of grasses would lead to more utilization of forbs, potentially resulting in the extirpation of desert parsley. The increase in wild horse population would result in overgrazing of riparian vegetation, and damage to riparian areas, affecting achievement of the Rangeland Health standards.

3.3.2.2 Proposed Action

Gather activities would result in some localized disturbances to vegetation where the horses are driven into the corral traps. These include damage to vegetation from wild horse trampling at gather sites, holding locations, crushing by vehicles, temporary corrals, and holding facilities. These disturbed areas would be small, totaling 1-5 acres. The impacts would be temporary, and vegetation would be expected to recover within the next growing season. This disturbance would be short term and negligible in comparison to not maintaining the AML. However, long-term effects from achieving and maintaining the established AML would benefit plant communities in both uplands and accessible riparian areas by reducing the grazing pressure on the resources. This is desirable because defoliation that occurs more than once in a growing season reduces a plants ability to maintain health and reproduction (Herbel 2004). Reducing the wild horse population to within AML would lessen grazing and trampling impacts and allow plants to continue photosynthetic processes to initiate regrowth for recovery and grow adequately for reproduction. This would help maintain or improve plant health, reproduction, diversity, and composition.

Reduced population growth rates and smaller population sizes would allow continued and increased environmental improvements in range condition within the project area, which would have long-term benefits to wild horse habitat quality. As the population nears, or is maintained at, levels necessary to achieve a natural ecological balance, vegetation resources would be expected to improve the forage available to wild horses and wildlife throughout the HMA. Lower population density would be expected to lead to reduced competition among wild horses using the accessible water sources and less damage to the riparian vegetation and resources. No gather sites and/or temporary holding facilities would be constructed in wetlands or riparian zones, therefore the proposed action would not directly, negatively affect riparian areas.

3.4 Livestock Management

3.4.1 Affected Environment

The HMA perimeter is fully fenced and encompasses three of the ten pastures of the Willow Ridge Allotment #ID00005 (Joe Hollow #05, Coonrod Gulch #06, and George Way #07; (See Appendix A, Map 1). The current permittee, AL Cattle Inc. #1100063, holds the authorization for grazing within the allotment as shown in Table 3. The allotment consists of approximately 45,302 total acres, 35,204 acres of BLM, resulting in an approximate stocking rate of 8 acres/AUM.

Table 3. Grazing Allotment Management

Number/Kind of Livestock	On Date	Off Date	Percent Public Land*	AUMs
1,115 (Cattle)	03/01	08/15	53%	3,264
1,115 (Cattle)	11/01	12/31	53%	1,185

*Percent public land for grazing allotment

The cattle graze the allotment in a two-herd, alternating year system, with up to 400 head per herd. Livestock are in the HMA during the dates shown in Table 4. Livestock grazing is not authorized within the HMA between August 16 and October 31. The permittee may need to alter pasture use of livestock operations during wild horse gathers. Fences are kept up and gates closed between pastures during these periods.

Table 4. Livestock Management Dates

Pasture	Even Years	Odd Years
Joe's Hollow #05	Grazing 5/16-6/30, Trailing 11/1-12/15*	Grazing 5/1-6/30, Trailing 12/16-12/20*
Coonrod Gulch #06	Trailing Only 11/1-12/15*	Grazing Only 7/1-8/15
George Way #07	Grazing Only 7/1-8/15	Trailing Only 11/1-12/15*

*Trailing Permit #ID11012016-Up to 100 head each herd (4 herds/4 days) or 400 Head (1 herd/1 day) trailing within the trail period not to exceed 13 AUMs/period.

3.4.2 Environmental Consequences

3.4.2.1 No Action Alternative

Under this alternative, competition for forage and water resources would continue to increase between livestock and wild horses. The utilization limits (upland (50%) and riparian) for the livestock grazing permit would likely be achieved earlier in the season, due to increased horse numbers and competition for resources. Utilization is conducted (ocular), within the grazing periods, and as needed across the allotment, usually within 2 weeks of livestock leaving the pasture. The increase in the number of horses would increase the burden of labor and costs for fence and trough maintenance. These impacts would potentially lead to future rangeland health standards not being met on the allotment. Livestock would not be disturbed or displaced due to gather operations under the No Action Alternative.

3.4.2.2 Proposed Action

The BLM would coordinate with the livestock operator to ensure gather activities would not disrupt grazing management. Grazing permittees would be contacted at least 30 days prior to initiating gather activities, allowing for any necessary adjustments to their operations. Herd population at AML would provide the necessary balance for forage demand between the livestock permit, wildlife, and wild horses. There would be minimal conflicts, including competition for forage, between livestock grazing and wild horses. Interactions between livestock, increasing elk, and wild horses could result in additional high use areas being created which could impact forage availability over the long term as horse numbers increase. Damage to rangeland improvements by wild horses may continue, although at a much lower rate, as the horses in the Willow Ridge Allotment remain in one large herd throughout the year.

Use of a helicopter would be utilized under this alternative, which may frighten livestock more than the bait/water traps. This disturbance would be short term (< 1 week), and livestock would return to areas quickly after the gather has concluded. Past experience has shown that wild horse gather operations have few direct impacts to livestock grazing in general. Livestock located near gather activities would be temporarily disturbed or displaced by the traps and the increased vehicle traffic during the gather operation. The BLM would work with livestock operators to set up traps at locations in the allotment that livestock are not currently utilizing. Livestock may be moved to different pastures to avoid trapping operations. Typically, livestock would move back into the area once gather operations cease.

3.5 Soils

3.5.1 Affected Environment

The soils in the HMA are generally shallow or stony loams with low to moderate erosion potential, due to the larger rock fragments that make us much of the surface. Soil erosion potential is also greatly affected by slope angle, rockiness, and the composition of the vegetation covering the soil surface. The structure of vegetation intercepts precipitation and water flows, and dampens surface wind speeds. Loamy soil can be compacted by trampling and vehicle traffic when damp. Currently most of the soils are protected from accelerated erosion by vegetation or rock, with isolated areas of localized erosion.

3.5.2 Environmental Consequences

3.5.2.1 No Action Alternative

If the horse population in the HMA continues to increase at the predicted rate, utilization of vegetation would increase proportionally, leading to overgrazed conditions. Overgrazing reduces the vigor and limits basal growth of perennial grasses and leads to the replacement by tumbleweeds (Piemesel 1951). The replacement of persistent aboveground cover and fibrous roots of perennial grasses by non-persistent cover and sparse taproots of tumbleweeds would increase the risk of erosion (De Baets and Poesen 2010). Furthermore, high concentrations of horses would increase soil compaction, leading to weaker, shallower roots in the remaining perennials (Krzic et al. 2013). Compaction would be greatest on flat sites near water, but riparian areas and steep and heavily trailed slopes would be subjected to accelerated erosion.

3.5.2.2 Proposed Action

Maintaining the populations within AML would maintain vegetation and soils conditions and continue to meet Idaho Rangeland Health Standards. Accessible areas near water sources in the uplands, would continue to maintain the shallow-rooted annual grasses, and deep-rooted perennial vegetation would be maintained on steep upland slopes. Riparian vegetation would be maintained along streams and springs.

Helicopter gather operations and bait and/or water trapping project implementation would occur on previously disturbed areas. Other soil disturbances would be the relatively small areas used for gathering and holding operations. Horses may be concentrated for a limited period in traps. Potential for soil compaction would occur but would be minimal and temporary. It would not be expected to adversely impact soil or its hydrologic function. Soil blowing hazards would occur during helicopter operations and with the increased amount of traffic. Areas of bare ground, compaction, and trailing where wild horses are frequently present would remain.

3.6 Wildlife

3.6.1 Affected Environment

Wildlife habitat within the HMA consists of pockets of low sagebrush and antelope bitterbrush in the uplands and a relatively large expanse of sagebrush in the northwest section of the HMA. Shrubs provide forage and cover to wildlife and are a key resource for wintering big game, greater sage-grouse, small mammals, migratory birds and BLM Type 2 sensitive wildlife. Ephemeral and intermittent streams have larger continuous patches of basin big sagebrush intermixed with other mountain shrubs. While sagebrush occurs mainly in scattered patches within the HMA, it becomes more continuous to the west and north, providing adjacent intact habitat for sagebrush-dependent species. Few areas within the HMA meet the criteria of 15-25 percent canopy cover considered to provide high quality Greater Sage-grouse (GRSG) habitat (ARMPA 2015).

The HMA is within the Mountain Valleys Conservation Area for greater sage-grouse (*Centrocercus urophasianus*; hereafter sage-grouse), and fully within a General Habitat Management Area (GHMA) designated through the Idaho and Southwestern Montana Greater Sage-grouse ARMPA (USDI BLMb, 2015). There is one lek with undetermined status within the HMA and three leks with undetermined status just outside the western perimeter. A lek is considered undetermined if there is inadequate survey data to identify the lek as occupied or unoccupied. All four leks were visited in April 2019, but no birds were found at the lek sites. The last documented lek sightings occurred in 1977. An occupied Columbian sharp-tailed grouse lek is also located in the HMA.

The HMA provides marginal or unsuitable habitat for sage-grouse based on the lack of shrubs over most of the area. Most of the HMA is mapped as winter habitat for sage-grouse, but due to lack of sagebrush cover, there are only pockets that provide quality winter habitat. About five square miles of nesting/brood rearing sage-grouse habitat occurs in the northwest section of the HMA and the presence of sage-grouse has been observed within the last few years.

BLM sensitive species associated with desert habitats that have been documented to occur in or near (within 5 miles) the HMA include southern Idaho ground squirrels (*Urocitellus brunneus*). There is a golden eagle (*Aquila chrysaetos*) nesting territory about 2.5 miles outside the southeast

boundary of the HMA, and a Swainson's hawk (*Buteo swainsoni*) nest in the riparian area associated with Four Mile Creek.

The HMA is designated winter range mainly for mule deer, but elk use the area as well, and antelope can utilize the area year-round. Hiding/thermal cover is sparse in the uplands, but available in drainages and scattered pockets. Recreational use is primarily by hunters and occasionally off-highway vehicle users. The HMA is fully within Game Management Unit (GMU) 32. Hunting for various species of wildlife in the HMA occurs from August through the month of January.

3.6.2 Environmental Consequences

3.6.2.1 No Action Alternative

Without gathers, the wild horse population within the HMA is expected to continue to substantially exceed AML. When populations exceed AML, resource conditions degrade. Winter range is considered the limiting factor for both wild horses and big game in the HMA; therefore, AML is based on forage availability during the winter months. When the combined use of big game, wild horses, and livestock exceed the sustainable capacity of the landscape to provide winter habitat, resource conditions would be expected to decline. over utilization would result in decreased forage availability and resource damage. Under the No Action Alternative, there would be no short-term disturbance associated with gathers, but failing to manage the number of horses in the HMA would eventually result in deteriorating habitat quality and lack of sufficient resources to support livestock, horses, wintering big game and migratory birds. Increasing wild horse populations can reduce grass and forb cover below ARMPA objectives.

Habitat for terrestrial wildlife would be degraded from an unmanaged Four Mile horse population. The No Action Alternative would be inconsistent with Secretarial Order 3362 as well as the land use plan specific management for sage-grouse habitat (USDI BLM, 2015). Secretarial Order 3362 (USDI BLM, 2018) supports management actions that enhance and improve big game habitat and recommends maintaining AMLs in all wild horse management areas. Objectives are to manage within established AML ranges by prioritizing gathers in sage-grouse habitat in order to meet ARMPA habitat objectives.

3.6.2.2 Proposed Action

In order to maintain the wild horse population within the recommended AML for the HMA, the proposed management plan allows for aerial gathers, bait trapping, fertility control, and population monitoring. As stated in section 2.2.1, seasonal restrictions for gathering activities would be implemented during various periods throughout the year. Due to the spring/summer timing restriction from March 1 to June 30, impacts to nesting sage-grouse, sharp-tailed grouse, migratory birds, and resident wildlife species would be negligible, and therefore will not be discussed further in the EA. Any gathering activity between November 15 and February 29 would require following the procedures outlined in Appendix C to protect big game on winter range. However, most gather events are expected to occur in September, October, and November, which would minimize impacts to big game species on winter range.

Aerial Gather
Individual animals of all species may be disturbed or displaced during gather events. Large mammals and some birds may run or fly (flush from roost sites) when the helicopter flies over looking for horses, but once the helicopter is gone the animals should return to normal activities. Small mammals, birds, and reptiles would be displaced at gather sites, but this would only be for a few days at each trap site. Gathering activities are primarily planned for fall and unlikely to occur during the spring breeding season.

If a gathering event were to take place between November 15 and February 29 in an area where big-game are concentrated, there could potentially be some stress to mule deer and possibly elk. The ramifications of this stress as a result of short-term exertion is difficult to quantify and would depend upon the duration, snow depth, temperature, terrain and condition of the animals. It is assumed that once the deer or elk realize that they are not the object of the herding or hazing efforts of the helicopter that they would cease their avoidance behavior and wait for the helicopter to pass. Given this scenario, the impacts to wintering big game during an average winter should be minimal.

Bait Gather
Bait gathers involve providing a limited resource such as water or feed in a corral setting adjacent to an access point until the horses become accustomed to the structure. A trigger setting would trap horses in the corral, and they would be removed from the site. This procedure would not cause notable disturbance to most wildlife within the HMA.

Fertility Control
Fertility control in the form of injections while in captivity would have no direct impact on wildlife in the HMA. Remote darting could cause negligible displacement. Long-term beneficial effects would result from a longer period between disturbances associated with gather activities, as reproduction would be delayed in the treated horses. Fertility control would result in less frequent disturbance in the HMA over the long term compared to no fertility control.

Re-Release
Re-release would result in the reintroduction of fewer horses back into the HMA. Lower numbers of horses would have a positive impact on wildlife habitat compared to current conditions as long as future management continues to maintain an appropriate population size relative to the capabilities of the landscape to provide food and cover for terrestrial wildlife. Re-release of captured horses may lead to less effective future gather operations as the horses acclimate and learn to avoid the gather activities. There would be no additional impacts to livestock grazing.

Population Monitoring
Population monitoring by helicopter or fixed wing flight within the HMA, would be used to determine the need for future gathers. Other methods could be used (ground monitoring). Flights for monitoring the wild horse population in the HMA are at high enough elevations that minor to no disturbance is expected to wildlife as a result of the flights.

Summary

While short-term disturbances could occur to big game on winter range primarily as a result of aerial gathering activities, the proposed action would meet the intent of SO 3362, which recommends site-specific management activities to conserve or restore big game habitat (2019). The Order specifically directs field offices to revise wild horse and burro AMLs if necessary and to remove horses and burros exceeding established AMLs from winter range or migration corridors if habitat is degraded as a result of their presence. The Order also recommends limiting disturbance of big game on winter range and supports BLM Idaho statewide guidelines (USDI BLM 2010b) for preventing disturbance to big game on winter range. Management to keep the wild horse population at or below the AML for the HMA would have negative short-term direct effects (1-2 weeks) of disturbance that are minimized through timing restrictions, but would maintain habitat for big game, BLM sensitive species like sage-grouse, and other wildlife in the HMA. Overall, the Proposed Action would have negligible effects to wildlife over the short term but would benefit habitat long-term compared to the No Action Alternative.

3.7 Cumulative Effects

3.7.1 Past, Present, and Reasonably Foreseeable Future Actions (RFFA)

Past actions include livestock and wild horse grazing and water developments such as pipelines and wells. RFFAs occurring in the HMA and Affected Environment, include livestock grazing, wild horse management (issuance of multiple use decisions, AML adjustments, gathers and planning), Recreation motorized and non-Motorized, off-highway vehicle (OHV) use.

Recreational motorized and non-motorized use and OHV use in the HMA/Project area would continue to increase as local use of the Public Lands increases with population growth.

Table 5. Timeframes for Short- and Long-Term Cumulative Effects Analysis

Resource	Short-Term Definition and Rationale	Long-Term Definition and Rationale
Wild Horses	Seven days to two months per gather (depending on gather type), extending the life of the project. Most of these impacts would be short-lived and temporary in nature.	Ten years - Wild horse population is expected to continue to increase. The rate of increase would be dependent on the alternative chosen and would be lowest under the Proposed Action.
Vegetation	Seven days to two months per gather (depending on gather type), extending the life of the project – Direct and indirect, concentrated impacts to vegetation related to gather activities would occur throughout the proposed gather period, and would extend slightly beyond due to post-gather clean up and project completion.	Ten to forty years – Arid vegetation communities are susceptible to transition between condition states with disturbance, recovery times can take decades when recovery is possible.

Soils	Seven days to two months, per gather would result in gather-site specific compaction of soils, increased dust and wind erosion.	Ten-years post gather event, would have similar but minimally compounded impacts on each gather site.
Livestock	Seven days to two months per gather (depending on gather type), extending the life of the project. Livestock grazing is expected to continue at similar stocking rates.	Ten years - Fewer impacts to livestock grazing with wild horse numbers at AML.
Wildlife	From seven days to Two Months per gather.	After the 10-year period of the Action Alternatives, management of wild horse populations as described in those alternatives would cease. Wild horse populations would then increase at 20-25% per year until once again exceeding AML within about 1 year. Therefore, the long-term time period is 11 years.

Table 6. Past, Present, and Reasonably Foreseeable Future Actions (RFFA)

Action Type	Past	Present	Reasonably Foreseeable
Wild horse management: issuance of multiple use decisions, AML adjustments, gathers and planning	X	X	X
Livestock Grazing-Issuance of decisions and grazing permits for ranching operations through the allotment evaluation process/standards and guidelines assessment	X	X	X
Recreation (including OHVs) Hunting, rockhounding, camping, motorized and non-motorized activities. Recreational uses are increasing and expanding throughout the area. As a result, the need for recreation planning has increased. Recreation planning allows land management agencies to work to balance the resource needs with the demand for a variety of recreation uses	X	X	X

Action Type	Past	Present	Reasonably Foreseeable
which the public can enjoy within the public lands both inside and outside of the HMA.			
Vegetation, native and Non-native, Invasive and noxious weed inventory/treatments; pesticide application	X	X	X
Wildlife	X	X	X

3.7.2 Wild Horse

Past and present action effects are described within Section 3.2.1. Two gathers of wild horses have occurred (2003, 2009) in the HMA in the recent past; repeated gathers in the same areas or conducted too frequently, can affect wild horse behavior making them harder to capture. Livestock grazing can impact wild horses by reducing the quantity and quality of forage. In addition, competition of forage in the future is expected to be less due to livestock grazing permit renewals in the area and the expectation that if land use plan objectives and the Idaho Standards for Rangeland Health are not met, changes would be made to livestock grazing to ensure progress towards meeting them. The increased presence and noise associated with motorized recreation could increase disruption of normal grazing and social behavior of the horses. Increased recreation would be expected to result in an increase in livestock control devices (gates, cattle guards, fences) to be left open or damaged, resulting in wild horses and livestock escaping from the HMA. Overall, cumulative effects from past, present, and foreseeable future actions are minimal and not expected to result in any meaningful disturbance to wild horses.

3.7.3 Vegetation

The Proposed Action would minimize trailing as well as reduce the spread of noxious species to new locations. The reduction of wild horses would lower the amount of ingestion of perennial species which are key to maintaining healthy and resilient rangelands. The No Action alternative with continued livestock grazing within the project area would result in more ingestion of perennial plant species and overall rangeland health conditions would decline due to the increase in invasive annual plant species and noxious weeds. Over AML of the HMA would adversely impact soil and vegetation health, by promoting the establishment and spread of invasive non-native species in the future.

Past and current non-motorized and motorized recreation use has contributed to the increase and spread of invasive and noxious weed infestations, these uses are expected to continue into the foreseeable future. Past and current livestock grazing has also contributed to the spread and increase of invasive and noxious weeds. Livestock grazing into the future will be adjusted during permit renewal processes to achieve the Idaho Standards for Rangeland Health and ensure land use plan objectives are being met. Achievement, or progress towards achievement, of the range health standards and land use plan objectives, would improve the health and vigor of perennial species, to more effectively compete with invasive or noxious weeds. Range improvements (fencing, troughs, etc.) constructed across the HMA in the past, and any future construction of range improvements would conform with BLM's standards for construction and maintenance.

3.7.4 Livestock

Livestock grazing will be managed in accordance with applicable laws, regulations and policies, including the regulatory requirement that livestock grazing be managed to meet, or make significant progress towards meeting, the Idaho Standards for Rangeland Health. Changes to the permitted livestock use, including AUMs and season of use, on pastures in the HMA would be evaluated during the permit renewal process. Overall, cumulative impacts would not be expected to livestock grazing from the Proposed Action and No Action alternative when added with past, present, and foreseeable future actions.

3.7.5 Wildlife (Other than BLM Special Status Species)

When added to past, present, and RFFAs, the aggregate impacts of direct and indirect effects are not expected to adversely impact wildlife populations. Over both the short and long-term, when added to past, present, and RFFAs, the aggregate impacts are expected to be beneficial for wildlife and their habitats including immediate benefit to wildlife through less competition for forage and water and gradual improvement of upland health. The cumulative impacts from the No Action Alternative would not see beneficial impacts to habitats and wild horse numbers in excess of AML would result in continuing decline of habitat conditions

4 Consultation and Coordination

4.1 Persons an Agencies Consulted

A public scoping period occurred from June 20 to July 15, 2019. The BLM received a response from Friends of Animals that is addressed accordingly in this EA. A public comment period occurred from October 31 to December 2, 2019. The BLM received one comment from the Idaho State Department of Agriculture.

4.2 Tribal Consultation

The Shoshone-Paiute Tribe was consulted during formal Government-to-Government consultation on June 20, 2019 and no comments were received, nor were any concerns raised.

The Shoshone-Bannock Tribe was consulted by providing them an electronic copy of the EA on August 2, 2019. The BLM received comments from the Shoshone-Bannock Tribe that are addressed accordingly in this EA.

5 List of Preparers

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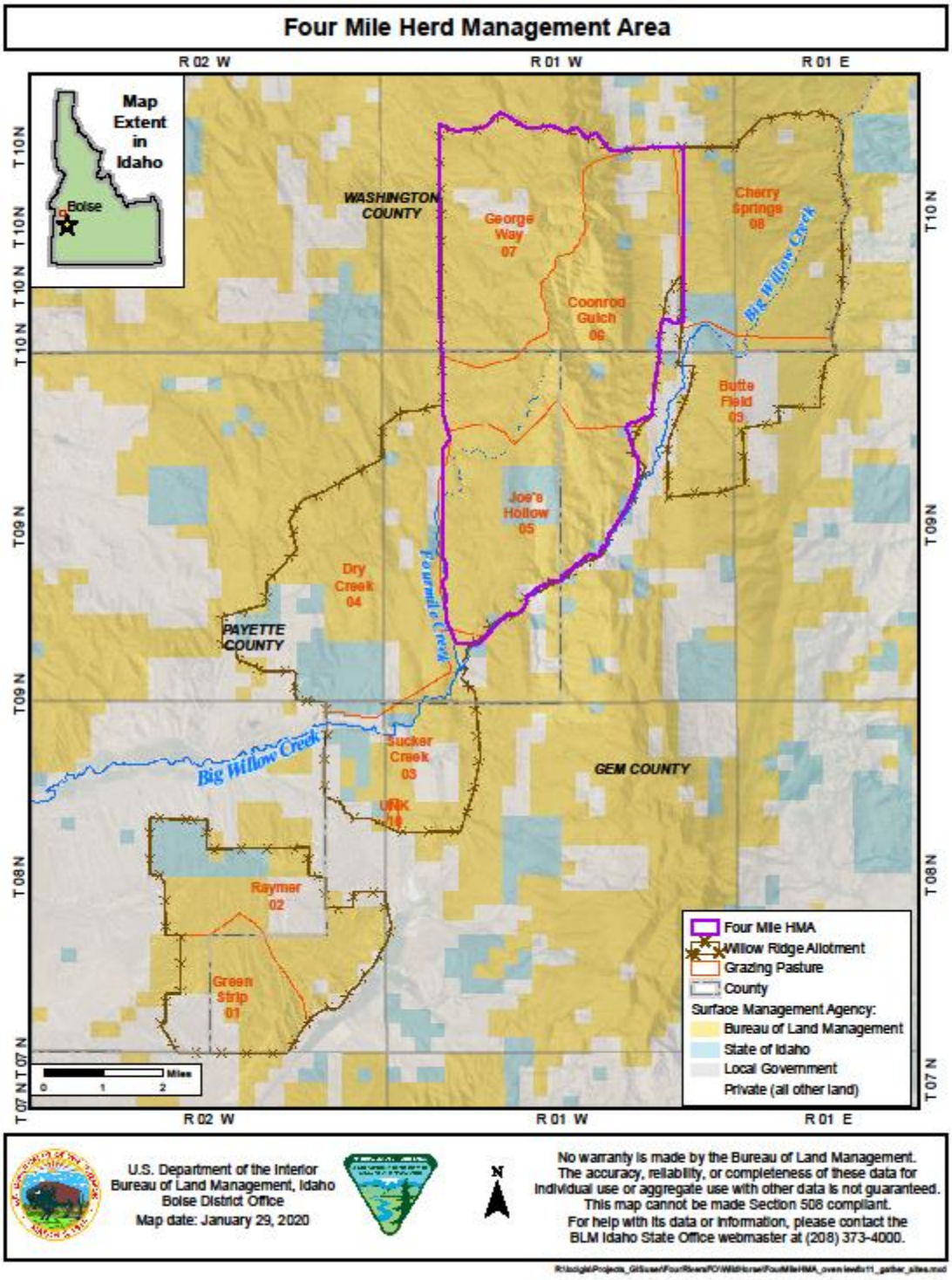
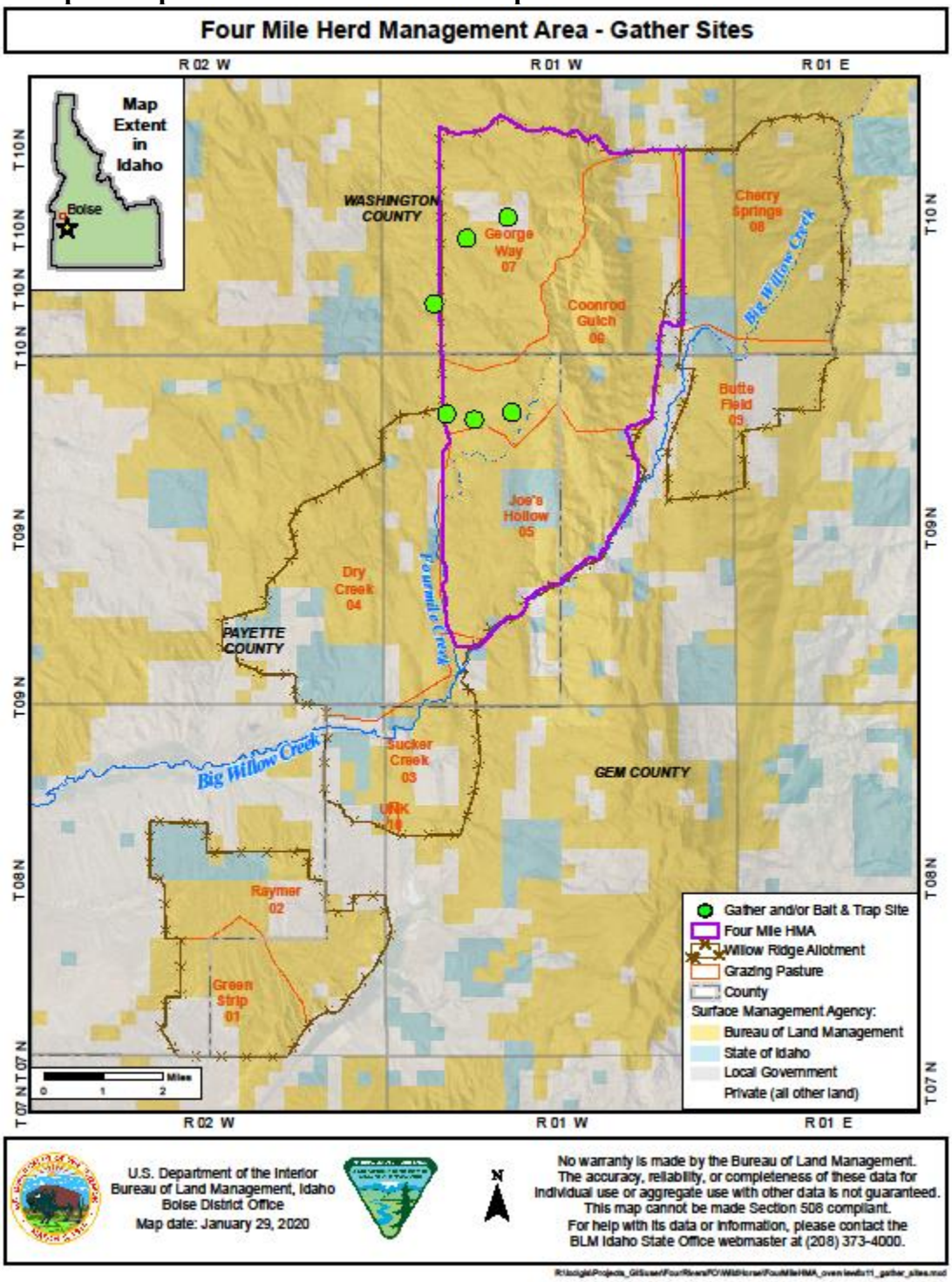
7 Appendices

7.1 Appendix A. Maps

7.1.1 Map 1. Four Mile Herd Management Area



7.1.2 Map 2. Proposed Gather and/or Bait Trap Sites



7.2 Appendix B. Standard Operating Procedures (SOPs)

FERTILITY CONTROL TREATMENT SOPS

The following management and monitoring requirements are part of the Proposed Action:

PZP Vaccine
1. PZP vaccine would be administered by trained BLM personnel.

2. The fertility control drug is administered with two separate injections: (1) a liquid dose of PZP is administered using an 18-gauge needle primarily by hand injection; (2) the pellets are preloaded into a 14-gauge needle. These are loaded on the end of a trocar (dry syringe with a metal rod) which is loaded into the jab-stick which then pushes the pellets into the breeding mares being returned to the range. The pellets and liquid are designed to release the PZP over time similar to a time-release cold capsule.

3. Delivery of the vaccine would be as an intramuscular injection while the mares are restrained in a working chute. Half a cubic centimeter (cc) of the PZP vaccine would be emulsified with half a cc of adjuvant (a compound that stimulates antibody production) and loaded into the delivery system. The pellets would be loaded into the jab-stick for the second injection. With each injection, the liquid and pellets would be propelled into the left hindquarters of the mare, just below the imaginary line that connects the point of the hip and the point of the buttocks.

4. All treated mares would be freeze-marked on the hip to enable researchers to positively identify the animals during the research project as part of the data collection phase.

5. At a minimum, monitoring of reproductive rates using helicopter flyovers will be conducted in years two through four by checking for the presence or absence of foals. The flight scheduled for year four will also assist in determining the percentage of mares that have returned to fertility. In addition, field monitoring will be routinely conducted as part of other regular ground-based monitoring activities.

6. A field data sheet will be used by the field applicators to record all the pertinent data relating to identification of the mare including a photograph when possible, date of treatment, type of treatment (1 or 2 year vaccine, adjuvant used) and HMA. The original form with the data sheets will be forwarded to the Authorized Officer at National Program Office (NPO) in Reno, Nevada. A copy of the form and data sheets and any photos taken will be maintained at the district office.

7. A tracking system will be maintained by NPO detailing the quantity of PZP issued, the quantity used, and disposition of any unused PZP, the number of treated mares by HMA, district office, and state along with the freeze-mark applied by HMA.

8. The field office will assure that treated mares do not enter the adoption market for 3 years following treatment. In the rare instance, due to unforeseen circumstance, treated mare(s) are removed from an HMA before 3 years has lapsed, they will be maintained in either a BLM facility or BLM-contracted Long-Term Pastures (LTPs) until expiration of the 3-year holding

period. In the event it is necessary to remove treated mares, their removal and disposition will be coordinated through NPO. After expiration of the 3-year holding period, the animal may be placed in the adoption program or sent to long-term pastures.

GonaCon Vaccine Hand-injection

1. GonaCon-Equine vaccine is administered by hand-injection to mares that are appropriately immobilized or restrained. Important: label instructions must be followed for this product. Females identified for treatment application are hand-injected with an intramuscular injection of Gona-Equine vaccine (2 ml) in the lower gluteal musculature using a hand-held, luer-lock syringe (18-gauge, 3.8 cm needle). The syringe is made of transparent plastic with the barrel showing graduated marks indicating the volume of the vaccine in the syringe. This facilitates the visual assessment of the quantity of vaccine injected into the animal without the need to weigh the syringes. Pre-loaded syringes should be kept refrigerated overnight and then set out the morning of application at room temperature. They should not be allowed to get too warm or cold during the day.
2. The vaccine is distributed as preloaded doses (2 mL) in labeled syringes. Upon receipt, the vaccine should be kept refrigerated (4° C) until use. Do not freeze. The vaccine has a 6-month shelf-life from the time of production and the expiration date will be noted on each syringe that is provided.
3. Although infrequent, hand-injections to immobilized or restrained horses can result in partial delivery of the vaccine due to inexperienced personnel and/or unexpected movement of the horse. As a precaution, order extra doses of the vaccine. For hand-injection application, assume a 10% failure rate and increase the original quantity accordingly.
4. Examine each syringe before and after injection and visually determine approximately how much vaccine was injected. A full dose is considered 90% (1.8 ml) or greater of the original 2 ml dose. Ensure a full dose is administered.
5. It is recommended that all treated mares be photographed to facilitate identification by individual markings and/or freeze-marked on the hip or neck to positively identify the animals as a GonaCon-Equine vaccinated mare during field observations or subsequent gathers.

GonaCon Vaccine Remote Delivery

<u>Preparation of Darts for Remote Delivery:</u>

1. The vaccine is distributed as preloaded doses (2 mL) in labeled syringes. Upon receipt, the vaccine should be kept refrigerated (4° C) until use. Do not freeze. The vaccine has a 6-month shelf-life from the time of production and the expiration date will be noted on each syringe that is provided. Important: label instructions must be followed for this product.
2. Although infrequent, dart injections can result in partial injections of the vaccine, and shots are missed. As a precaution, it is recommended that extra doses of the vaccine be ordered to accommodate failed delivery (~15 %). To determine the amount of vaccine delivered, the dart must be weighed before loading, and before and after delivery in the field.

3. For best results, darts with a gel barb should be used. (i.e. 2 cc Pneu-Dart brand darts configured with Slow-inject technology, 3.81 cm long 14 ga.tri-port needles, and gel collars positioned 1.27 cm ahead of the ferrule)
4. Wearing latex gloves, darts are numbered and filled with vaccine by attaching a loading needle (7.62 cm; provided by dart manufacturer) to the syringe containing vaccine and placing the needle into the cannula of the dart to the fullest depth possible. Slowly depress the syringe plunger and begin filling the dart. Periodically, tap the dart on a hard surface to dislodge air bubbles trapped within the vaccine. Due to the viscous nature of the fluid, air entrapment typically results in a maximum of approximately 1.8 ml of vaccine being loaded in the dart. The dart is filled to max once a small amount of the vaccine can be seen at the tri-ports.
5. Important! Do not load and refrigerate darts the night before application. When exposed to moisture and condensation, the edges of gel barbs soften, begin to dissolve, and will not hold the dart in the muscle tissue long enough for full injection of the vaccine. The dart needs to remain in the muscle tissue for a minimum of 1 minute to achieve dependable full injection. Sharp gel barbs are critical.
6. Darts (configured specifically as described above) can be loaded in the field and stored in a cooler prior to application. Darts loaded, but not used can be maintained in a cooler at about 4° C and used the next day, but do not store in a refrigerator or any other container likely to cause condensation.

Administering the Vaccine:

1. For initial and booster treatments, mares would ideally receive 2.0 ml of GonaCon-Equine. However, experience has demonstrated that only 1.8 ml of vaccine can typically be loaded into 2 cc darts, and this dose has proven successful. Calculations below reflect a 1.8 ml dose.
2. With each injection, the vaccine should be injected into the left or right hind quarters of the mare, above the imaginary line that connects the point of the hip (hook bone) and the point of the buttocks (pin bone).
3. Darts should be weighed to the nearest hundredth gram by electronic scale when empty, when loaded with vaccine, and after discharge, to ensure that 90% (1.62 ml) of the vaccine has been injected. Animals receiving <50% should be darted with another full dose; those receiving >50% but <90% should receive a half dose (1 ml). All darts should be weighed to verify a combination of ≥1.62 ml has been administered. Therefore, every effort should be made to recover darts after they have fallen from animals.
4. A booster vaccine may be administered 90 or more days after the first injection to improve efficacy of the product over subsequent years.
5. Free ranging animals may be photographed using a telephoto lens and high-quality digital receiver as a record of treated individuals, and the injection site can be recorded on data sheets to facilitate identification by animal markings and potential injection scars.

7.3 Appendix C. Timing Restriction Exceptions

Big Game Winter Range

Seasonal restrictions for potentially disruptive activities within big game winter ranges in Idaho will apply from November 15 through April 30 unless a temporary, short-term exception is granted by the BLM field office manager. General time-frames for calving/fawning are May 1-June 30 for elk and deer and May 15 through June 30 for pronghorn. These dates, as specified, are general in nature for purposes of this document, and may be adjusted as needed based on local conditions. Additional factors to consider when granting exceptions to seasonal restrictions on winter ranges are summarized in Table 7 below.

Table 7. Procedures for Granting Short-Term Exceptions in Winter Range

Animal (Big Game) Presence/Absence	If Present, Animal Condition
Weather Severity	Snow Conditions, Snow Depth, Crusting, Longevity Seasonal Weather Patterns Wind Chill Factor Air Temperatures and Variation Duration of Winter Conditions
Habitat Condition	Animal Density (high or low) Forage Condition (good or poor) Competition (livestock, horses/burros, other wildlife) Forage Availability/Accessibility (amount and percentage above snow)
Site Location	Likelihood of Animals Habituating to the Proposed Activity Presence of Thermal and Security Cover and Related Factors Proportion of Winter Range Affected Topographic Features (Site Distances) Location of Site Within Winter Range (Adjacent, Edge, Center) Other Activity in the Area that could Add to Cumulative Effects
Timing	Early or Late in the Winter Season Kind and Duration of Disruptive Activity

Procedure for Requesting and Granting Exceptions to Seasonal Wildlife Restrictions:

Exceptions to seasonal restrictions for helicopter gathers may be considered and granted by the field office manager if the BLM field office biologist in consultation with IDFG believes that granting an exception will not unacceptably disturb, displace or stress the wildlife species being protected. There is no clear-cut formula but use of available data and knowledge of local conditions will be the primary factors in making the recommendation. The general process will be as follows:

1. A request for an exception to a seasonal wildlife restriction must be initiated in writing (via letter or email) to the BLM field office manager. The request must include a 1) description of the activity needing exception, 2) description of the need and rationale for the exception, 3) description of measures and alternatives such as alternative scheduling, staged activity, etc., that may reduce impacts to the wildlife resource, and 4) date or dates for the requested exception.

2. The BLM field office biologist, in coordination with the appropriate IDFG staff, will review the application for exception and available information, including site visits, as appropriate, along with the considerations and criteria in Table 2. Analyses of requests for exception will include validation of the seasonal restriction (e.g., is the area still serving as mule deer winter range? Is there still a likelihood of nesting raptors in the area, etc.?) and a review of potential measures and alternatives proposed in the application, such as alternative scheduling, staged activity, etc. The BLM field office biologist will then provide a recommendation in writing to the field office manager as expeditiously as is practical.
3. A final determination for granting an exception to seasonal wildlife restrictions will be made by the BLM field office manager, in consideration of the biologist's recommendation and consistent with applicable law, regulation, policy, or local planning. The request for exception is considered as a unique, site specific action, is analyzed, and subsequently documented by the field office manager or his/her representative, with respect to RMP and project NEPA compliance
1. Exceptions may be cancelled by the field office manager in the event that local conditions change suddenly in a manner that places wildlife at unacceptable risk.

7.4 Appendix D. PZP and GonaCon Literature Reviews, Fertility Control and Fertility Control Vaccines, in general

Reference in this text to any specific commercial product, process, or service, or the use of any trade, firm or corporation name is for the information and convenience of the public, and does not constitute endorsement, recommendation, or favoring by the Department of the Interior.

Various forms of fertility control can be used in wild horses and wild burros, with the goals of maintaining herds at or near AML, reducing fertility rates, and reducing the frequency of gathers and removals. The WFRHBA of 1971 specifically provides for contraception and sterilization (section 3.b.1). Fertility control measures have been shown to be a cost-effective and humane treatment to slow increases in wild horse populations or, when used in combination with gathers, to reduce horse population size (Bartholow 2004, de Seve and Boyles-Griffin 2013, Fonner and Bohara 2017). Although fertility control treatments may be associated with a number of potential physiological, behavioral, demographic, and genetic effects, those impacts are generally minor and transient, do not prevent overall maintenance of a self-sustaining population, and do not generally outweigh the potential benefits of using contraceptive treatments in situations where it is a management goal to reduce population growth rates (Garrott and Oli 2013).

An extensive body of peer-reviewed scientific literature details the impacts of fertility control methods on wild horses and burros. No finding of excess animals is required for BLM to pursue contraception in wild horses or wild burros, but NEPA analysis has been required. This review focuses on peer-reviewed scientific literature. The summary that follows examines effects of fertility control vaccine use in mares. Cited studies are generally limited to those involving horses and burros, except where including studies on other species helps in making inferences about physiological or behavioral questions not yet addressed in horses or burros specifically. While most studies reviewed here refer to horses, burros are extremely similar in terms of physiology, such that expected effects are comparable, except where differences between the species are noted.

On the whole, the identified impacts are generally transient and affect primarily the individuals treated. Fertility control that affects individual horses and burros does not prevent BLM from ensuring that there will be self-sustaining populations of wild horses and burros in single herd management areas (HMAs), in complexes of HMAs, and at regional scales of multiple HMAs and complexes. Under the WFRHBA of 1971, BLM is charged with maintaining self-reproducing populations of wild horses and burros. The National Academies of Sciences (2013) encouraged BLM to manage wild horses and burros at the spatial scale of "metapopulations" – that is, across multiple HMAs and complexes in a region. In fact, many HMAs have historical and ongoing genetic and demographic connections with other HMAs, and BLM routinely moves animals from one to another to improve local herd traits and maintain high genetic diversity.

All fertility control methods affect the behavior and physiology of treated animals (NAS 2013), and are associated with potential risks and benefits, including effects of handling, frequency of handling, physiological effects, behavioral effects, and reduced population growth rates (Hampton et al. 2015). Contraception alone does not remove excess horses from an HMA's population, so one or more gathers are usually needed in order to bring the herd down to a level

close to AML. Horses are long-lived, potentially reaching 20 years of age or more in the wild. Except in cases where extremely high fractions of mares are rendered infertile over long time periods of (i.e., 10 or more years), fertility control methods such as immunocontraceptive vaccines and sex ratio manipulation are not very effective at reducing population growth rates to the point where births equal deaths in a herd. However, even more modest fertility control activities can reduce the frequency of horse gather activities, and costs to taxpayers. Bartholow (2007) concluded that the application of 2-year or 3-year contraceptives to wild mares could reduce operational costs in a project area by 12-20%, or up to 30% in carefully planned population management programs. Because applying contraception to horses requires capturing and handling, the risks and costs associated with capture and handling of horses may be comparable to those of gathering for removal, but with expectedly lower adoption and long-term holding costs. Population growth suppression becomes less expensive if fertility control is long-lasting (Hobbs et al. 2000).

In the context of BLM wild horse and burro management, fertility control vaccines rely on reducing the number of reproducing females. Taking into consideration available literature on the subject, the National Academies of Sciences concluded in their 2013 report that forms of fertility control vaccines were two of the three 'most promising' available methods for contraception in wild horses and burros (NAS 2013).

Fertility control vaccines (also known as immunocontraceptives) meet BLM requirements for safety to mares and the environment (EPA 2009a, 2012). Because they work by causing an immune response in treated animals, there is no risk of hormones or toxins being taken into the food chain when a treated mare dies. The BLM and other land managers have mainly used three fertility control vaccine formulations for fertility control of wild horse mares on the range: ZonaStat-H, PZP-22, and GonaCon-Equine. As other formulations become available, they may be applied in the future.

Liquid emulsion vaccines can be injected by hand or remotely administered in the field using a pneumatic dart (Roelle and Ransom 2009, Rutberg et al. 2017, McCann et al. 2017) in cases where mares are relatively approachable. Use of remotely delivered (dart-delivered) vaccine is generally limited to populations where individual animals can be accurately identified and repeatedly approached within 50 m (BLM 2010). Booster doses can be safely administered by hand or by dart. Even with repeated booster treatments of the vaccines, it is expected that most mares would eventually return to fertility, though some individual mares treated repeatedly may remain infertile. Once the herd size in a project area is at AML and population growth seems to be stabilized, BLM can make adaptive determinations as to the required frequency of new and booster treatments.

BLM has followed SOPs for fertility control vaccine application (BLM IM 2009-090). The IM requires that treated mares be identifiable via a visible freeze brand or individual color markings, so that their vaccination history can be known. The IM calls for follow-up population surveys to determine the realized annual growth rate in herds treated with fertility control vaccines.

Porcine Zona Pellucida (PZP) Vaccine

PZP vaccines have been used on dozens of horse herds by the National Park Service, US Forest Service, Bureau of Land Management, and Native American tribes and its use is approved for free-ranging wild horse herds. Taking into consideration available literature on the subject, the National Research Council concluded in their 2013 report that PZP was one of the preferable available methods for contraception in wild horses and burros (NAS 2013). PZP use can reduce or eliminate the need for gathers and removals (Turner et al. 1997). PZP vaccines meet most of the criteria that the National Research Council (2013) used to identify promising fertility control methods, in terms of delivery method, availability, efficacy, and side effects. It has been used extensively in wild horses (NAS 2013), and in feral burros on Caribbean islands (Turner et al. 1996, French et al. 2017). PZP is relatively inexpensive, meets BLM requirements for safety to mares and the environment, and is produced as ZonaStat-H, an EPA-registered commercial product (EPA 2012, SCC 2015), or as PZP-22, which is a formulation of PZP in polymer pellets that can lead to a longer immune response (Turner et al. 2002, Rutberg et al. 2017). 'Native' PZP proteins can be purified from pig ovaries (Liu et al. 1989). Recombinant ZP proteins may be produced with molecular techniques (Gupta and Minhas 2017, Joonè et al. 2017a, Nolan et al. 2018a). ZonaStat-H can be remotely administered in the field in cases where mares are relatively approachable. Use of remotely delivered (dart-delivered) vaccine is generally limited to populations where individual animals can be accurately identified and repeatedly approached within 50 m (BLM 2010).

Under the Proposed Action, the BLM would return to the HMA as needed to re-apply PZP-22 and/or ZonaStat-H and initiate new treatments in order to maintain contraceptive effectiveness in controlling population growth rates. Both forms of PZP can safely be reapplied as necessary to control the population growth rate. Even with repeated booster treatments of PZP, it is expected that most mares would return to fertility, though some mares treated repeatedly may not (see *PZP Direct Effects*, below). Once the population is at AML and population growth seems to be stabilized, BLM could use population planning software (WinEquus II, currently in development by USGS Fort Collins Science Center) to determine the required frequency of re-treating mares with PZP.

The BLM currently uses two PZP formulations for fertility control of wild horse mares, ZonaStat-H (PZP Native) and PZP-22. As other formulations are approved for use by BLM, they may be applied through future gathers or darting activities. For the purpose of this management plan, field or remote darting refers to applying the vaccine using a dart. Darting can be implemented when animals are gathered into corrals or opportunistically by applicators near water sources or along main WH&B trails out on the range. Blinds may be used to camouflage applicators to allow efficient treatment of as many mares as possible. PZP can also be applied via hand injections using plastic syringes when animals are gathered into corrals and chutes. When advisories on the product label (EPA 2015) are followed, the product is safe for users and the environment (EPA 2012). In keeping with the EPA registration for ZonaStat-H (EPA 2012; reg. no. 86833-1), certification through the Science and Conservation Center in Billings Montana is required to apply that vaccine to equids.

When applying native PZP (i.e., ZonaStat-H), first the primer with modified Freund's Complete adjuvant is given and then the booster with Freund's modified incomplete adjuvant is given 2-6

weeks later. Preferably, the timing of the booster dose is at least 1-2 weeks prior to the onset of breeding activity. Following the initial 2 inoculations, only annual boosters are required. For maximum effectiveness, PZP would be administered within the December to February timeframe. The procedures to be followed for application of PZP are detailed in *Appendix E. Standard Operating Procedures for Population-level Porcine Zona Pellucida Fertility control treatments.*

For the PZP-22 formulation administered during gathers, each released mare would receive a single dose of the two-year PZP contraceptive vaccine at the same time as a dose of the liquid PZP vaccine with modified Freund's Complete adjuvant. The pellets are applied to the mare with a large gauge needle and jab-stick into the hip. Although PZP-22 pellets have been delivered via darting in trial studies (Rutberg et al 2017), BLM does not plan to use darting for PZP-22 delivery in this HMA until there is more demonstration that PZP-22 can be reliably delivered via dart. Therefore, WH&Bs must be gathered for each application of this formulation.

PZP Direct Effects

The historically accepted hypothesis explaining PZP vaccine effectiveness posits that when injected as an antigen in vaccines, PZP causes the mare's immune system to produce antibodies that are specific to zona pellucida proteins on the surface of that mare's eggs. The antibodies bind to the mare's eggs surface proteins (Liu et al. 1989), and effectively block sperm binding and fertilization (Zoo Montana, 2000). Because treated mares do not become pregnant but other ovarian functions remain generally unchanged, PZP can cause a mare to continue having regular estrus cycles throughout the breeding season. More recent observations support a complementary hypothesis, which posits that PZP vaccination causes reductions in ovary size and function (Mask et al. 2015, Joonè et al. 2017b, Joonè et al. 2017c, Nolan et al. 2018b). Antibodies specific to PZP protein do not cross react with tissues outside of the reproductive system (Barber and Fayrer-Hosken 2000).

Research has demonstrated that contraceptive efficacy of an injected liquid PZP vaccine, such as ZonaStat-H, is approximately 90% or more for mares treated twice in one year (Turner and Kirkpatrick 2002, Turner et al. 2008). The highest success for fertility control has been reported when the vaccine has been applied November through February. High contraceptive rates of 90% or more can be maintained in horses that are boostered annually (Kirkpatrick et al. 1992). Approximately 60% to 85% of mares are successfully contracepted for one year when treated simultaneously with a liquid primer and PZP-22 pellets (Rutberg et al. 2017). Application of PZP for fertility control would reduce fertility in a large percentage of mares for at least one year (Ransom et al. 2011).

The contraceptive result for a single application of the liquid PZP vaccine primer dose along with PZP vaccine pellets (PZP-22), based on winter applications, can be expected to fall in the approximate efficacy ranges as follows (based on figure 2 in Rutberg et al. 2017). Below, the approximate efficacy is measured as the relative decrease in foaling rate for treated mares, compared to control mares:

Year 1	Year 2	Year 3
0 (developing fetuses come to term)	~30-75%	~20-50%

If mares that have been treated with PZP-22 vaccine pellets subsequently receive a booster dose of either the liquid PZP vaccine or the PZP-22 vaccine pellets, the subsequent contraceptive effect is apparently more pronounced and long-lasting. The approximate efficacy following a booster dose can be expected to be in the following ranges (based on figure 3 in Rutberg et al. 2017).

Year 1	Year 2	Year 3	Year 4
0 (developing fetuses come to term)	~50-90%	~55-75%	~40-75%

The efficacies noted above, which are based on results in Rutberg et al. (2017), call into question population and economic models that assume PZP-22 can have an 85% efficacy in years 2 and 3 after immunization, such as Fonner and Bohara (2017).

The fraction of mares treated in a herd can have a large effect on the realized change in growth rate due to PZP contraception, with an extremely high portion of mares required to be treated to lead prevent population-level growth (e.g., Turner and Kirkpatrick 2002). Gather efficiency would likely not exceed 85% via helicopter, and may be less with bait and water trapping, so there would be a portion of the female population uncaptured that is not treated in any given year. Additionally, some mares may not respond to the fertility control vaccine, but instead will continue to foal normally.

Reversibility and Effects on Ovaries

In most cases, PZP contraception appears to be temporary and reversible, with most treated mares returning to fertility over time (Kirkpatrick and Turner 2002). The NAS (2013) criterion by which PZP is not optimal for wild horse contraception was duration. The ZonaStat-H formulation of the vaccine tends to confer only one year of efficacy per dose. Some studies have found that a PZP vaccine in long-lasting pellets (PZP-22) can confer multiple years of contraception (Turner et al. 2007), particularly when boostered with subsequent PZP vaccination (Rutberg et al. 2017). Other trial data, though, indicate that the pelleted vaccine may only be effective for one year (J. Turner, University of Toledo, Personal Communication to BLM).

The purposes of applying PZP treatment is to prevent mares from conceiving foals, but BLM acknowledges that long-term infertility, or permanent sterility, could be a result for some number of wild horses receiving PZP vaccinations. The rate of long-term or permanent sterility following vaccinations with PZP is hard to predict for individual horses, but that outcome appears to increase in likelihood as the number of doses increases (Kirkpatrick and Turner 2002). Permanent sterility for mares treated consecutively 5-7 years was observed by Nuñez et al. (2010, 2017). In a graduate thesis, Knight (2014) suggested that repeated treatment with as few as three to four years of PZP treatment may lead to longer-term sterility, and that sterility may result from PZP treatment before puberty. Repeated treatment with PZP led long-term

infertility in Przewalski's horses receiving as few as one PZP booster dose (Feh 2012). However, even if some number of mares become sterile as a result of PZP treatment, that potential result would be consistent with the contraceptive purpose that motivates BLM's potential use of the vaccine.

In some mares, PZP vaccination may cause direct effects on ovaries (Gray and Cameron 2010, Joonè et al. 2017b, Joonè et al. 2017c, Joonè et al. 2017d, Nolan et al 2018b, Nolan et al. in press). Joonè et al. (2017a) noted reversible effects on ovaries in mares treated with one primer dose and booster dose. Joonè et al. (2017c) and Nolan et al (2018b) documented decreased anti-Mullerian hormone (AMH) levels in mares treated with native or recombinant PZP vaccines; AMH levels are thought to be an indicator of ovarian function. Bechert et al. (2013) found that ovarian function was affected by the SpayVac PZP vaccination, but that there were no effects on other organ systems. Mask et al. (2015) demonstrated that equine antibodies that resulted from SpayVac immunization could bind to oocytes, ZP proteins, follicular tissues, and ovarian tissues. It is possible that result is specific to the immune response to SpayVac, which may have lower PZP purity than ZonaStat or PZP-22 (Hall et al. 2016). However, in studies with native ZP proteins and recombinant ZP proteins, Joonè et al. (2017a) found transient effects on ovaries after PZP vaccination in some treated mares; normal estrus cycling had resumed 10 months after the last treatment. SpayVac is a patented formulation of PZP in liposomes that led to multiple years of infertility in some breeding trials (Killian et al. 2008, Roelle et al. 2017, Bechert and Fraker 2018), but unacceptably poor efficacy in a subsequent trial (Kane 2018). Kirkpatrick et al. (1992) noted effects on horse ovaries after three years of treatment with PZP. Observations at Assateague Island National Seashore indicate that the more times a mare is consecutively treated, the longer the time lag before fertility returns, but that even mares treated 7 consecutive years did eventually return to ovulation (Kirkpatrick and Turner 2002). Other studies have reported that continued applications of PZP may result in decreased estrogen levels (Kirkpatrick et al. 1992) but that decrease was not biologically significant, as ovulation remained similar between treated and untreated mares (Powell and Monfort 2001). Permanent sterility for mares treated consecutively 5-7 years was observed by Nuñez et al. (2010, 2017). Bagavant et al. (2003) demonstrated T-cell clusters on ovaries, but no loss of ovarian function after ZP protein immunization in macaques. Skinner et al. (1984) raised concerns about PZP effects on ovaries, based on their study in laboratory rabbits, as did Kaur and Prabha (2014), though neither paper was a study of PZP effects in equids.

Effects on Existing Pregnancies, Foals, and Birth Phenology

If a mare is already pregnant, the PZP vaccine has not been shown to affect normal development of the fetus or foal, or the hormonal health of the mare with relation to pregnancy (Kirkpatrick and Turner 2003). Studies on Assateague Island (Kirkpatrick and Turner 2002) showed that once female offspring born to mares treated with PZP during pregnancy eventually breed, they produce healthy, viable foals. It is possible that there may be transitory effects on foals born to mares or jennies treated with PZP. In mice, Sacco et al. (1981) found that antibodies specific to PZP can pass from mother mouse to pup via the placenta or colostrum, but that did not apparently cause any innate immune response in the offspring: the level of those antibodies were undetectable by 116 days after birth. There was no indication in that study that the fertility or ovarian function of those mouse pups was compromised, nor is BLM aware of any such results in horses or burros. Unsubstantiated speculative connections between PZP treatment and foal

stealing has not been published in a peer-reviewed study and thus cannot be verified. 'Foal stealing,' where a near-term pregnant mare steals a neonate foal from a weaker mare, is unlikely to be a common behavioral result of including spayed mares in a wild horse herd. McDonnell (2012) noted that "foal stealing is rarely observed in horses, except under crowded conditions and synchronization of foaling," such as in horse feed lots. Those conditions are not likely in the wild, where pregnant mares will be widely distributed across the landscape, and where the expectation is that parturition dates would be distributed across the normal foaling season. Similarly, although Nettles (1997) noted reported stillbirths after PZP treatments in cynomolgus monkeys, those results have not been observed in equids despite extensive use.

On-range observations from 20 years of application to wild horses indicate that PZP application in wild mares does not generally cause mares to give birth to foals out of season or late in the year (Kirkpatrick and Turner 2003). Nuñez's (2010) research showed that a small number of mares that had previously been treated with PZP foaled later than untreated mares and expressed the concern that this late foaling "may" impact foal survivorship and decrease band stability, or that higher levels of attention from stallions on PZP-treated mares might harm those mares. However, that paper provided no evidence that such impacts on foal survival or mare well-being actually occurred. Rubenstein (1981) called attention to a number of unique ecological features of horse herds on Atlantic barrier islands, which calls into question whether inferences drawn from island herds can be applied to western wild horse herds. Ransom et al. (2013), though, identified a potential shift in reproductive timing as a possible drawback to prolonged treatment with PZP, stating that treated mares foaled on average 31 days later than non-treated mares. Results from Ransom et al. (2013), however, showed that over 81% of the documented births in this study were between March 1 and June 21, i.e., within the normal, peak, spring foaling season. Ransom et al. (2013) pointedly advised that managers should consider carefully before using immunocontraception in small refugia or rare species. Wild horses and burros managed by BLM do not generally occur in isolated refugia, nor are they rare species. Moreover, an effect of shifting birth phenology was not observed uniformly: in two of three PZP-treated wild horse populations studied by Ransom et al. (2013), foaling season of treated mares extended three weeks and 3.5 months, respectively, beyond that of untreated mares. In the other population, the treated mares foaled within the same time period as the untreated mares. Furthermore, Ransom et al. (2013) found no negative impacts on foal survival even with an extended birthing season. If there are shifts in birth phenology, though, it is reasonable to assume that some negative effects on foal survival might result from particularly severe weather events (Nuñez et al. 2018).

Effects of Marking and Injection

Standard practices require that immunocontraceptive-treated animals be readily identifiable, either via brand marks or unique coloration (BLM 2010). BLM has instituted guidelines to reduce the sources of handling stress in captured animals (BLM 2015). Some level of transient stress is likely to result in newly captured mares that do not have markings associated with previous fertility control treatments. 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). Handling may include freeze-marking, for the purpose of identifying that mare and identifying her PZP vaccine treatment history. Under past management practices, captured mares experienced increased stress levels from handling (Ashley and Holcombe 2001). Markings may also be used into the future to determine the approximate fraction of mares in a herd that have

been previously treated, and could provide additional insight regarding gather efficiency.

Most mares recover from the stress of capture and handling quickly once released back to the HMA, and none are expected to suffer serious long term effects from the fertility control injections, other than the direct consequence of becoming temporarily infertile. Injection site reactions associated with fertility control treatments are possible in treated mares (Roelle and Ransom 2009, Bechert et al. 2013, French et al. 2017), but swelling or local reactions at the injection site are expected to be minor in nature. Roelle and Ransom (2009) found that the most time-efficient method for applying PZP is by hand-delivered injection of 2-year pellets when horses are gathered. They observed only two instances of swelling from that technique. Use of remotely delivered, 1-year PZP is generally limited to populations where individual animals can be accurately identified and repeatedly approached. The dart-delivered formulation produced injection-site reactions of varying intensity, though none of the observed reactions appeared debilitating to the animals (Roelle and Ransom 2009). Joonè et al. (2017a) found that injection site reactions had healed in most mares within 3 months after the booster dose, and that they did not affect movement or cause fever. The longer term nodules observed did not appear to change any animal's range of movement or locomotor patterns and in most cases did not appear to differ in magnitude from naturally occurring injuries or scars.

Indirect Effects

One expected long-term, indirect effect on wild horses treated with fertility control would be an improvement in their overall health (Turner and Kirkpatrick 2002). Many treated mares would not experience the biological stress of reproduction, foaling and lactation as frequently as untreated mares. The observable measure of improved health is higher body condition scores (Nuñez et al. 2010). After a treated mare returns to fertility, her future foals would be expected to be healthier overall, and would benefit from improved nutritional quality in the mare's milk. This is particularly to be expected if there is an improvement in rangeland forage quality at the same time, due to reduced wild horse population size. Past application of fertility control has shown that mares' overall health and body condition remains improved even after fertility resumes. PZP treatment may increase mare survival rates, leading to longer potential lifespan (Turner and Kirkpatrick 2002, Ransom et al. 2014a). To the extent that this happens, changes in lifespan and decreased foaling rates could combine to cause changes in overall age structure in a treated herd (i.e., Turner and Kirkpatrick 2002, Roelle et al. 2010), with a greater prevalence of older mares in the herd (Gross 2000). Observations of mares treated in past gathers showed that many of the treated mares were larger than, maintained higher body condition than, and had larger healthy foals than untreated mares (BLM, anecdotal observations)..

Following resumption of fertility, the proportion of mares that conceive and foal could be increased due to their increased fitness; this has been called a 'rebound effect.' Elevated fertility rates have been observed after horse gathers and removals (Kirkpatrick and Turner 1991). More research is needed to document and quantify these hypothesized effects in PZP-treated herds. If repeated contraceptive treatment leads to a prolonged contraceptive effect, then that may minimize or delay the hypothesized rebound effect. Selectively applying contraception to older animals and returning them to the HMA could reduce long-term holding costs for such horses, which are difficult to adopt, and may reduce the compensatory reproduction that often follows removals (Kirkpatrick and Turner 1991).

Because successful fertility control would reduce foaling rates and population growth rates, another indirect effect should be to reduce the number of wild horses that have to be removed over time to achieve and maintain the established AML. Contraception would be expected to lead to a relative increase in the fraction of older animals in the herd. Reducing the numbers of wild horses that would have to be removed in future gathers could allow for removal of younger, more easily adoptable excess wild horses, and thereby could eliminate the need to send additional excess horses from this area to off-range holding corrals or pastures for long-term holding. Among mares in the herd that remain fertile, a high level of physical health and future reproductive success would be expected because reduced population sizes should lead to more availability of water and forage resources per capita.

A principle motivation for use of contraceptive vaccines or sex ratio manipulation is to reduce population growth rates and maintain herd sizes at AML. Where successful, this should allow for continued and increased environmental improvements to range conditions within the project area, which would have long-term benefits to wild horse habitat quality, and well-being of animals living on the range. As the population nears or is maintained at the level necessary to achieve a thriving natural ecological balance, vegetation resources would be expected to recover, improving the forage available to wild horses and wildlife throughout the HMA. With rangeland conditions more closely approaching a thriving natural ecological balance, and with a less concentrated distribution of wild horses across the HMA, there should also be less trailing and concentrated use of water sources. Lower population density would be expected to lead to reduced competition among wild horses using the water sources, and less fighting among horses accessing water sources. Water quality and quantity would continue to improve to the benefit of all rangeland users including wild horses. Wild horses would also have to travel less distance back and forth between water and desirable foraging areas. Should PZP booster treatment continue into the future, the chronic cycle of overpopulation and large gathers and removals would no longer occur, but instead a consistent cycle of balance and stability would ensue, resulting in continued improvement of overall habitat conditions and animal health. While it is conceivable that widespread and continued treatment with PZP could reduce the birth rates of the population to such a point that birth is consistently below mortality, that outcome is not likely unless a very high fraction of the mares present are all treated in almost every year.

Behavioral Effects

The NAS report (2013) noted that all fertility suppression has effects on mare behavior, mostly as a result of the lack of pregnancy and foaling, and concluded that PZP was a good choice for use in the program. The result that PZP-treated mares may continue estrus cycles throughout the breeding season can lead to behavioral differences (as discussed below), when compared to mares that are fertile. Such behavioral differences should be considered as potential consequences of successful contraception. The resulting impacts may be seen as neutral in the sense that a wide range of natural behaviors is already observable in untreated wild horses, or mildly adverse in the sense that effects are expected to be transient and to not affect all treated animals.

Ransom and Cade (2009) delineate behaviors that can be used to test for quantitative differences due to treatments. Ransom et al. (2010) found no differences in how PZP-treated and untreated

mares allocated their time between feeding, resting, travel, maintenance, and most social behaviors in three populations of wild horses, which is consistent with Powell's (1999) findings in another population. Likewise, body condition of PZP-treated and control mares did not differ between treatment groups in Ransom et al.'s (2010) study. Nuñez (2010) found that PZP-treated mares had higher body condition than control mares in another population, presumably because energy expenditure was reduced by the absence of pregnancy and lactation. Knight (2014) found that PZP-treated mares had better body condition, lived longer and switched harems more frequently, while mares that foaled spent more time concentrating on grazing and lactation and had lower overall body condition.

In two studies involving a total of four wild horse populations, both Nuñez et al. (2009) and Ransom et al. (2010) found that PZP-treated mares were involved in reproductive interactions with stallions more often than control mares, which is not surprising given the evidence that PZP-treated females of other mammal species can regularly demonstrate estrus behavior while contracepted (Shumake and Killian 1997, Heilmann et al. 1998, Curtis et al. 2001, Duncan et al. 2017). There was no evidence, though, that mare welfare was affected by the increased level of herding by stallions noted in Ransom et al. (2010). Nuñez's later analysis (2017) noted no difference in mare reproductive behavior as a function of contraception history.

Ransom et al. (2010) found that control mares were herded by stallions more frequently than PZP- treated mares, and Nuñez et al. (2009, 2014, 2017, 2018) found that PZP-treated mares exhibited higher infidelity to their band stallion during the non-breeding season than control mares. Madosky et al. (2010) and Knight (2014) found this infidelity was also evident during the breeding season in the same population that Nuñez et al. (2009, 2010, 2014, 2017, 2018) studied. Nuñez et al. (2014, 2017, 2018) concluded that PZP-treated mares changing bands more frequently than control mares could lead to band instability. Nuñez et al. (2009), though, cautioned against generalizing from that island population to other herds. Nuñez et al. (2014) found elevated levels of fecal cortisol, a marker of physiological stress, in mares that changed bands. The research is inconclusive as to whether all the mares' movements between bands were related to the PZP treatments themselves or the fact that the mares were not nursing a foal, and did not demonstrate any long-term negative consequence of the transiently elevated cortisol levels. Nuñez et al. 2014 wrote that these effects "…may be of limited concern when population reduction is an urgent priority." Nuñez (2018) noted (based on unpublished results) that band stallions of mares that have received PZP treatment can exhibit changes in behavior and physiology. Nuñez (2018) cautioned that PZP use may limit the ability of mares to return to fertility, but also noted that, "such aggressive treatments may be necessary when rapid reductions in animal numbers are of paramount importance…If the primary management goal is to reduce population size, it is unlikely (and perhaps less important) that managers achieve a balance between population control and the maintenance of more typical feral horse behavior and physiology."

In contrast to transient stresses, Creel et al. (2013) highlight that variation in population density is one of the most well-established causal factors of chronic activation of the hypothalamic-pituitary-adrenal axis, which mediates stress hormones; high population densities and competition for resources can cause chronic stress. Creel et al. (2013) also state that "…there is little consistent evidence for a negative association between elevated baseline glucocorticoids

and fitness." Band fidelity is not an aspect of wild horse biology that is specifically protected by the WFRHBA of 1971. It is also notable that Ransom et al. (2014b) found higher group fidelity after a herd had been gathered and treated with a contraceptive vaccine; in that case, the researchers postulated that higher fidelity may have been facilitated by the decreased competition for forage after excess horses were removed. At the population level, available research does not provide evidence of the loss of harem structure among any herds treated with PZP. Long-term implications of these changes in social behavior are currently unknown, but no negative impacts on the overall animals or populations overall, long-term welfare or well-being have been established in these studies.

The National Research Council (2013) found that harem changing was not likely to result in serious adverse effects for treated mares:

> "The studies on Shackleford Banks (Nuñez et al., 2009; Madosky et al., 2010) suggest that there is an interaction between pregnancy and social cohesion. The importance of harem stability to mare well-being is not clear, but considering the relatively large number of free-ranging mares that have been treated with liquid PZP in a variety of ecological settings, the likelihood of serious adverse effects seem low."

Nuñez (2010) stated that not all populations will respond similarly to PZP treatment. Differences in habitat, resource availability, and demography among conspecific populations will undoubtedly affect their physiological and behavioral responses to PZP contraception, and need to be considered. Kirkpatrick et al. (2010) concluded that: "the larger question is, even if subtle alterations in behavior may occur, this is still far better than the alternative," and that the "…other victory for horses is that every mare prevented from being removed, by virtue of contraception, is a mare that will only be delaying her reproduction rather than being eliminated permanently from the range. This preserves herd genetics, while gathers and adoption do not."

The NAS report (2013) provides a comprehensive review of the literature on the behavioral effects of contraception that puts research up to that date by Nuñez et al. (2009, 2010) into the broader context of all of the available scientific literature, and cautions, based on its extensive review of the literature that:

> ". . . in no case can the committee conclude from the published research that the behavior differences observed are due to a particular compound rather than to the fact that treated animals had no offspring during the study. That must be borne in mind particularly in interpreting long-term impacts of contraception (e.g., repeated years of reproductive "failure" due to contraception)."

Genetic Effects of PZP Vaccination

In HMAs where large numbers of wild horses have recent and / or an ongoing influx of breeding animals from other areas with wild or feral horses, contraception is not expected to cause an unacceptable loss of genetic diversity or an unacceptable increase in the inbreeding coefficient. In any diploid population, the loss of genetic diversity through inbreeding or drift can be prevented by large effective breeding population sizes (Wright 1931) or by introducing new potential breeding animals (Mills and Allendorf 1996). The NAS report (2013) recommended that single HMAs should not be considered as isolated genetic populations. Rather, managed herds of wild horses should be considered as components of interacting metapopulations, with

the potential for interchange of individuals and genes taking place as a result of both natural and human-facilitated movements. Introducing 1-2 mares every generation (about every 10 years) is a standard management technique that can alleviated potential inbreeding concerns (BLM 2010).

In the last 10 years, there has been a high realized growth rate of wild horses in most areas administered by the BLM, such that most alleles that are present in any given mare are likely to already be well represented in her siblings, cousins, and more distant relatives. With the exception of horses in a small number of well-known HMAs that contain a relatively high fraction of alleles associated with old Spanish horse breeds (NAS 2013), the genetic composition of wild horses in lands administered by the BLM is consistent with admixtures from domestic breeds. As a result, in most HMAs, applying fertility control to a subset of mares is not expected to cause irreparable loss of genetic diversity. Improved longevity and an aging population are expected results of contraceptive treatment that can provide for lengthening generation time; this result would be expected to slow the rate of genetic diversity loss (Hailer et al. 2006). Based on a population model, Gross (2000) found that a strategy to preferentially treat young animals with a contraceptive led to more genetic diversity being retained than either a strategy that preferentially treats older animals, or a strategy with periodic gathers and removals. The Proposed Action preferentially selects older animals to return to the range (see EA section 2.2), which similarly will tend to retain more genetic diversity than would a preference for turning back only younger animals.

Even if it is the case that repeated treatment with PZP may lead to prolonged infertility, or even sterility in some mares, most HMAs have only a low risk of loss of genetic diversity if logistically realistic rates of contraception are applied to mares. Wild horses in most herd management areas are descendants of a diverse range of ancestors coming from many breeds of domestic horses. As such, the existing genetic diversity in the majority of HMAs does not contain unique or historically unusual genetic markers. Past interchange between HMAs, either through natural dispersal or through assisted migration (i.e., human movement of horses) means that many HMAs are effectively indistinguishable and interchangeable in terms of their genetic composition. Roelle and Oyler-McCance (2015) used the VORTEX population model to simulate how different rates of mare sterility would influence population persistence and genetic diversity, in populations with high or low starting levels of genetic diversity, various starting population sizes, and various annual population growth rates. Their results show that the risk of the loss of genetic heterozygosity is extremely low except in case where all of the following conditions are met: starting levels of genetic diversity are low, initial population size is 100 or less, the intrinsic population growth rate is low (5% per year), and very large fractions of the female population are permanently sterilized. At Four Mile HMA, even though the number of mares is expected to be relatively low at times, most are not expected to become sterile, the starting genetic diversity is expected to be high, and there are expected to be periodic introductions of new mares from other herds; these are all conditions that favor maintenance of adequate genetic diversity over time.

It is worth noting that, although maintenance of genetic diversity at the scale of the overall population of wild horses is an intuitive management goal, there are no existing laws or policies that require BLM to maintain genetic diversity at the scale of the individual herd management area

or complex. Also, there is no Bureau-wide policy that requires BLM to allow each female in a herd to reproduce before she is treated with contraceptives.

One concern that has been raised with regards to genetic diversity is that treatment with immunocontraceptives could possibly lead to an evolutionary increase in the frequency of individuals whose genetic composition fosters weak immune responses (Cooper and Larson 2006, Ransom et al. 2014a).Many factors influence the strength of a vaccinated individual's immune response, potentially including genetics, but also nutrition, body condition, and prior immune responses to pathogens or other antigens (Powers et al. 2013). This premise is based on an assumption that lack of response to PZP is a heritable trait, and that the frequency of that trait will increase over time in a population of PZP-treated animals. Cooper and Herbert (2001) reviewed the topic, in the context of concerns about the long-term effectiveness of immunocontraceptives as a control agent for exotic species in Australia. They argue that imunocontraception could be a strong selective pressure, and that selecting for reproduction in individuals with poor immune response could lead to a general decline in immune function in populations where such evolution takes place. Other authors have also speculated that differences in antibody titer responses could be partially due to genetic differences between animals (Curtis et al. 2001, Herbert and Trigg 2005). However, Magiafolou et al. (2013) clarify that if the variation in immune response is due to environmental factors (i.e., body condition, social rank) and not due to genetic factors, then there will be no expected effect of the immune phenotype on future generations. It is possible that general health, as measured by body condition, can have a causal role in determining immune response, with animals in poor condition demonstrating poor immune reactions (NAS 2013).

Correlations between physical factors and immune response would not preclude, though, that there could also be a heritable response to immunocontraception. In studies not directly related to immunocontraception, immune response has been shown to be heritable (Kean et al. 1994, Sarker et al. 1999). Unfortunately, predictions about the long-term, population-level evolutionary response to immunocontraceptive treatments are speculative at this point, with results likely to depend on several factors, including: the strength of the genetic predisposition to not respond to PZP; the heritability of that gene or genes; the initial prevalence of that gene or genes; the number of mares treated with a primer dose of PZP (which generally has a short-acting effect); the number of mares treated with multiple booster doses of PZP; and the actual size of the genetically-interacting metapopulation of horses within which the PZP treatment takes place.

BLM is not aware of any studies that have quantified the heritability of a lack of response to immunocontraception such as PZP vaccine or GonaCon-Equine in horses. At this point there are no studies available from which one could make conclusions about the long-term effects of sustained and widespread immunocontraception treatments on population-wide immune function. Although a few, generally isolated, feral horse populations have been treated with high fractions of mares receiving PZP immunocontraception for long-term population control (e.g., Assateague Island and Pryor Mountains), no studies have tested for changes in immune competence in those areas. Relative to the large number of free-roaming feral horses in the western United States, immunocontraception has not been used in the type of widespread or prolonged manner that might be required to cause a detectable evolutionary response.

Although this topic may merit further study, lack of clarity should not preclude the use of immunocontraceptives to help stabilize extremely rapidly growing herds.

Gonadotropin Releasing Hormone (GnRH) Vaccine

This literature review is intended to summarize what is known and what is not known about potential effects of treating mares with GonaCon. As noted below, some negative consequences of vaccination are possible. Anti-GnRH vaccines can be administered to either sex, but this analysis is limited to effects on females, except where inferences can be made to females, based on studies that have used the vaccine in males.

Whether to use or not use this method to reduce population growth rates in wild horses is a decision that must be made considering those effects as well as the potential effects of inaction, such as continued overpopulation and rangeland health degradation.

Registration and safety of GonaCon-Equine

Taking into consideration available literature on the subject, the National Research Council concluded in their 2013 report that GonaCon-B (which is produced under the trade name GonaCon-Equine for use in feral horses and burros) was one of the most preferable available methods for contraception in wild horses and burros (NAS 2013)., in terms of delivery method, availability, efficacy, and side effects. GonaCon-Equine is approved for use by authorized federal, state, tribal, public and private personnel, for application to wild and feral equids in the United States (EPA 2013, 2015). Its use is appropriate for free-ranging wild horse herds. GonaCon-Equine has been used on feral horses in Theodore Roosevelt National Park and on wild horses by BLM (BLM 2015). GonaCon-Equine can be remotely administered in the field in cases where mares are relatively approachable, using a customized pneumatic dart (McCann et al. 2017). Use of remotely delivered (dart-delivered) vaccine is generally limited to populations where individual animals can be accurately identified and repeatedly approached within 50 m (BLM 2010).

GonaCon is an immunocontraceptive vaccine which has been shown to provide multiple years of infertility in several wild ungulate species, including horses (Killian et al., 2008; Gray et al., 2010). GonaCon uses the gonadotropin-releasing hormone (GnRH), a small neuropeptide that performs an obligatory role in mammalian reproduction, as the vaccine antigen. When combined with an adjuvant, the GnRH vaccine stimulates a persistent immune response resulting in prolonged antibody production against GnRH, the carrier protein, and the adjuvant (Miller et al., 2008). The most direct result of successful GnRH vaccination is that it has the effect of decreasing the level of GnRH signaling in the body, as evidenced by a drop in luteinizing hormone levels, and a cessation of ovulation. The lack of estrus cycling that results from successful GonaCon vaccination has been compared to typical winter period of anoestrus in open mares. As anti-GnRH antibodies decline over time, concentrations of available endogenous GnRH increase and treated animals usually regain fertility (Power et al., 2011).

As with other contraceptives applied to wild horses, the long-term goal of GonaCon-Equine use is to reduce or eliminate the need for gathers and removals (NAS 2013). GonaCon-Equine vaccine is an EPA-approved pesticide (EPA, 2009a) that is relatively inexpensive, meets BLM requirements for safety to mares and the environment, and is produced in a USDA-APHIS

laboratory. The intended effect of the vaccine is as a contraceptive. GonaCon is produced as a pharmaceutical-grade vaccine, including aseptic manufacturing technique to deliver a sterile vaccine product (Miller et al. 2013). If stored at 4° C, the shelf life is 6 months (Miller et al 2013).

Miller et al. (2013) reviewed the vaccine environmental safety and toxicity. When advisories on the product label (EPA 2015) are followed, the product is safe for users and the environment (EPA 2009b). EPA waived a number of tests prior to registering the vaccine, because GonaCon was deemed to pose low risks to the environment, so long as the product label is followed (Wang-Cahill et al., *in press*).

Under the Proposed Action, the BLM would return to the HMA as needed to re-apply GonaCon-Equine and initiate new treatments in order to maintain contraceptive effectiveness in controlling population growth rates. GonaCon-Equine can safely be reapplied as necessary to control the population growth rate; booster dose effects may lead to increased effectiveness of contraception, which is generally the intent. Even with one booster treatment of GonaCon-Equine, it is expected that most, if not all, mares would return to fertility at some point, although the average duration of effect after booster doses has not yet been quantified. Although it is unknown what would be the expected rate for the return to fertility rate in mares boosted more than once with GonaCon-Equine, a prolonged return to fertility would be consistent with the desired effect of using GonaCon (e.g., effective contraception). Once the herd size in the project area is at AML and population growth seems to be stabilized, BLM could make a determination as to the required frequency of new mare treatments and mare re-treatments with GonaCon, to maintain the number of horses within AML.

GnRH Vaccine Direct Effects

GonaCon-Equine is one of several vaccines that have been engineered to create an immune response to the gonadotropin releasing hormone peptide (GnRH). GnRH is a small peptide that plays an important role in signaling the production of other hormones involved in reproduction in both sexes. The most direct result of successful GnRH vaccination in female mammals is that it has the effect of decreasing the level of GnRH signaling in the body, as evidenced by a drop in luteinizing hormone levels, and a cessation of ovulation. GnRH is highly conserved across mammalian taxa, so some inferences about the mechanism and effects of GonaCon-Equine in horses can be made from studies that used different anti-GnRH vaccines, in horses and other taxa. Other commercially available anti-GnRH vaccines include: Improvac (Imboden et al. 2006, Botha et al. 2008, Janett et al. 2009a, Janett et al. 2009b, Schulman et al. 2013, Dalmau et al. 2015), made in South Africa; Equity (Elhay et al. 2007), made in Australia; Improvest, for use in swine (Bohrer et al. 2014); Repro-BLOC (Boedeker et al. 2011); and Bopriva, for use in cows (Balet et al. 2014). Of these, GonaCon-Equine, Improvac, and Equity are specifically intended for horses. Other anti-GnRH vaccine formulations have also been tested, but did not become trademarked products (e.g., Goodloe 1991, Dalin et al 2002, Stout et al. 2003, Donovan et al. 2013, Schaut et al. 2018, Yao et al. 2018). The effectiveness and side-effects of these various anti-GnRH vaccines may not be the same as would be expected from GonaCon-Equine use in horses. Results could differ as a result of differences in the preparation of the GnRH antigen, and the choice of adjuvant used to stimulate the immune response. For some formulations of anti-GnRH vaccines, a booster dose is required to elicit a contraceptive response, though GonaCon

can cause short-term contraception in a fraction of treated animals from one dose (Powers et al. 2011, Gionfriddo et al. 2011a, Baker et al. 2013, Miller et al 2013).

GonaCon has been produced by USDA-APHIS (Fort Collins, Colorado) in several different formulations, the history of which is reviewed by Miller et al. (2013). In any vaccine, the antigen is the stimulant to which the body responds by making antigen-specific antibodies. Those antibodies then signal to the body that a foreign molecule is present, initiating an immune response that removes the molecule or cell. GonaCon vaccines present the recipient with hundreds of copies of GnRH as peptides on the surface of a linked protein that is naturally antigenic because it comes from invertebrate hemocyanin (Miller et al 2013). Early GonaCon formulations linked many copies of GnRH to a protein from the keyhole limpet (GonaCon-KHL), but more recently produced formulations where the GnRH antigen is linked to a protein from the blue mussel (GonaCon-B) proved less expensive and more effective (Miller et al. 2008). GonaCon-Equine is in the category of GonaCon-B vaccines.

Adjuvants are included in vaccines to elevate the level of immune response, inciting recruitment of lymphocytes and other immune cells which foster a long-lasting immune response that is specific to the antigen. The adjuvant used in GonaCon, Adjuvac, generally leads to a milder reaction than Freund's Complete Adjuvant (Powers et al. 2011). Adjuvac contains a small number of killed *Mycobacterium avium* cells (Miller et al. 2008, Miller et al. 2013). The antigen and adjuvant are emulsified in mineral oil, such that they are not all presented to the immune system right after injection It is thought that the mineral oil emulsion leads to a 'depot effect' that is associated with slow or sustained release of the antigen, and a resulting longer-lasting immune response (Miller et al. 2013). Miller et al. (2008, 2013) have speculated that, in cases where memory-B leukocytes are protected in immune complexes in the lymphatic system, it can lead to years of immune response. Increased doses of vaccine may lead to stronger immune reactions, but only to a certain point; when Yoder and Miller (2010) tested varying doses of GonaCon in prairie dogs, antibody responses to the 200μg and 400μg doses were equal to each other but were both higher than in response to a 100μg dose.

Antibody titer measurements are proximate measures of the antibody concentration in the blood specific to a given antigen. Anti-GnRH titers generally correlate with a suppressed reproduction system (Gionfriddo et al. 2011a, Powers et al. 2011). Various studies have attempted to identify a relationship between anti-GnRH titer levels and infertility, but that relationship has not been universally predictable or consistent. The time length that titer levels stay high appears to correlate with the length of suppressed reproduction (Dalin et al. 2002, Levy et al. 2011, Donovan et al. 2013, Powers et al. 2011). For example, Goodloe (1991) noted that mares did produce elevated titers and had suppressed follicular development for 11-13 weeks after treatment, but that all treated mares ovulated after the titer levels declined. Similarly, Elhay (2007) found that high initial titers correlated with longer-lasting ovarian and behavioral anoestrus. However, Powers et al. (2011) did not identify a threshold level of titer that was consistently indicative of suppressed reproduction despite seeing a strong correlation between antibody concentration and infertility, nor did Schulman et al. (2013) find a clear relationship between titer levels and mare acyclicity.

In many cases, young animals appear to have higher immune responses, and stronger

contraceptive effects of anti-GnRH vaccines than older animals (Brown et al. 1994, Curtis et al. 2001, Stout et al. 2003, Schulman et al. 2013). Vaccinating with GonaCon at too young an age, though, may prevent effectiveness; Gionfriddo et al. (2011a) observed weak effects in 3-4 month old fawns. It has not been possible to predict which individuals of a given age class will have long-lasting immune responses to the GonaCon vaccine. Gray (2010) noted that mares in poor body condition tended to have lower contraceptive efficacy in response to GonaCon-B. Miller et al. (2013) suggested that higher parasite loads might have explained a lower immune response in free-roaming horses than had been observed in a captive trial. At this time it is unclear what the most important factors affecting efficacy are.

Females that are successfully contracepted by GnRH vaccination enter a state similar to anestrus, have a lack of or incomplete follicle maturation, and no ovarian cycling (Botha et al. 2008). A leading hypothesis is that anti-GnRH antibodies bind GnRH in the hypothalamus – pituitary 'portal vessels,' preventing GnRH from binding to GnRH-specific binding sites on gonadotroph cells in the pituitary, thereby limiting the production of gonadotropin hormones, particularly luteinizing hormone (LH) and, to a lesser degree, follicle-stimulating hormone (FSH) (Powers et al. 2011, NAS 2013). This reduction in LH (and FSH), and a corresponding lack of ovulation, has been measured in response to treatment with anti-GnRH vaccines (Boedeker et al. 2011, Garza et al. 1986).

Females successfully treated with anti-GnRH vaccines have reduced progesterone levels (Garza et al. 1986, Stout et al. 2003, Imboden et al. 2006, Elhay 2007, Botha et al. 2008, Killian et al. 2008, Miller et al. 2008, Janett et al. 2009, Schulman et al. 2013, Balet et al 2014, Dalmau et al. 2015) and β-17 estradiol levels (Elhay et al. 2007), but no great decrease in estrogen levels (Balet et al. 2014). Reductions in progesterone do not occur immediately after the primer dose, but can take several weeks or months to develop (Elhay et al. 2007, Botha et al. 2008, Schulman et al. 2013, Dalmau et al. 2015). This indicates that ovulation is not occurring and corpora lutea, formed from post-ovulation follicular tissue, are not being established.

Changes in hormones associated with anti-GnRH vaccination lead to measurable changes in ovarian structure and function. The volume of ovaries reduced in response to treatment (Garza et al. 1986, Dalin et al. 2002, Imboden et al. 2006, Elhay et al. 2007, Botha et al. 2008, Gionfriddo 2011a, Dalmau et al. 2015). Treatment with an anti-GnRH vaccine changes follicle development (Garza et al. 1986, Stout et al. 2003, Imboden et al. 2006, Elhay et al. 2007, Donovan et al. 2013, Powers et al. 2011, Balet et al. 2014), with the result that ovulation does not occur. A related result is that the ovaries can exhibit less activity and cycle with less regularity or not at all in anti-GnRH vaccine treated females (Goodloe 1991, Dalin et al. 2002, Imboden et al. 2006, Elhay et al. 2007, Janett et al. 2009a, Powers et al. 2011, Donovan et al. 2013). In studies where the vaccine required a booster, hormonal and associated results were generally observed within several weeks after delivery of the booster dose.

GnRH Vaccine Contraceptive Effects

The NAS (2013) review pointed out that single doses of GonaCon-Equine do not lead to high rates of initial effectiveness, or long duration. Initial effectiveness of one dose of GonaCon-Equine vaccine appears to be lower than for a combined primer plus booster dose of the PZP vaccine Zonastat-H (Kirkpatrick et al. 2011), and the initial effect of a single GonaCon dose can be limited to as little as one breeding season. However, preliminary results on the effects of

boostered doses of GonaCon-Equine indicate that it can have high efficacy and longer-lasting effects in free-roaming horses (Baker et al. 2017) than the one-year effect that is generally expected from a single booster of Zonastat-H.

GonaCon and other anti-GnRH vaccines can be injected while a female is pregnant (Miller et al. 2000, Powers et al. 2011, Baker et al. 2013) – in such a case, a successfully contracepted mare will be expected to give birth during the following foaling season, but may be infertile during the same year's breeding season. Thus, a mare injected in November of 2018 would not show the contraceptive effect (i.e., no new foal) until spring of 2020.

Too few studies have reported on the various formulations of anti-GnRH vaccines to make generalizations about differences between products, but GonaCon formulations were consistently good at causing loss of fertility in a statistically significant fraction of treated mares for at least one year (Killian et al. 2009, Gray et al. 2010, Baker et al. 2013, 2017). With few exceptions (e.g., Goodloe 1991), anti-GnRH treated mares gave birth to fewer foals in the first season when there would be an expected contraceptive effect (Botha et al. 2008, Killian et al. 2009, Gray et al. 2010, Baker et al. 2013). Goodloe (1991) used an anti-GnRH-KHL vaccine with a triple adjuvant, in some cases attempting to deliver the vaccine to horses with a hollow-tipped 'biobullet,'but concluded that the vaccine was not an effective immunocontraceptive in that study.

Not all mares should be expected to respond to the GonaCon-equine vaccine; some number should be expected to continue to become pregnant and give birth to foals. In studies where mares were exposed to stallions, the fraction of treated mares that are effectively contracepted in the year after anti-GnRH vaccination varied from study to study, ranging from ~50% (Baker et al. 2017), to 61% (Gray et al. 2010), to ~90% (Killian et al. 2006, 2008, 2009). Miller et al. (2013) noted lower effectiveness in free-ranging mares (Gray et al. 2010) than captive mares (Killian et al. 2009). Some of these rates are lower than the high rate of effectiveness typically reported for the first year after PZP vaccine treatment (Kirkpatrick et al. 2011). In the one study that tested for a difference, darts and hand-injected GonaCon doses were equally effective in terms of fertility outcome (McCann et al. 2017).

In studies where mares were not exposed to stallions, the duration of effectiveness also varied. A primer and booster dose of Equity led to anoestrus for at least 3 months (Elhay et al. 2007). A primer and booster dose of Improvac also led to loss of ovarian cycling for all mares in the short term (Imboden et al. 2006). It is worth repeating that those vaccines do not have the same formulation as GonaCon.

Results from horses (Baker et al. 2017) and other species (Curtis et al. 2001) suggest that providing a booster dose of GonaCon-Equine will increase the fraction of temporarily infertile animals to higher levels than would a single vaccine dose alone.

Longer-term infertility has been observed in some mares treated with anti-GnRH vaccines, including GonaCon-Equine. In a single-dose mare captive trial with an initial year effectiveness of 94 %, Killian et al. (2008) noted infertility rates of 64%, 57%, and 43% in treated mares during the following three years, while control mares in those years had infertility rates of 25%,

12%, and 0% in those years. GonaCon effectiveness in free-roaming populations was lower, with infertility rates consistently near 60% for three years after a single dose in one study (Gray et al. 2010) and annual infertility rates decreasing over time from 55% to 30% to 0% in another study with one dose (Baker et al. 2017). Similarly, gradually increasing fertility rates were observed after single dose treatment with GonaCon in elk (Powers et al. 2011) and deer (Gionfriddo et al. 2011a).

Baker et al. (2017) observed a return to fertility over 4 years in mares treated once with GonaCon, but then noted extremely low fertility rates of 0% and 16% in the two years after the same mares were given a booster dose four years after the primer dose. These are extremely promising preliminary results from that study in free-roaming horses; a third year of post-booster monitoring is ongoing in summer 2017, and researchers on that project are currently determining whether the same high-effectiveness, long-term response is observed after boosting with GonaCon after 6 months, 1 year, 2 years, or 4 years after the primer dose. Four of nine mares treated with primer and booster doses of Improvac did not return to ovulation within 2 years of the primer dose (Imboden et al. 2006), though one should probably not make conclusions about the long-term effects of GonaCon-Equine based on results from Improvac.

It is difficult to predict which females will exhibit strong or long-term immune responses to anti-GnRH vaccines (Killian et al. 2006, Miller et al. 2008, Levy et al. 2011). A number of factors may influence responses to vaccination, including age, body condition, nutrition, prior immune responses, and genetics (Cooper and Herbert 2001, Curtis et al. 2001, Powers et al. 2011). One apparent trend is that animals that are treated at a younger age, especially before puberty, may have stronger and longer-lasting responses (Brown et al. 1994, Curtis et al. 2001, Stout et al. 2003, Schulman et al. 2013). It is plausible that giving ConaGon-Equine to prepubertal mares will lead to long-lasting infertility, but that has not yet been tested.

To date, short term evaluation of anti-GnRH vaccines, show contraception appears to be temporary and reversible. Killian et al. noted long-term effects of GonaCon in some captive mares (2009). However, Baker et al. (2017) observed horses treated with GonaCon-B return to fertility after they were treated with a single primer dose; after four years, the fertility rate was indistinguishable between treated and control mares. It appears that a single dose of GonaCon results in reversible infertility. Although it is unknown whether long-term treatment would result in permanent infertility, such permanent infertility fertility would be consistent with the desired effect of using GonaCon (e.g., effective contraception).

Other anti-GnRH vaccines also have had reversible effects in mares. Elhay (2007) noted a return to ovary functioning over the course of 34 weeks for 10 of 16 mares treated with Equity. That study ended at 34 weeks, so it is not clear when the other six mares would have returned to fertility. Donovan et al. (2013) found that half of mares treated with an anti-GnRH vaccine intended for dogs had returned to fertility after 40 weeks, at which point the study ended. In a study of mares treated with a primer and booster dose of Improvac, 47 of 51 treated mares had returned to ovarian cyclicity within 2 years; younger mares appeared to have longer-lasting effects than older mares (Schulman et al. 2013). Joonè et al. (2017) analyzed samples from the Schulman et al. (2013) study, and found no significant decrease in anti-Mullerian hormone (AMH) levels in mares treated with GnRH vaccine. AMH levels are thought to be an indicator

of ovarian function, so results from Joonè et al. (2017) support the general view that the anoestrus resulting from GnRH vaccination is physiologically similar to typical winter anoestrus. In a small study with a non-commercial anti-GnRH vaccine (Stout et al. 2003), three of seven treated mares had returned to cyclicity within 8 weeks after delivery of the primer dose, while four others were still suppressed for 12 or more weeks. In elk, Powers et al. (2011) noted that contraception after one dose of GonaCon was reversible. In white-tailed deer, single doses of GonaCon appeared to confer two years of contraception (Miller et al. 2000). Ten of 30 domestic cows treated became pregnant within 30 weeks after the first dose of Bopriva (Balet et al. 2014).

Permanent sterility as a result of single-dose or boostered GonaCon-Equine vaccine, or other anti-GnRH vaccines, has not been recorded, but that may be because no long-term studies have tested for that effect. It is conceivable that some fraction of mares could become sterile after receiving one or more booster doses of GonaCon-Equine, but the rate at which that could be expected to occur is currently unknown. If some fraction of mares treated with GonaCon-Equine were to become sterile, though, that result would be consistent with text of the WFRHBA of 1971, as amended, which allows for sterilization to achieve population goals.

In summary, based on the above results related to fertility effects of GonaCon and other anti-GnRH vaccines, application of a single dose of GonaCon-Equine to gathered or remotely-darted wild horses could be expected to prevent pregnancy in perhaps 30%-60% of mares for one year. Some smaller number of wild mares should be expected to have persistent contraception for a second year, and less still for a third year. Applying one booster dose of GonaCon to previously-treated mares should lead to two or more years with relatively high rates (80+%) of additional infertility expected, with the potential that some as-yet-unknown fraction of boostered mares may be infertile for several to many years. There is no data to support speculation regarding efficacy of multiple boosters of GonaCon-Equine; however, given it is formulated as a highly immunogenic long-lasting vaccine, it is reasonable to hypothesize that additional boosters would increase the effectiveness and duration of the vaccine.

GonaCon-Equine only affects the fertility of treated animals; untreated animals will still be expected to give birth. Even under favorable circumstances for population growth suppression, gather efficiency might not exceed 85% via helicopter, and may be less with bait and water trapping. Similarly, not all animals may be approachable for darting. The uncaptured or undarted portion of the female population would still be expected to have normally high fertility rates in any given year, though those rates could go up slightly if contraception in other mares increases forage and water availability.

GnRH Vaccine Effects on Other Organ Systems

BLM requires individually identifiable marks for immunocontraceptive treatment; this may require handling and marking. Mares that receive any vaccine as part of a gather operation would experience slightly increased stress levels associated with handling while being vaccinated and freeze-marked, and potentially microchipped. Newly captured mares that do not have markings associated with previous fertility control treatments would be marked with a new freeze-mark for the purpose of identifying that mare, and identifying her vaccine treatment history. This information would also be used to determine the number of mares captured that

were not previously treated, and could provide additional insight regarding gather efficiency, and the timing of treatments required into the future. Most mares recover from the stress of capture and handling quickly once released back to the HMA, and none are expected to suffer serious long term effects from the fertility control injections, other than the direct consequence of becoming temporarily infertile.

Injection site reactions associated with immunocontraceptive treatments are possible in treated mares (Roelle and Ransom 2009). Whether injection is by hand or via darting, GonaCon-Equine is associated with some degree of inflammation, swelling, and the potential for abscesses at the injection site (Baker et al. 2013). Swelling or local reactions at the injection site are generally expected to be minor in nature, but some may develop into draining abscesses. When PZP vaccine was delivered via dart it led to more severe swelling and injection site reactions (Roelle and Ransom 2009), but that was not observed with dart-delivered GonaCon (McCann et al. 2017). Mares treated with one formulation of GnRH-KHL vaccine developed pyogenic abscesses (Goodloe 1991). Miller et al. (2008) noted that the water and oil emulsion in GonaCon will often cause cysts, granulomas, or sterile abscesses at injection sites; in some cases, a sterile abscess may develop into a draining abscess. In elk treated with GonaCon, Powers et al. (2011) noted up to 35% of treated elk had an abscess form, despite the injection sites first being clipped and swabbed with alcohol. Even in studies where swelling and visible abscesses followed GonaCon immunization, the longer term nodules observed did not appear to change any animal's range of movement or locomotor patterns (Powers et al. 2013, Baker et al. 2017).

The result that other formulations of anti-GnRH vaccine may be associated with less notable injection site reactions in horses may indicate that the adjuvant formulation in GonaCon leads a single dose to cause a stronger immune reaction than the adjuvants used in other anti-GnRH vaccines. Despite that, a booster dose of GonaCon-Equine appears to be more effective than a primer dose alone (Baker et al. 2017). Horses injected in the hip with Improvac showed only transient reactions that disappeared within 6 days in one study (Botha et al. 2008), but stiffness and swelling that lasted 5 days were noted in another study where horses received Improvac in the neck (Imboden et al. 2006). Equity led to transient reactions that resolved within a week in some treated animals (Elhay et al. 2007). Donovan et al. noted no reactions to the canine anti-GnRH vaccine (2013). In cows treated with Bopriva there was a mildly elevated body temperature and mild swelling at injection sites that subsided within 2 weeks (Balet et al. 2014).

Several studies have monitored animal health after immunization against GnRH. GonaCon treated mares did not have any measurable difference in uterine edema (Killian 2006, 2008). Powers et al. (2011, 2013) noted no differences in blood chemistry except a mildly elevated fibrinogen level in some GonaCon treated elk. In that study, one sham-treated elk and one GonaCon treated elk each developed leukocytosis, suggesting that there may have been a causal link between the adjuvant and the effect. Curtis et al. (2008) found persistent granulomas at GonaCon-KHL injection sites three years after injection, and reduced ovary weights in treated females. Yoder and Miller (2010) found no difference in blood chemistry between GonaCon treated and control prairie dogs. One of 15 GonaCon treated cats died without explanation, and with no determination about cause of death possible based on necropsy or histology (Levy et al. 2011). Other anti-GnRH vaccine formulations have led to no detectable adverse effects (in elephants; Boedeker et al. 2011), though Imboden et al. (2006) speculated that young treated

animals might conceivably have impaired hypothalamic or pituitary function.

Kirkpatrick et al. (2011) raised concerns that anti-GnRH vaccines could lead to adverse effects in other organ systems outside the reproductive system. GnRH receptors have been identified in tissues outside of the pituitary system, including in the testes and placenta (Khodr and Siler-Khodr 1980), ovary (Hsueh and Erickson 1979), bladder (Coit et al. 2009), heart (Dong et al. 2011), and central nervous system, so it is plausible that reductions in circulating GnRH levels could inhibit physiological processes in those organ systems. Kirkpatrick et al. (2011) noted elevated cardiological risks to human patients taking GnRH agonists (such as leuprolide), but the National Academy of Sciences (2013) concluded that the mechanism and results of GnRH agonists would be expected to be different from that of anti-GnRH antibodies; the former flood GnRH receptors, while the latter deprive receptors of GnRH.

GnRH Vaccine Effects on Fetus and Foal

Although fetuses are not explicitly protected under the WFRHBA of 1971, as amended, it is prudent to analyze the potential effects of GonaCon-Equine or other anti-GnRH vaccines on developing fetuses and foals. GonaCon had no apparent effect on pregnancies in progress, foaling success, or the health of offspring, in horses that were immunized in October (Baker et al. 2013), elk immunized 80-100 days into gestation (Powers et al. 2011, 2013), or deer immunized in February (Miller et al. 2000). Kirkpatrick et al. (2011) noted that anti-GnRH immunization is not expected to cause hormonal changes that would lead to abortion in the horse, but this may not be true for the first 6 weeks of pregnancy (NAS 2013). Curtis et al. (2011) noted that GonaCon-KHL treated white tailed deer had lower twinning rates than controls, but speculated that the difference could be due to poorer sperm quality late in the breeding season, when the treated does did become pregnant. Goodloe (1991) found no difference in foal production between treated and control animals.

Offspring of anti-GnRH vaccine treated mothers could exhibit an immune response to GnRH (Khodr and Siler-Khodr 1980), as antibodies from the mother could pass to the offspring through the placenta or colostrum. In the most extensive study of long-term effects of GonaCon immunization on offspring, Powers et al. (2012) monitored 15 elk fawns born to GonaCon treated cows. Of those, 5 had low titers at birth and 10 had high titer levels at birth. All 15 were of normal weight at birth, and developed normal endocrine profiles, hypothalamic GnRH content, pituitary gonadotropin content, gonad structure, and gametogenesis. All the females became pregnant in their second reproductive season, as is typical. All males showed normal development of secondary sexual characteristics. Powers et al. (2012) concluded that suppressing GnRH in the neonatal period did not alter long-term reproductive function in either male or female offspring. Miller et al. (2013) report elevated anti-GnRH antibody titers in fawns born to treated white tailed deer, but those dropped to normal levels in 11 of 12 of those fawns, which came into breeding condition; the remaining fawn was infertile for three years.

Direct effects on foal survival are equivocal in the literature. Goodloe (1991), reported lower foal survival for a small sample of foals born to anti-GnRH treated mares, but she did not assess other possible explanatory factors such as mare social status, age, body condition, or habitat in her analysis (NAS 2013). Gray et al. (2010) found no difference in foal survival in foals born to free-roaming mares treated with GonaCon.

There is little empirical information available to evaluate the effects of GnRH vaccination on foaling phenology. It is possible that immunocontracepted mares returning to fertility late in the breeding season could give birth to foals at a time that is out of the normal range (Nuñez et al. 2010, Ransom et al 2013). Curtis et al. (2001) did observe a slightly later fawning date for GonaCon treated deer in the second year after treatment, when some does regained fertility late in the breeding season. In anti-GnRH vaccine trials in free-roaming horses, there were no published differences in mean date of foal production (Goodloe 1991, Gray et al. 2010). Unpublished results from an ongoing study of GonaCon treated free-roaming mares indicate that some degree of aseasonal foaling is possible (D. Baker, Colorado State University, personal communication to Paul Griffin, BLM WH&B Research Coordinator). Because of the concern that contraception could lead to shifts in the timing of parturitions for some treated animals, Ransom et al. (2013) advised that managers should consider carefully before using PZP immunocontraception in small refugia or rare species; the same considerations could be advised for use of GonaCon, but wild horses and burros in most areas do not generally occur in isolated refugia, they are not a rare species at the regional, national, or international level, and genetically they represent descendants of domestic livestock with most populations containing few if any unique alleles (NAS 2013). Moreover, in PZP-treated horses that did have some degree of parturition date shift, Ransom et al. (2013) found no negative impacts on foal survival even with an extended birthing season; however, this may be more related to stochastic, inclement weather events than extended foaling seasons. If there were to be a shift in foaling date for some treated mares, the effect on foal survival may depend on weather severity and local conditions; for example, Ransom et al. (2013) did not find consistent effects across study sites.

Indirect Effects of GnRH Vaccination

One expected long-term, indirect effect on wild horses treated with fertility control would be an improvement in their overall health. Many treated mares would not experience the biological stress of reproduction, foaling and lactation as frequently as untreated mares, and their better health is expected to be reflected in higher body condition scores. After a treated mare returns to fertility, her future foals would be expected to be healthier overall, and would benefit from improved nutritional quality in the mares' milk. This is particularly to be expected if there is an improvement in rangeland forage quality at the same time, due to reduced wild horse population size. Past application of fertility control has shown that mares' overall health and body condition can remain improved even after fertility resumes. Anecdotal, subjective observations of mares treated with a different immunocontraceptive, PZP, in past gathers showed that many of the treated mares were larger, maintained better body condition, and had larger healthy foals than untreated mares.

Body condition of anti-GnRH-treated females was equal to or better than that of control females in published studies. Ransom et al. (2014b) observed no difference in mean body condition between GonaCon-B treated mares and controls. Goodloe (1991) found that GnRH-KHL treated mares had higher survival rates than untreated controls. In other species, treated deer had better body condition than controls (Gionfriddo et al. 2011b), treated cats gained more weight than controls (Levy et al. 2011), as did treated young female pigs (Bohrer et al. 2014).

Following resumption of fertility, the proportion of mares that conceive and foal could be

increased due to their increased fitness; this has been called by some a 'rebound effect.' Elevated fertility rates have been observed after horse gathers and removals (Kirkpatrick and Turner 1991). More research is needed to document and quantify these hypothesized effects. If repeated contraceptive treatment leads to a prolonged contraceptive effect, then that may minimize or delay the hypothesized rebound effect. Selectively applying contraception to older animals and returning them to the HMA could reduce long-term holding costs for such horses, which are difficult to adopt, and could negate the compensatory reproduction that can follow removals (Kirkpatrick and Turner 1991).

Because successful fertility control would reduce foaling rates and population growth rates, another indirect effect would be to reduce the number of wild horses that have to be removed over time to achieve and maintain the established AML. Contraception would be expected to lead to a relative increase in the fraction of older animals in the herd. Reducing the numbers of wild horses that would have to be removed in future gathers could allow for removal of younger, more easily adoptable excess wild horses, and thereby could eliminate the need to send additional excess horses from this area to off-range holding corrals or pastures for long-term holding. Among mares in the herd that remain fertile, a high level of physical health and future reproductive success would be expected because reduced population sizes should lead to more availability of water and forage resources per capita.

Reduced population growth rates and smaller population sizes could also allow for continued and increased environmental improvements to range conditions within the project area, which would have long-term benefits to wild horse habitat quality. As the local horse abundance nears or is maintained at the level necessary to achieve a thriving natural ecological balance, vegetation resources would be expected to recover, improving the forage available to wild horses and wildlife throughout the HMA or HMAs. With rangeland conditions more closely approaching a thriving natural ecological balance, and with a less concentrated distribution of wild horses across the HMA, there should also be less trailing and concentrated use of water sources. Lower population density would be expected to lead to reduced competition among wild horses using the water sources, and less fighting among horses accessing water sources. Water quality and quantity would continue to improve to the benefit of all rangeland users including wild horses. Wild horses would also have to travel less distance back and forth between water and desirable foraging areas. Should GonaCon-Equine treatment, including booster doses, continue into the future, with treatments given on a schedule to maintain a lowered level of fertility in the herd, the chronic cycle of overpopulation and large gathers and removals might no longer occur, but instead a consistent abundance of wild horses could be maintained, resulting in continued improvement of overall habitat conditions and animal health. While it is conceivable that widespread and continued treatment with GonaCon-Equine could reduce the birth rates of the population to such a point that birth is consistently below mortality, that outcome is not likely unless a very high fraction of the mares present are all treated with primer and booster doses, and perhaps repeated booster doses.

Behavioral Effects of GnRH Vaccination

Behavioral differences should be considered as potential consequences of contraception with GonaCon. The NAS (2013) noted that all successful fertility suppression has effects on mare behavior, mostly as a result of the lack of pregnancy and foaling, and concluded that GonaCon

was a good choice for use in the program. The result that GonaCon treated mares may have suppressed estrous cycles throughout the breeding season can lead treated mares to behave in ways that are functionally similar to pregnant mares.

Where it is successful in mares, GonaCon and other anti-GnRH vaccines are expected to induce fewer estrous cycles when compared to non-pregnant control mares. This has been observed in many studies (Garza et al. 1986, Curtis et al. 2001, Dalin et al. 2002, Killian et al. 2006, Dalmau et al. 2015). In contrast, PZP vaccine is generally expected to lead mares to have more estrous cycles per breeding season, as they continue to be receptive to mating while not pregnant. Females treated with GonaCon had fewer estrous cycles than control or PZP-treated mares (Killian et al. 2006) or deer (Curtis et al. 2001). Thus, concerns about PZP treated mares receiving more courting and breeding behaviors from stallions (Nuñez et al. 2009, Ransom et al. 2010) are not generally expected to be a concern for mares treated with anti-GnRH vaccines (Botha et al. 2008).

Ransom et al. (2014b) found that GonaCon treated mares had similar rates of reproductive behaviors that were similar to those of pregnant mares. Among other potential causes, the reduction in progesterone levels in treated females may lead to a reduction in behaviors associated with reproduction. Despite this, some females treated with GonaCon or other anti-GnRH vaccines did continue to exhibit reproductive behaviors, albeit at irregular intervals and durations (Dalin et al. 2002, Stout et al. 2003, Imboden et al. 2006), which is a result that is similar to spayed (ovariectomized) mares (Asa et al. 1980). Gray et al. (2009) found no difference in sexual behaviors in mares treated with GonaCon and untreated mares. When progesterone levels are low, small changes in estradiol concentration can foster reproductive estrous behaviors (Imboden et al. 2006). Owners of anti-GnRH vaccine treated mares reported a reduced number of estrous-related behaviors under saddle (Donovan et al. 2013). Treated mares may refrain from reproductive behavior even after ovaries return to cyclicity (Elhay et al. 2007). Studies in elk found that GonaCon treated cows had equal levels of precopulatory behaviors as controls (Powers et al. 2011), though bull elk paid more attention to treated cows late in the breeding season, after control cows were already pregnant (Powers et al. 2011).

Stallion herding of mares, and harem switching by mares are two behaviors related to reproduction that might change as a result of contraception. Ransom et al. (2014b) observed a 50% decrease in herding behavior by stallions after the free-roaming horse population at Theodore Roosevelt National Park was reduced via a gather, and mares there were treated with GonaCon-B. The increased harem tending behaviors by stallions were directed to both treated and control mores. It is difficult to separate any effect of GonaCon in this study from changes in horse density and forage following horse removals.

Mares in untreated free-roaming populations change bands; some have raised concerns over effects of PZP vaccination on band structure (Nuñez et al. 2009), with rates of band fidelity being suggested as a measure of social stability. With respect to treatment with GonaCon or other anti-GnRH vaccines, it is probably less likely that treated mares will switch harems at higher rates than untreated animals, because treated mares are similar to pregnant mares in their behaviors (Ransom et al. 2014b). Indeed, Gray et al. (2009) found no difference in band fidelity in a free-roaming population of horses with GonaCon treated mares, despite differences in foal

production between treated and untreated mares. Ransom et al. (2014b) actually found increased levels of band fidelity after treatment, though this may have been partially a result of changes in overall horse density and forage availability.

Even in cases where there may be changes in band fidelity, the National Research Council (2013) found that harem changing was not likely to result in serious adverse effects for treated mares:

> "The studies on Shackleford Banks (Nuñez et al., 2009; Madosky et al., 2010) suggest that there is an interaction between pregnancy and social cohesion. The importance of harem stability to mare well-being is not clear, but considering the relatively large number of free-ranging mares that have been treated with liquid PZP in a variety of ecological settings, the likelihood of serious adverse effects seem low."

Kirkpatrick et al. (2010) concluded that "the larger question is, even if subtle alterations in behavior may occur, this is still far better than the alternative."

The NAS (2013) provides a comprehensive review of the literature on the behavioral effects of contraception that puts Nuñez's (2009, 2010) research into the broader context of all of the available scientific literature, and cautions, based on its extensive review of the literature that:

> ". . . in no case can the committee conclude from the published research that the behavior differences observed are due to a particular compound rather than to the fact that treated animals had no offspring during the study. That must be borne in mind particularly in interpreting long-term impacts of contraception (e.g., repeated years of reproductive "failure" due to contraception)."

Gray et al. (2009) and Ransom et al. (2014b) monitored non-reproductive behaviors in GonaCon treated populations of free-roaming horses. Gray et al. (2009) found no difference between treated and untreated mares in terms of activity budget, sexual behavior, proximity of mares to stallions, or aggression. Ransom et al. (2014b) found only minimal differences between treated and untreated mare time budgets, but those differences were consistent with differences in the metabolic demands of pregnancy and lactation in untreated mares, as opposed to non-pregnant treated mares.

Genetic Effects of GnRH Vaccination - Similar to those listed under *Genetic Effects of PZP Vaccination.*

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7.5 Appendix E. Removal Criteria and Treatment and Procedures for Handling Horses After Gather at Off-Range Corrals (ORC)

Upon arrival at the Boise BLM ORC, recently captured wild horses are off-loaded and placed in holding pens where they are fed good quality hay and water. Most wild horses begin to eat and drink immediately and adjust rapidly to their new environment. Any animals affected by a chronic or incurable disease, injury, lameness, or serious physical defect (such as severe tooth loss or wear, club feet, and other severe congenital abnormalities) would be humanely euthanized using methods in IM-2015-151. Wild horses in underweight condition or animals with injuries are sorted and placed in hospital pens, fed separately and/or treated for their injuries as necessary.

Recently captured wild horses, generally mares, in underweight condition may have difficulty transitioning to feed. Some of these animals are in such poor condition it is unlikely they would have survived if left on the range. Similarly, some mares may lose their fetuses. Every effort is taken to help the mare make a quiet, low-stress transition to captivity and domestic feed to minimize the risk of miscarriage or death.

At the Boise BLM ORC horses will be prepared for adoptions and sales. Preparation involves freezemarking the animals with a unique identification number, drawing a blood sample to test for equine infection anemia, vaccinating against common diseases, castration (of male horses) as necessary, and deworming.

At ORCs, a minimum of 400 square feet is provided per animal. Mortality at ORC facilities averages approximately 5% per year (GAO 2013), 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 are seriously injured or accidentally die during sorting, handling, or preparation.

During the preparation process, potential effects to wild horses are similar to those that can occur during handling and transportation. Serious injuries and deaths from injuries during the preparation process can occur. From there, they would be made available for adoption or sale to qualified individuals or sent to ORPs. Implementation of management actions, the disposition of removed excess horses would follow existing or updated policies.
When shipping wild horses for adoption, sale, or ORP, animals may be transported for a maximum of 24 hours. Immediately prior to transportation, and after every 18 to 24 hours of transportation, animals are offloaded and provided a minimum of 8 hours on-the-ground rest. During the rest period, each animal is provided access to unlimited amounts of clean water and 25 pounds of good quality hay per horse with adequate bunk space to allow all animals to eat at one time. Most animals are not shipped more than 18 hours before they are rested. The rest period may be waived in situations where the travel time exceeds the 24- hour limit by just a few hours and stress of offloading and reloading is likely to be greater than the stress involved in the additional period of uninterrupted travel.

ORPs are designed to provide excess wild horses with humane, lifelong care in a natural setting off public rangelands. Wild horses are maintained in grassland pastures large enough to allow free-roaming behavior and with forage, water, and shelter necessary to sustain them in good condition.

About 50,000 wild horses, in excess of the existing adoption or sale demand (because of age or other factors), are currently being held in ORPs. These animals are generally more than 10 years of age. Located in mid or tall grass prairie regions of the United States, these ORPs are highly productive grasslands as compared to more arid western rangelands.

Generally, mares and castrated stallions (geldings) are segregated into separate pastures. No reproduction occurs in the ORP, but foals born to pregnant mares are gathered and weaned when they reach about 8 to 10 months of age and are then shipped to ORCs like the Boise BLM Facility where they are made available for adoption.

Handling by humans is minimized to the extent possible, although regular on-the ground observation and weekly counts of wild horses to ascertain their numbers, well-being, and safety are conducted. A very small percentage of the animals may be humanely euthanized if they are in underweight condition and are not expected to improve to a BCS of 3 or greater due to age or other factors. Natural mortality of wild horses in ORPs average approximately 8 percent per year, but can be higher or lower depending on the average age of the horses' pastured (GAO 2013).While humane euthanasia and sale without limitation of healthy horses for which there is no adoption demand is authorized under the WFRHBA, it has been restricted either by a moratorium instituted by the director of BLM or by the annual Congressional appropriations bill for the Department of the Interior in most years.

7.6 Appendix F. WinEquus Population Model and Modeling Results

Overview

Version 1.40 of the *WinEquus Program*, developed by Dr. Steve Jenkins (Jenkins Model) was utilized to perform population modeling. The model uses average survival probabilities and foaling rates of wild horses to simulate population growth for up to 20 years. The model accounts for year-to-year variation in these demographic parameters by using a randomization process to select survival probabilities and foaling rates for each age class from a distribution of values based on these averages. This aspect of population dynamics is called environmental stochasticity, and reflects the fact that future environmental conditions that may affect horse populations cannot be known in advance. Therefore, each trial with the model will give a different pattern of population growth. Some trials may include mostly "good years", when the population grows rapidly; other trials may include a series of several "bad" years in succession. The stochastic approach to population modeling uses repeated trials to project a range of possible population trajectories over a period of years, which is more realistic than predicting a single specific trajectory.

The model incorporates both selective removal and fertility control treatment as management strategies. A simulation may include no management, selective removal, fertility control treatment, or both removal and fertility control treatment. Wild Horse and Burro Specialists can specify many different options for these management strategies such as the schedule of gathers for removal or fertility control treatment, the threshold population size which triggers a gather, the target population size following a removal, the ages and sexes of horses to be removed, and the effectiveness of fertility control treatment. Results of the population model are not considered a "prediction" of what will happen to the herd in the future. Results of the model are being used as an aid to evaluate the management practices that are identified in this document and to project population growth.

There are three data sets from three Herd Management Areas (HMAs; Garfield, Granites, and Pryor Mountain) built into and available for use in the Jenkins Model. An infinite number of data sets from other sources can also be entered into the model for local herds. Most population projections are based on the Garfield data. These data are the best available for many areas and are based on substantial field work and research. The model's projections using the Garfield data are very close to what actually occurs in the herds. Survival and foaling data was collected by M. Ashley and S. Jenkins at Garfield Flat, Nevada, between 1993 and 1999. The age and sex distribution data used was extrapolated from the 2018 aerial survey conducted on the Four Mile HMA.

For each simulation, a series of graphs and tables were generated which included the "most typical" trial, projected population sizes, growth rates, and gather numbers, and minimum, average, and maximum population sizes. These numbers are useful to make relative comparisons of the different alternatives, and potential outcomes under different management options. This output, together with the time series and most typical trial graphs are useful representations of the results of the program in terms of assessing the effects of the various alternatives because it shows not only expected average results but also extreme results that might be possible. The model was run for 100 trials for a 10-year period to assess the potential outcomes for these management scenarios over a long period of time. This provides for a more useful comparison of

alternatives when assessing small populations. The model output provides information for 11 years.

Population Modeling Criteria
The following summarizes the criteria utilized to complete the modeling:

• Initial population: 221 (Proposed Action), 221 (No Action)
• Starting year: 2020
• Initial Gather Year: 2020
• Gather interval: minimum interval of three years (Standard interval within the modeling program)
• Effectiveness of Fertility Control PZP: Year 1: 94%, Year 2: 82%, Year 3: 68%
• Effectiveness of Fertility Control GonaCon: Year 1: 100%, Year 2: 84%, Year 3: 84%
• Gather for fertility treatment regardless of population size: No
• Continue to gather after reduction to treat females: Yes
• Threshold population size: 120
• Target population following gathers: 37
• Percent of the population that can be gathered: 90%
• Minimum age for long term pasture horses: Not Applicable
• Foals are not included in the AML
• Simulations were run for 10 years with 100 trials each

RESULTS

No Action
This alternative was modeled using the Removal Only Option. The model displayed results through year 2030 (Figure 1). Figure 1 depicts the "most typical trial" (indicated in red) of the 100 trials (indicated in blue) simulated for this alternative.

Average population growth rates for the No Action simulations were 15.8 to 24.5% (based on 10th to 90th percentile), with a median of 20.5% (Figure 2). Average growth rates were within reasonable ranges, and none of the trials reflect a "crash" in the population. The average population size of the median trial was 581 wild horses, with the maximum number (on the highest trial) of 1268 horses by 2030.

Proposed Action utilizing PZP as the fertility control vaccine
For the Proposed Action, utilizing PZP as the fertility control vaccine, modeling was completed with both the removal and fertility control option through year 2030. Figure 3 depicts the "most typical trial" (indicated in red) of the 100 trials (indicated in blue) simulated for this alternative.

Average population growth rates for the Proposed Action simulations were 3.2 to 17.1% (based on 10th to 90th percentile), with a median of 10.8% (Figure 4). Average growth rates were within reasonable ranges, and none of the trials reflect a "crash" in the population. The average population size of the median trial was 77 to 204 wild horses.

Proposed Action utilizing GonaCon as the fertility control vaccine
For the Proposed Action, utilizing GonaCon as the fertility control vaccine, modeling was completed with both the removal and fertility control option through year 2029. Figure 5 depicts the "most typical trial" (indicated in red) of the 100 trials (indicated in blue) simulated for this alternative.

Average population growth rates for the Proposed Action simulations were -0.4 to 15.9% (based on 10th to 90th percentile), with a median of 10.8% (Figure 6). Average growth rates were within reasonable ranges, and none of the trials reflect a "crash" in the population. The average population size of the median trial was 76 to 194 wild horses.

Figure 1. No Action Alternative - Population Size from 2020 to 2030.

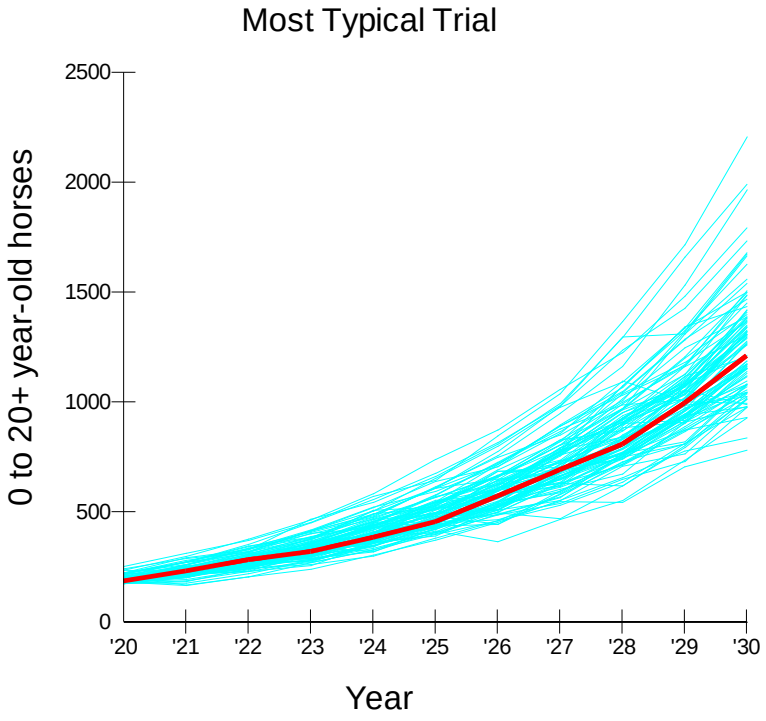


Figure 2. No Action Alternative - Growth Rates from 2020 to 2030.

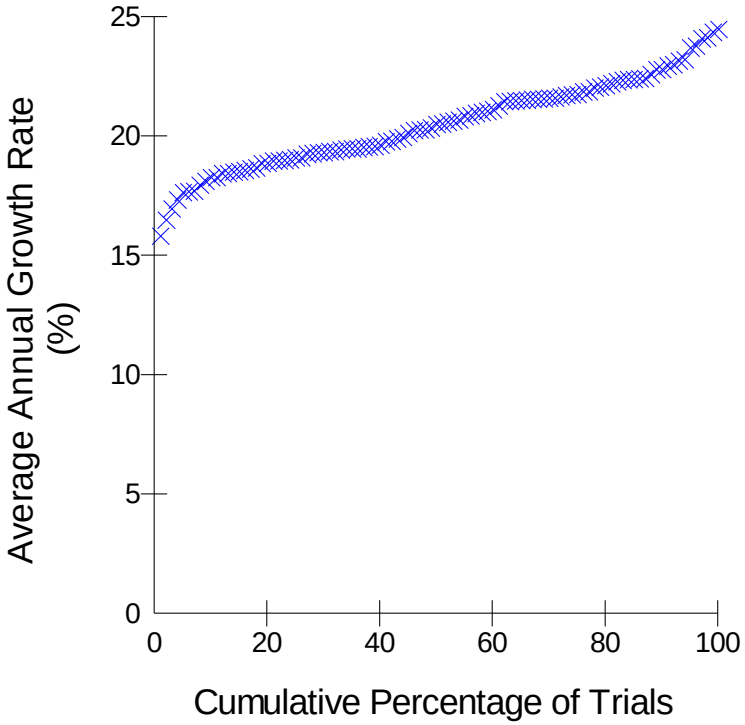


Figure 3. Proposed Action Alternative - PZP - Population Size from 2020 to 2030.

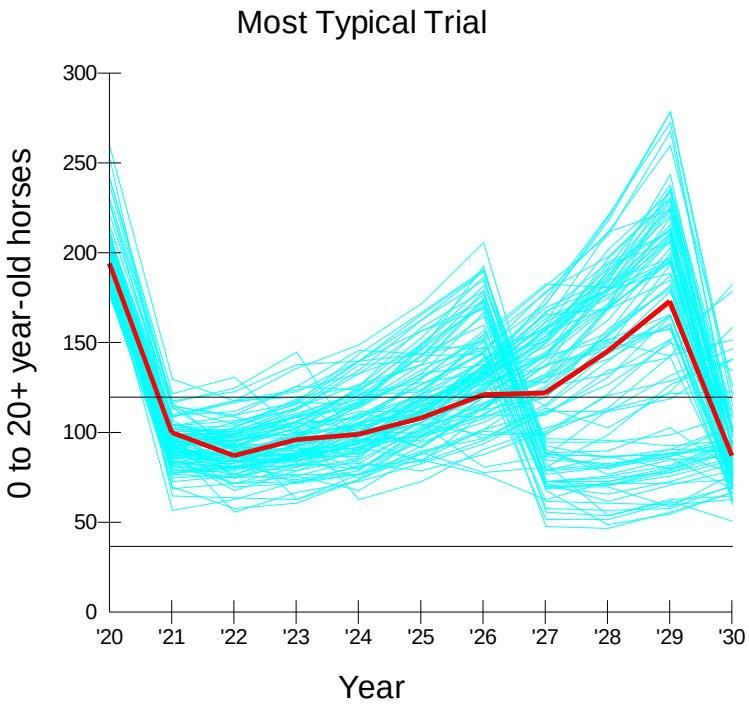


Figure 4. Proposed Action Alternative – PZP- Growth Rates from 2020 to 2030.

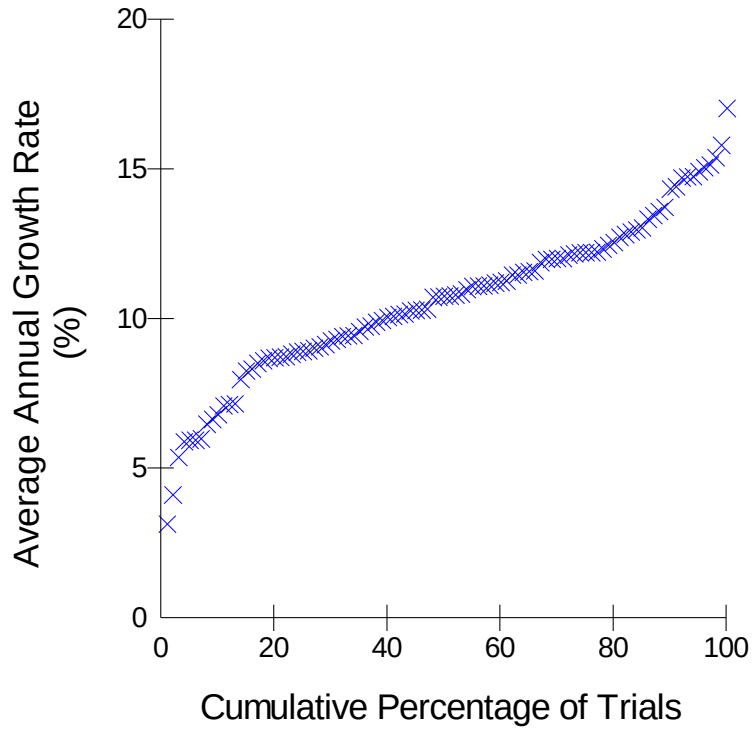


Figure 5. Proposed Action Alternative – GonaCon - Population Size from 2020 to 2030.

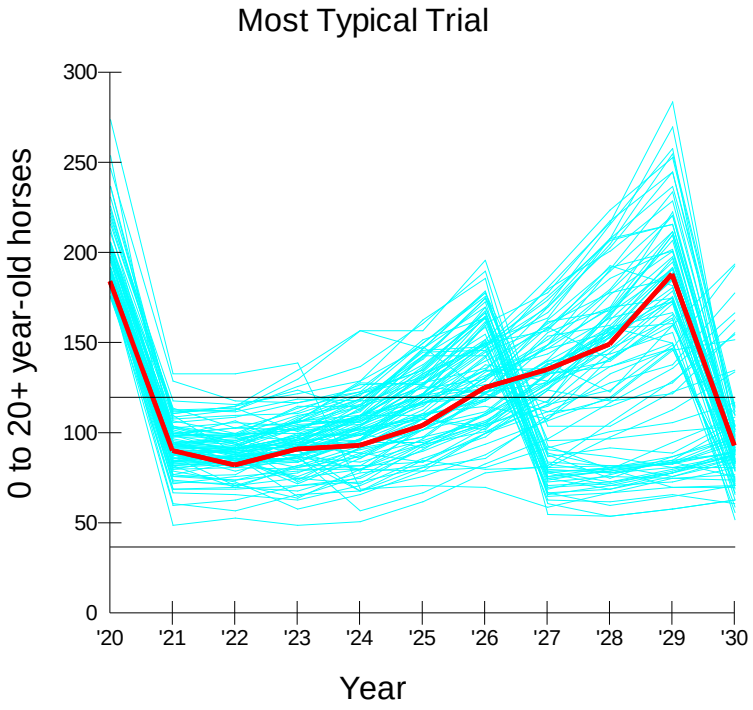
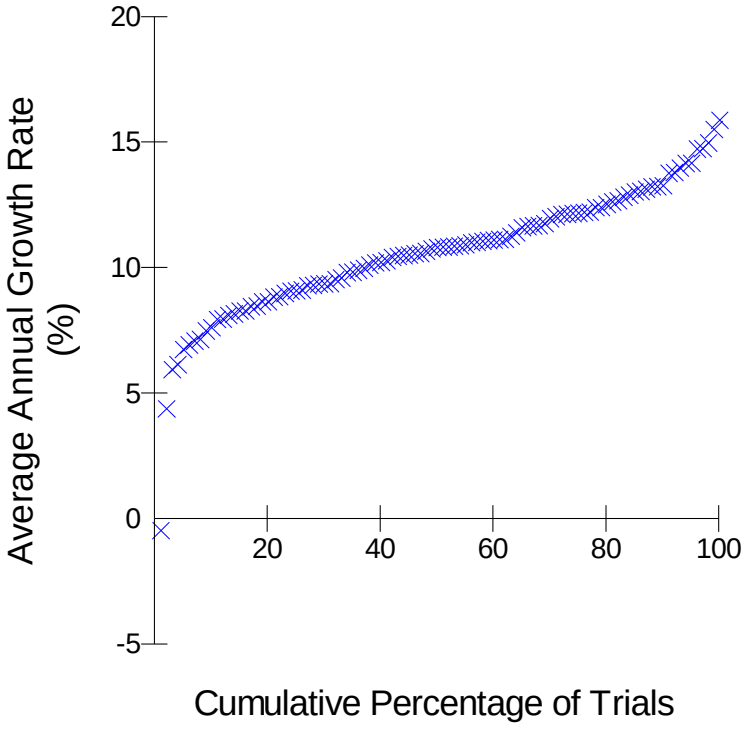


Figure 6. Proposed Action Alternative – GonaCon - Growth Rates from 2020 to 2030.


Average Annual Growth Rate (%)
20
15
10
5
0
-5
20
40
60
80
100
Cumulative Percentage of Trials

7.7 Appendix G. Comprehensive Animal Welfare Program (CAWP) for Wild Horse and Burro Gathers SOPs

In 2015 (IM2015-151), BLM initiated a comprehensive animal welfare program (CAWP) which updated WH&B gather SOPs to formalize the standards, training and monitoring for conducting safe, efficient and successful WH&B gather operations while ensuring humane care and handling of animals gathered. These standards include requirements for trap and temporary holding facility design; capture and handling; transportation; and appropriate care after capture. The standards have been incorporated into helicopter gather contracts as specifications for performance. It includes a requirement that all Incident Commanders (IC), Lead Contracting Officer Representatives (LCOR), Contracting Officer Representatives (COR), Project Inspectors (PI), and contractors must complete a mandatory training course covering all aspects of the CAWP prior to gathers. The goal is to ensure that the responsibility for humane care and treatment of WH&Bs remains a high priority for the BLM and its contractors at all times. The BLM's objective is to use the best available science, husbandry and handling practices applicable for WH&Bs and to make improvements whenever possible, while also meeting our overall gather goals and objectives in accordance with current BLM policy, SOPs and contract requirements.

Gathers would be conducted by utilizing contractors from the Wild Horse Gathers-Western States Contract, or BLM personnel. The following procedures for gathering and handling wild horses would apply whether a contractor or BLM personnel conduct a gather. For helicopter gathers conducted by BLM personnel, gather operations will be conducted in conformance with the *Wild Horse Aviation Management Handbook* (January 2009).

Prior to any gathering operation, the BLM will provide a pre-gather evaluation of existing conditions in the gather area(s). The evaluation will include animal conditions, prevailing temperatures, drought conditions, soil conditions, road conditions, and a topographic map with wilderness boundaries, the location of fences, other physical barriers, and acceptable trap locations in relation to animal distribution. The evaluation will determine whether the proposed activities will necessitate the presence of a veterinarian during operations. If it is determined that a large number of animals may need to be euthanized or gather operations could be facilitated by a veterinarian, these services would be arranged before the gather would proceed. The contractor will be apprised of all conditions and will be given instructions regarding the gather and handling of animals to ensure their health and welfare is protected.

Trap sites and temporary holding sites will be located to reduce the likelihood of injury and stress to the animals, and to minimize potential damage to the natural resources of the area. These sites would be located on or near existing roads whenever possible.

The primary gather methods used in the performance of gather operations include:
1. Helicopter Drive Trapping. This gather method involves utilizing a helicopter to herd wild horses into a temporary trap.

2. Helicopter Assisted Roping. This gather method involves utilizing a helicopter to herd wild horses or burros to ropers.

3. Bait Trapping. This gather method involves utilizing bait (e.g., water or feed) to lure wild horses into a temporary trap.

The following procedures and stipulations will be followed to ensure the welfare, safety and humane treatment of wild horses in accordance with the provisions of 43 CFR 4700.

Helicopter Gather Methods used in the Performance of Gather Contract Operations

The primary concern of the contractor is the safe and humane handling of all animals gathered.

All gather attempts shall incorporate the following:

1. All trap and holding facilities locations must be approved by the Contracting Officer's Representative (COR) and/or the Project Inspector (PI) prior to construction. All trap and holding facilities locations must be approved by the LCOR/COR/PI prior to construction. The Contractor may also be required to change or move trap locations as determined by the LCOR/COR/PI. LCOR/COR/PI will determine when capture objectives are met. All traps and holding facilities not located on public land must have prior written approval of the landowner that will be provided to the LCOR prior to use. Selection of all traps and holding sites will include consideration for public and media observation.

2. The rate of movement and distance the animals travel must not exceed limitations set by the LCOR/COR/PI who will consider terrain, physical barriers, access limitations, weather, condition of the animals, urgency of the operation (animals facing drought, starvation, fire, etc.) and other factors. The trap site shall be moved close to WH&B locations whenever possible to minimize the distance the animals need to travel.

3. All traps, wings, and holding facilities shall be constructed, maintained and operated to handle the animals in a safe and humane manner and be in accordance with the following:

a. When moving the animals from one pasture/allotment to another pasture/allotment, the fencing wire needs to be let down for a distance that is approved by the LCOR on either side of the gate or crossing.

b. If jute is hung on the fence posts of an existing wire fence in the trap wing, the wire should either be rolled up or let down for the entire length of the jute in such a way that minimizes the possibility of entanglement by WH&Bs unless otherwise approved by the LCOR/COR/PI. No modification of existing fences will be made without authorization from the LCOR/COR/PI. The Contractor shall be responsible for restoration of any fence modification which they have made.

c. Building a trail using domestic horses through the fence line, crossing or gate may be necessary to avoid animals hitting the fence.

d. The trap site and temporary holding facility must be constructed of stout materials and must be maintained in proper working condition. Traps and holding facilities shall be constructed of portable panels, the top of which shall not be less than 72 inches high for horses and 60 inches for burros, and the bottom rail of which shall not be more than 12 inches from

ground level. All traps and holding facilities shall be oval or round in design with rounded corners.

e. All portable loading chute sides shall be a minimum of 6 feet high and shall be fully covered on the sides with plywood, or metal without holes.

f. All alleyways that lead to the fly chute or sorting area shall be a minimum of 30 feet long and a minimum of 6 feet high for horses, and 5 feet high for burros and the bottom rail must not be more than 12 inches from ground level. All gates and panels in the animal holding and handling pens and alleys of the trap site must be covered with plywood, burlap, plastic snow fence or like material approximately 48" in height to provide a visual barrier for the animals. All materials shall be secured in place. These guidelines apply:

i. For exterior fences, material covering panels and gates must extend from the top of the panel or gate toward the ground.

ii. For alleys and small internal handling pens, material covering panels and gates shall extend from no more than 12 inches below the top of the panel or gate toward the ground to facilitate visibility of animals and the use of flags and paddles during sorting.

iii. The initial capture pen may be left uncovered as necessary to encourage animals to enter the first pen of the trap.

iv. Padding must be installed on the overhead bars of all gates used in single file ally.

v. An appropriate chute designed for restraining WH&B's must be available for necessary procedures at the temporary holding facility. The government furnished portable fly chute to restrain, age, or provide additional care for the animals shall be placed in the alleyway in a manner as instructed by or in concurrence with the LCOR/COR/PI.

vi. There must be no holes, gaps or openings, protruding surfaces, or sharp edges present in fence panels, latches**,** or other structures that may cause escape or possible injury.

vii. Hinged, self-latching gates must be used in all pens and alleys except for entry gates into the trap, which may be secured with tie ropes or chains.

viii. When dust conditions occur within or adjacent to the trap or holding facility, the Contractor shall be required to wet down the ground with water.

All animals gathered shall be sorted into holding pens as to age, size, temperament, sex, condition, and whether animals are identified for removal as excess or retained in the HMA. These holding pens shall be of sufficient size to minimize, to the extent possible, injury due to fighting and trampling as well as to allow animals to move easily and have adequate access to water and feed. All pens will be capable of expansion on request of the LCOR/COR/PI. Alternate pens, within the holding facility shall be furnished by the Contractor to separate mares or Jennies with small foals, sick and injured animals, and private animals from the other animals. Under normal conditions, the BLM will require that animals be restrained to determine an animal's age, sex, and ownership. In other situations restraint may be required to conduct other procedures such as veterinary treatments, restraint for fertility control vaccinations, castration, spaying, branding, blood draw, collection of hair samples for genetic testing, testing for equine diseases, application of GPS collars and radio tags. In these instances, a portable restraining chute may be necessary and will be provided by the government. Alternate pens shall be

furnished by the Contractor to hold animals if the specific gathering requires that animals be released back into the capture area(s) following selective removal and/or population suppression treatments. In areas requiring one or more satellite traps, and where a centralized holding facility is utilized, the contractor may be required to provide additional holding pens to segregate animals transported from remote locations so they may be returned to their traditional ranges. Either segregation or temporary marking and later segregation will be at the discretion of the LCOR/COR/PI. The LCOR will determine if the corral size needs to be expanded due to horses staying longer, large.

FEEDING AND WATERING

a. Adult WH&Bs held in traps or temporary holding pens for longer than 12 hours must be fed every morning and evening and provided with drinking water at all times other than when animals are being sorted or worked.

b. Dependent foals must be reunited with their mares/jennies at the temporary holding facility within four hours of capture unless the LCOR/COR/PI authorizes a longer time or foals are old enough to be weaned. If a nursing foal is held in temporary holding pens for longer than 4 hours without their dams, it must be provided with water and good quality weed seed free hay.

c. Water must be provided at a minimum rate of 10 gallons per 1,000 pound animal per day, adjusted accordingly for larger or smaller horses, burros and foals, and environmental conditions, with each trough placed in a separate location of the pen (i.e. troughs at opposite ends of the pen) with a minimum of one trough per 30 horses. Water must be refilled at least every morning and evening when necessary.

d. Good quality weed seed free hay must be fed at a minimum rate of 20 pounds per 1,000 pound adult animal per day, adjusted accordingly for larger or smaller horses, burros and foals.

1. Hay must not contain poisonous weeds or toxic substances.
2. Hay placement must allow all WH&B's to eat simultaneously.

e. When water or feed deprivation conditions exist on the range prior to the gather, the LCOR/COR/PI shall adjust the watering and feeding arrangements in consultation with the onsite veterinarian as necessary to provide for the needs of the animals to avoid any toxicity concerns.

TRAP SITE

A dependent foal or weak/debilitated animal must be separated from other WH&Bs at the trap site to avoid injuries during transportation to the temporary holding facility. Separation of dependent foals from mares must not exceed four hours unless the LCOR/COR/PI authorizes a longer time or the decision is made to wean the foals.

TEMPORARY HOLDING FACILITY

a. All WH&B's in confinement must be observed at least twice daily during feeding time to identify sick or injured WH&Bs and ensure adequate food and water.

b. Non-ambulatory WH&B's must be located in a pen separate from the general population and must be examined by the LCOR/COR/PI and/or on-call or on-site veterinarian no more than 4 hours after recumbency (lying down) is observed. Unless otherwise directed by a veterinarian, hay and water must be accessible to an animal within six hours after recumbency.

c. Alternate pens must be made available for the following:

1. WH&Bs that are weak or debilitated
2. Mares/jennies with dependent foals
3. Aggressive WH&B's that could cause serious injury to other animals.

d. WH&B's in pens at the temporary holding facility shall be maintained at a proper stocking density such that when at rest all WH&B's occupy no more than half the pen area.

e. It is the responsibility of the Contractor to provide security to prevent loss, injury or death of captured animals until delivery to final destination.

f. It is the responsibility of the Contractor to provide for the safety of the animals and personnel working at the trap locations and temporary holding corrals in consultation with the LCOR/COR/PI. This responsibility will not be used to exclude or limit public and media observation as long as current BLM policies are followed.

g. The contractor will ensure that non-essential personnel and equipment are located as to minimize disturbance of WH&Bs. Trash, debris, and reflective or noisy objects shall be eliminated from the trap site and temporary holding facility.

h. The Contractor shall restrain sick or injured animals if treatment is necessary in consultation with the LCOR/COR/PI and/or onsite veterinarian. The LCOR/COR/PI and/or onsite veterinarian will determine if injured animals must be euthanized and provide for the euthanasia of such animals. The Contractor may be required to humanely euthanize animals in the field and to dispose of the carcasses as directed by the LCOR/COR/PI, at no additional cost to the Government.

i. Once the animal has been determined by the LCOR/COR/PI to be removed from the HMA/HA, animals shall be transported to final destination from temporary holding facilities within 48 hours after capture unless prior approval is granted by the LCOR/COR/PI. Animals to be released back into the HMA following gather operations will be held for a specified length of time as stated in the Task Order/SOW. The Contractor shall schedule shipments of animals to arrive at final destination between 7:00 a.m. and 4:00 p.m. unless prior approval has been obtained by the LCOR. No shipments shall be scheduled to arrive at final destination on Sunday and Federal holidays, unless prior approval has been obtained by the LCOR. Animals shall not be allowed to remain standing on gooseneck or semi-trailers while not in transport for a combined period of greater than three (3) hours. Total planned transportation time from the temporary holding to the BLM facility will not exceed 10 hours. Animals that are to be released back into the capture area may need to be transported back to the original trap site per direction of the LCOR.

CAPTURE METHODS THAT MAY BE USED IN THE PERFORMANCE OF A GATHER

Helicopter Drive Trapping

a. The helicopter must be operated using pressure and release methods to herd the animals in a desired direction and shall not repeatedly evoke erratic behavior in the WH&B's causing injury or exhaustion. Animals must not be pursued to a point of exhaustion; the on-site veterinarian must examine WH&B's for signs of exhaustion.

b. The rate of movement and distance the animals travel must not exceed limitations set by the LCOR/COR/PI who will consider terrain, physical barriers, access limitations, weather, condition of the animals, urgency of the operation (animals facing drought, starvation, fire, etc.) and other factors.

i. WH&B's that are weak or debilitated must be identified by BLM staff or the contractors. Appropriate gather and handling methods shall be used according to the direction of the LCOR/COR/PI as defined in this contract.

ii. The appropriate herding distance and rate of movement must be determined the LCOR/COR/PI on a case-by-case basis considering the weakest or smallest animal in the group (e.g., foals, pregnant mares, or horses that are weakened by body condition, age, or poor health) and the range and environmental conditions present.

iii. Rate of movement and distance travelled must not result in exhaustion at the trap site, unless the exhausted animals were already in a severely compromised condition prior to the gather. Where compromised animals cannot be left on the range or where doing so would only serve to prolong their suffering, the LCOR/COR/PI will determine if euthanasia will be performed in accordance with BLM policy.

c. WH&B's must not be pursued repeatedly by the helicopter such that the rate of movement and distance travelled exceeds the limitation set by the LCOR/COR/PI. Abandoning the pursuit or alternative capture methods may be considered by the LCOR/COR/PI in these cases.

d. The helicopter is prohibited from coming into physical contact with any WH&B regardless of whether the contact is accidental or deliberate.

e. WH&B's may escape or evade the gather site while being moved by the helicopter. If there are mare/dependent foal pairs in a group being brought to a trap and half of an identified pair is thought to have evaded capture, multiple attempts by helicopter may be used to bring the missing half of the pair to the trap or to facilitate capture by roping. In these instances, animal condition and fatigue will be evaluated by the LCOR/COR/PI or on-site veterinarian on a case-by-case basis to determine the number of attempts that can be made to capture an animal.

f. Horse captures must not be conducted when ambient temperature at the trap site is below 10ºF or above 95ºF without approval of the LCOR/COR/PI. Burro captures must not be conducted when ambient temperature is below 10ºF or above 100ºF without approval of the

LCOR/COR/PI. The LCOR/COR/PI will not approve captures when the ambient temperature exceeds 105 ºF.

g. The contractor shall assure that dependent foals shall not be left behind. Any animals identified as such will be recovered as a priority in completing the gather.

h. Any adult horse or burro that cannot make it to the trap due to physical limitations shall be identified to the LCOR/COR/PI by the pilot or contractor immediately. An inspection of the animal will be made to determine the problem and the LCOR/COR/PI and/or veterinarian will decide if that animal needs to be humanely euthanized.

ROPING

a. The roping of any WH&B must be approved by the LCOR/COR/PI prior to the action.

b. The roping of any WH&B will be documented by the LCOR/COR/PI along with the circumstances. WH&Bs may be roped under circumstances which include but are not limited to the following: reunite a mare or jenny and her dependent foal; capture nuisance, injured or sick WH&Bs or those that require euthanasia; environmental reasons such as deep snow or traps that cannot be set up due to location or environmental sensitivity; and public and animal safety or legal mandates for removal.

c. Ropers should dally the rope to their saddle horn such that animals can gradually be brought to a stop and must not tie the rope hard and fast to the saddle, which can cause the animals to be jerked off their feet.

d. WH&Bs that are roped and tied down in recumbency must be continuously observed and monitored by an attendant at a maximum of 100 feet from the animal.

e. WH&Bs that are roped and tied down in recumbency must be untied within 30 minutes.

f. If the animal is tied down within the wings of the trap, helicopter drive trapping within the wings will cease until the tied-down animal is removed.

g. Sleds, slide boards, or slip sheets must be placed underneath the animal's body to move and/or load recumbent WH&Bs.

h. Halters and ropes tied to a WH&B may be used to roll, turn, and position or load a recumbent animal, but a WH&B must not be dragged across the ground by a halter or rope attached to its body while in a recumbent position.

i. All animals captured by roping must be marked at the trap site by the contractor for evaluation by the on-site/on-call veterinarian within four hours after capture, and re-evaluation periodically as deemed necessary by the on-site/on-call veterinarian.

HANDLING

Willful Acts of Abuse
The following are prohibited:
a. Hitting, kicking, striking, or beating any WH&B in an abusive manner.

b. Dragging a recumbent WH&B across the ground without a sled, slide board or slip sheet. Ropes used for moving the recumbent animal must be attached to the sled, slide board or slip sheet unless being loaded as specified in Section C 9.2.h

c. Deliberate driving of WH&Bs into other animals, closed gates, panels, or other equipment.

d. Deliberate slamming of gates and doors on WH&Bs.

e. Excessive noise (e.g., constant yelling) or sudden activity causing WH&Bs to become unnecessarily flighty, disturbed or agitated.

General Handling
a. All sorting, loading or unloading of WH&Bs during gathers must be performed during daylight hours except when unforeseen circumstances develop and the LCOR/COR/PI approves the use of supplemental light.

b. WH&Bs should be handled to enter runways or chutes in a forward direction.

c. WH&Bs should not remain in single-file alleyways, runways, or chutes longer than 30 minutes.

d. With the exception of helicopters, equipment should be operated in a manner to minimize flighty behavior and injury to WH&Bs.

Handling Aids
a. Handling aids such as flags and shaker paddles are the primary tools for driving and moving WH&Bs during handling and transport procedures. Contact of the flag or paddle end with a WH&B is allowed. Ropes looped around the hindquarters may be used from horseback or on foot to assist in moving an animal forward or during loading.

b. Routine use of electric prods as a driving aid or handling tool is prohibited. Electric prods may be used in limited circumstances only if the following guidelines are followed:

1. Electric prods must only be a commercially available make and model that uses DC battery power and batteries should be fully charged at all times.
2. The electric prod device must never be disguised or concealed.
3. Electric prods must only be used after three attempts using other handling aids (flag, shaker paddle, voice or body position) have been tried unsuccessfully to move the WH&Bs.
4. Electric prods must only be picked up when intended to deliver a stimulus; these devices must not be constantly carried by the handlers.
5. Space in front of an animal must be available to move the WH&B forward prior to application of the electric prod. 000230 Antelope and Triple B Complexes Gather Plan EA

6. Electric prods must never be applied to the face, genitals, anus, or underside of the tail of a WH&B.

7. Electric prods must not be applied to any one WH&B more than three times during a procedure (e.g., sorting, loading) except in extreme cases with approval of the LCOR/COR/PI. Each exception must be approved at the time by the LCOR/COR/PI.

8. Any electric prod use that may be necessary must be documented daily by the LCOR/COR/PI including time of day, circumstances, handler, location (trap site or temporary holding facility), and any injuries (to WH&B or human).

MOTORIZED EQUIPMENT

Loading and Unloading Areas

a. Facilities in areas for loading and unloading WH&B's at the trap site or temporary holding facility must be maintained in a safe and proper working condition, including gates that swing freely and latch or tie easily.

b. The side panels of the loading chute must be a minimum of 6 feet high and fully covered with materials such as plywood or metal without holes that may cause injury.

c. There must be no holes, gaps or openings, protruding surfaces, or sharp edges present in fence panels or other structures that may cause escape or possible injury.

d. All gates and doors must open and close properly and latch securely.

e. Loading and unloading ramps must have a non-slip surface and be maintained in a safe and proper working condition to prevent slips and falls**.** Examples of non-slip flooring would include, but not be limited to, rubber mats, sand, shavings, and steel reinforcement rods built into ramp. There must be no holes in the flooring or items that can cause an animal to trip.

f. Trailers must be properly aligned with loading and unloading chutes and panels such that no gaps exist between the chute/panel and floor or sides of the trailer creating a situation where a WH&B could injure itself.

g. Stock trailers shall be positioned for loading or unloading such that there is no more than 12" clearance between the ground and floor of the trailer for burros and 18" for horses. . If animals refuse to load, it may be necessary to dig a tire track hole where the trailer level is closer to ground level.

TRANSPORTATION

A. General

1. All sorting, loading, or unloading of WH&Bs during gathers must be performed during daylight hours except when unforeseen circumstances develop and the LCOR/COR/PI approves the use of supplemental light.

2. WH&Bs identified for removal should be shipped from the temporary holding facility to a BLM facility within 48 hours.

3. Shipping delays for animals that are being held for release to range or potential on-site adoption must be approved by the LCOR/COR/PI.

4. Shipping should occur in the following order of priority; 1) debilitated animals, 2) pairs, 3) weanlings, 4) dry mares and 5) studs.

5. Total planned transport time to the BLM preparation facility from the trap site or temporary holding facility must not exceed 10 hours.

6. WH&Bs should not wait in stock trailers and/or semi-trailers at a standstill for more than a combined period of three hours during the entire journey.

B. Vehicles

1. All motorized equipment employed in the transportation of captured animals shall be in compliance with appropriate State and Federal laws and regulations applicable to the humane transportation of animals. The Contractor shall provide the CO annually, with a current safety inspection (less than one year old) for all motorized equipment and tractor-trailers used to transport animals to final destination.

2. Only tractor-trailers or stock trailers with a covered top or overhead bars shall be allowed for transporting animals from trap site(s) to temporary holding facilities, and from temporary holding facilities to final destination(s). Sides or stock racks of all trailers used for transporting animals shall be a minimum height of 6 feet 6 inches from the floor. Single deck tractor-trailers 40 feet or longer shall have two (2) partition gates providing three (3) compartments within the trailer to separate animals. Tractor-trailers less than 40 feet shall have at least one partition gate providing two (2) compartments within the trailer to separate the animals. Compartments in all tractor-trailers shall be of equal size plus or minus 10 %. Each partition shall be a minimum of 6 feet high and shall have a minimum 5 foot wide swinging gate. The use of double deck tractor-trailers is prohibited. Only straight deck trailers and stock trailers are to be used for transporting WH&B's.

3. WH&B's must have adequate headroom during loading and unloading and must be able to maintain a normal posture with all four feet on the floor during transport without contacting the roof or overhead bars.

4. The width and height of all gates and doors must allow WH&B's to move through freely.

5. All gates and doors must open and close easily and be able to be secured in a closed position.

6. The rear door(s) of stock trailers must be capable of opening the full width of the trailer.

7. Loading and unloading ramps must have a non-slip surface and be maintained in proper working condition to prevent slips and falls.

8. All partitions and panels inside of trailers must be free of sharp edges or holes that could cause injury to WH&B's.

9. The inner lining of all trailers must be strong enough to withstand failure by kicking that would lead to injuries.

10. Partition gates in transport vehicles shall be used to distribute the load into compartments during travel.

11. Surfaces and floors of trailers must be cleaned of dirt, manure and other organic matter prior to the beginning of a gather.

12. Surfaces and floors of trailers shall have non-slip surface, use of shavings, dirt, and floor mates.

C. Care of WH&B's during Transport Procedures

1. WH&B's that are loaded and transported from the temporary holding facility to the BLM preparation facility must be fit to endure travel per direction of LCOR/COR/PI following consultation with on-site/on-call veterinarian.

2. WH&B's that are non-ambulatory, blind in both eyes, or severely injured must not be loaded and shipped unless it is to receive immediate veterinary care or euthanasia.

3. WH&B's that are weak or debilitated must not be transported without approval of the LCOR/COR/PI in consultation with the on-site veterinarian. Appropriate actions for their care during transport must be taken according to direction of the LCOR/COR/PI.

4. WH&B's shall be sorted prior to transport to ensure compatibility and minimize aggressive behavior that may cause injury.

5. Trailers must be loaded using the minimum space allowance in all compartments as follows:

a. For a 6.8 foot wide; 24 foot long stock trailer 12 to 14 adult horses;
b. For a 6.8 foot wide; 24 foot long stock trailer 18 to 21 adult burros
c. For a 6.8 foot wide; 20 foot long stock trailer 10 to 12 adult horses can be loaded
d. For a 6.8 foot wide; 20 foot long stock trailer 15 to 18 adult burros

For a semi-trailer:
a. 12 square feet per adult horse.
bi. 6.0 square feet per dependent horse foal.
c. 8.0 square feet per adult burro.
d. 4.0 square feet per dependent burro foal

6. Considering the condition of the animals, prevailing weather, travel distance and other factors or if animals are going down on trailers or arriving at their destination down or with injuries or a

condition suggesting they may have been down, additional space or footing provisions may be necessary and will be required if directed by the LCOR/COR.

7. The LCOR/COR/PI, in consultation with the receiving Facility Manager, must document any WH&B that is recumbent or dead upon arrival at the destination. Non-ambulatory or recumbent WH&B's must be evaluated on the trailer and either euthanized or removed from the trailers using a sled, slide board or slip sheet.

8. Saddle horses must not be transported in the same compartment with WH&B's.

EUTHANASIA or DEATH

Euthanasia Procedure during Gather Operations
1. An authorized, properly trained, and experienced person as well as a firearm appropriate for the circumstances must be available at all times during gather operations. When the travel time between the trap site and temporary holding facility exceeds one hour or if radio or cellular communication is not reliable, provisions for euthanasia must be in place at both the trap site and temporary holding facility during the gather operation.
2. Euthanasia must be performed according to American Veterinary Medical Association euthanasia guidelines (2013) using methods of gunshot or injection of an approved euthanasia agent.

3. The decision to euthanize and method of euthanasia must be directed by the LCOR/COR/PI who must be on site and may consult with the on-site/on-call veterinarian. In event and rare circumstance that the LCOR/COR/PI is not available, the contractor if properly trained may euthanize an animal as an act of mercy.

4. All carcasses will be disposed of in accordance with state and local laws and as directed by the LCORCOR/PI.

5. Carcasses left on the range should not be placed in washes or riparian areas where future runoff may carry debris into ponds or waterways. Trenches or holes for buried animals should be dug so the bottom of the hole is at least 6 feet above the water table and 4-6 feet of level earth covers the top of the carcass with additional dirt mounded on top where possible.

COMMUNICATIONS
a. The Contractor shall have the means to communicate with the LCOR/COR/PI and all contractor personnel engaged in the capture of wild horses and burros utilizing a VHF/FM Transceiver or VHF/FM portable Two-Way radio.

b. The Contractor shall obtain the necessary FCC licenses for the radio system.

SAFETY AND SECURITY
a. All accidents involving animals or people that occur during the performance of any task order shall be immediately reported to the LCOR/COR/PI.

b. It is the responsibility of the Contractor to provide security to prevent unauthorized release, injury or death of captured animals until delivery to final destination.

c. The contractor must comply with all applicable federal, state and local regulations.

d. Fueling operations shall not take place within 1,000 feet of animals or personnel and equipment other than the refueling truck and equipment.

e. Children under the age of 12 shall not be allowed within the gather's working areas which include near the chute when working animals at the temporary holding facility, or near the pens at the trap site when working and loading of animals. Children under the age of 12 in the non-working area must be accompanied by an adult at either location at all times.

BIOSECURITY

A. Health records for all saddle and pilot horses used on WH&B gathers must be provided to the LCOR during the BLM/Contractor pre-work meeting, including:

1. Certificate of Veterinary Inspection (Health Certificate, within 30 days).
2. Proof of:
    a. A negative test for equine infectious anemia (Coggins or EIA ELISA test) within 12 months.
    b. Vaccination for tetanus, eastern and western equine encephalomyelitis, West Nile virus, equine herpes virus, influenza, *Streptococcus equi*, and rabies within 12 months.

B. Saddle horses and pilot horses must not be removed from the gather operation (such as for an equestrian event) and allowed to return unless they have been observed to be free from signs of infectious disease for a period of at least three weeks and a new Certificate of Veterinary Inspection is obtained after three weeks and prior to returning to the gather.

C. WH&B's, saddle horses, and pilot horses showing signs of infectious disease must be examined by the on-site/on-call veterinarian.

1. Any saddle or pilot horses showing signs of infectious disease (fever, nasal discharge or illness) must be removed from service and isolated from other animals on the gather until such time as the horse is free from signs of infectious disease and approved by the on-site/on-call veterinarian to return to the gather.
2. WH&B's showing signs of infectious disease will normally not be mixed with groups of healthy WH&B's at the temporary holding facility, or during transport..

PUBLIC AND MEDIA INTERACTION

a. Due to heightened public interest in wild horse and burro gathers, the BLM expects an increasing number of requests from the public and media to view the operation. All requests received by the Contractor to view gather operation shall be forwarded to the BLM, who will provide a person with the expertise necessary to escort the public and media. The safety of the WHB's, BLM employees, Contractor crew, Contractor's private animals, and the media and

public will be the first priority in determining whether a viewing opportunity will be provided, and if so, the time, location, and conditions associated with the viewing opportunity.

b. Assuming the BLM determines that providing a viewing opportunity for the media and the public is appropriate, the Contractor will establish the viewing area in accordance with instructions from the LCOR/COR/PI and current wild horse and burro program policy and guidance. BLM's observation policy will be discussed with the contractor during the pre-work meeting.

c. Member(s) of the viewing public or media whose conduct interferes with the gather operation in a way that threatens the safety of the WH&B's, BLM employees, contractor crew (including animals), the media, or the public will be warned once to terminate the conduct. If the conduct persists, the offending individual(s) will be asked to leave the viewing area and the gather operation. The LCOR/COR/PI may direct the Contractor to temporarily shut down the gather operation until the situation is resolved.

d. Under no circumstances will the public or any media or media equipment be allowed in or on the gather helicopter or on the trap or holding equipment. The public, media, and media equipment must be at least 500 feet away from the trap during the trapping operation.

e. The public and media may be escorted closer than 500 feet to the trap site if approved by the LCOR/COR and in consultation with the Contractor during the time between gather runs or before or after the gather operation.

f. The Contractor shall not release any information to the news media or the public regarding the activities being conducted under this contract. All communications regarding BLM WH&B management, including but not limited to media, public and local stakeholders, are to come from the BLM unless it expressly authorizes the Contractor to give interviews, etc.

CONTRACTOR-FURNISHED PROPERTY

a. As specified herein, it is the contractor's responsibility to provide all necessary support equipment and vehicles including weed seed free hay and water for the captured animals and any other items, personnel, vehicles (which shall include good condition trucks and stock trailers to haul horses and burros from the trap site to the holding facility and two tractor trailers in good condition to haul horses from the holding facility to the preparation facility), saddle horses, etc. to support the humane and compassionate capture, care, feeding, transportation, treatment, and as appropriate, release of WHB's. Other equipment includes but is not limited to, a minimum 2,500 linear feet of 72-inch high (minimum height) panels for horses or 60-inch high (minimum height) for burros for traps and holding facilities. Separate water troughs shall be provided at each pen where animals are being held meeting the standards in section C.6. Water troughs shall be constructed of such material (e.g., rubber, galvanized metal with rolled edges, rubber over metal) so as to avoid injury to the animals.

b. The Contractor shall provide a radio transceiver to insure communications are maintained with the BLM project PI when driving or transporting the wild horses/burros. The contractor needs to insure communications can be made with the BLM and be capable of operating in the

150 MHz to 174 MHz frequency band, frequency synthesized, CTCSS 32 sub-audible tone capable, operator programmable, 5kHz channel increment, minimum 5 watts carrier power.

c. The Contractor shall provide water and weed seed free hay.

d. The proper operation, service and maintenance of all contractor furnished property is the responsibility of the Contractor.

BLM ROLES AND RESPONSIBILITIES

a. Veterinarian

1. On-site veterinary support must be provided for all helicopter gathers.

2. Veterinary support will be under the direction of the LCOR/COR/PI. Upon request, the on-site/on-call veterinarian will consult with the LCOR/COR/PI on matters related to WH&B health, handling, welfare and euthanasia. All final decisions regarding medical treatment or euthanasia will be made by the on-site LCOR/COR/PI based on recommendations from the on-site veterinarian.

b. Transportation

1. The LCOR/COR/PI shall consider the condition and size of the animals, weather conditions, distance to be transported to the final destination or release, recommendations from the contractor and on-site veterinarian and other factors when planning for the movement of captured animals. The LCOR/COR/PI shall provide for any brand inspection services required for the movement of captured animals to BLM prep facilities. If animals are to be transported over state lines the LCOR will be responsible for obtaining a waiver from the receiving State Veterinarian.

2. If the LCOR/COR/PI determines that conditions are such that the animals could be endangered during transportation, the Contractor will be instructed to adjust speed or delay transportation until conditions improve.

GOVERNMENT FURNISHED EQUIPMENT/SUPPLIES/MATERIALS

a. The government will provide:

1. A portable restraining chute for each contractor to be used for the purpose of restraining animals to determine the age of specific individuals or other similar procedures. The contractor will be responsible for the maintenance of the portable restraining chute during the gather season.
2. All inoculate syringes, freezemarking equipment, and all related equipment for fertility control treatments.
3. A boat to transport burros as appropriate.
4. Sleds, slide boards, or slip sheets for loading of recumbent animals.

b. The Contractor shall be responsible for the security of all Government Furnished Property.

SITE CLEARANCES

a. Prior to setting up a trap or temporary holding facility, BLM will conduct all necessary legal reviews and clearances (NEPA, ARPA, NHPA, etc.). All proposed site(s) must be inspected by a government archaeologist. Once archaeological clearance has been obtained, the trap or temporary holding facility may be set up. Said clearance shall be coordinated and arranged for by the COR/ PI, or other BLM employees.

Water and Bait Trapping Standard Operating Procedures

The work consists of the capture, handling, care, feeding, daily rate and transportation of wild horses and/or burros from the States of Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah and Wyoming. The method of capture will be with the use of bait and/or water traps in accordance with the standards identified in the Comprehensive Animal Welfare Program (CAWP) for Wild horse and Burro Gathers, Bureau of Land Management (BLM) Instruction Memorandum 2015-151 (Attachment 1). Items listed in the sections of the Statement of Work (SOW) either are not covered or deviate from the CAWP, the SOW takes precedence over the CAWP when there is conflicting information. Extended care, handling and animal restraint for purposes of population growth suppression treatments may be required for some trapping operations. The contractor shall furnish all labor, supplies, transportation and equipment necessary to accomplish the individual task order requirements with the exception of a Government provided restraint fly chute, as needed for population growth suppression. The work shall be accomplished in a safe and humane manner and be in accordance with the provisions of 43 CFR Part 4700, the CAWP, the specifications and provisions included in this SOW, and any subsequent SOW documents issued with individual task orders. The primary concern of the contractor shall be the safety of all personnel involved and the humane capture and handling of all wild horses and burros. It is the responsibility of the contractor to provide appropriate safety and security measures to prevent loss, injury or death of captured wild horses and burros.

Any reference to hay in this SOW or subsequent SOW documents issued with individual task orders will be implied as certified weed-free hay (grass or alfalfa). The contractor will be responsible for providing certifications upon request from the Government. The COR/PI's will observe a minimum of at least 25% of the trapping activity. BLM reserves the right to place game cameras or other cameras in the capture area to document animal activity and response, capture techniques and procedures, and humane care during trapping. No private/non-BLM camera will be placed within the capture areas.

Trapping activities would be on the HA/HMA/WHBT or outside areas specified in the task order. However, trapping could be required on adjacent land, federal, state, tribal, military, or private property. If trapping operations include work on military and/or other restricted areas, the BLM will coordinate all necessary clearances, such as background checks, to conduct operations for equipment and personnel.

The permissions to use private/state/tribal lands during task order performance will be coordinated by the BLM, contractor, and landowner. The need for these permissions will be identified in the Task Order SOW and will be obtained in writing.

Prior to any gathering operation, the BLM will provide for a pre-capture evaluation of existing conditions in the gather area(s). The evaluation will include animal conditions, prevailing temperatures, drought conditions, soil conditions, road conditions, and preparation of a topographic map with wilderness boundaries, the location of fences, other physical barriers, and acceptable gather site locations in relation to animal distribution. The evaluation will determine whether the proposed activities will necessitate the presence of a veterinarian during operations. If it is determined that capture operations necessitate the services of a veterinarian, one would be obtained before the capture would proceed. The contractor will be apprised of all conditions and will be given instructions regarding the capture and handling of animals to ensure their health and welfare is protected.

Gather sites and temporary holding sites will be located to reduce the likelihood of undue injury and stress to the animals, and to minimize potential damage to the natural and cultural resources of the area. Temporary holding sites would be located on or near existing roads.

Bait Trapping - Facility Design (Temporary Holding Facility Area and Traps)
All trap and temporary holding facility areas locations must be approved by the COR and/or the Project Inspector (PI) prior to construction and/or operation. The contractor may also be required to change or move trap locations as determined by the COR/PI. All traps and temporary holding facilities not located on public land must have prior written approval of the landowner or other management agency.

Facility design to include traps, wings, alleys, handling pens, finger gates, and temporary holding facilities, etc. shall be constructed, maintained and operated to handle the wild horses and burros in a safe and humane manner in accordance with the standards identified in the Comprehensive Animal Welfare Program (CAWP) for Wild Horse and Burro Gathers, Bureau of Land Management (BLM) Instruction Memorandum 2015-151 (Attachment 1).

Some gather operations will require the construction of an off-site temporary holding facility as identified in specific individual task orders for extended care and handling for purposes of slow trapping conditions or management activities such as research, population growth suppression treatments, etc.

No modification of existing fences will be made without authorization from the COR/PI. The contractor shall be responsible for restoring any fences that are modified back to the original condition.

Temporary holding and sorting pens shall be of sufficient size to prevent injury due to fighting and trampling. These pens shall also allow for captured horses and burros to move freely and have adequate access to water and feed.

All pens will be capable of expansion when requested by the COR/PI.

Separate water troughs shall be provided for each pen where wild horses and burros are being held. Water troughs shall be constructed of such material (e.g., rubber, plastic, fiberglass,

galvanized metal with rolled edges, and rubber over metal) so as to avoid injury to the wild horses and burros.

Any changes or substitutions to trigger and/or trip devices previously approved for use by the Government must be approved by the COR prior to use.

Bait Trapping, Animal Care, and Handling

If water is to be used as the bait agent and the Government determines that cutting off other water sources is the best action to take under the individual task order, elimination of other water sources shall not last longer than a period of time approved by the COR/PI.

Hazing/Driving of wild horses and burros for the purpose of trapping the animals will not be allowed for the purposes of fulfilling individual task orders. Roping will be utilized only as directed by the COR.

Darting of wild horses and burros for trapping purposes will not be allowed.

No barbed wire material shall be used in the construction of any traps or used in new construction to exclude horses or burros from water sources.

Captured wild horses and burros shall be sorted into separate pens (i.e. by age, gender, animal health/condition, population growth suppression, etc.).

A temporary holding facility area will be required away from the trap site for any wild horses and burros that are being held for more than 24 hours.

The contractor shall assure that captured mares/jennies and their dependent foals shall not be separated for more than 4 hours, unless the COR/PI determines it necessary.

The contractor shall provide a saddle horse on site that is available to assist with the pairing up of mares/jennies with their dependent foals and other tasks as needed.

Contractor will report any injuries/deaths that resulted from trapping operations as well as preexisting conditions to the COR/PI within 12 hours of capture and will be included in daily gather activity report to the COR.

The COR/PI may utilize contractor constructed facilities when necessary in the performance of individual task orders for such management actions as population growth suppression, and/or selecting animals to return to the range.

In performance of individual task orders, the contractor may be directed by the COR to transport and release wild horses or burros back to the range.

At the discretion of the COR/PI the contractor may be required to delay shipment of horses until the COR/PI inspects the wild horses and burros at the trap site and/or the temporary holding facility prior to transporting them to the designated facility.

Wild Horse and Burro Care and Biosecurity
The contractor shall restrain sick or injured wild horses and burros if treatment is necessary in consultation with the COR/PI and/or veterinarian.

Any saddle or pilot horses used by the contractor will be vaccinated within 12 months of use (EWT, West Nile, Flu/rhino, strangles).

Transportation and Animal Care
The contractor, following coordination with the COR, shall schedule shipments of wild horses and burros to arrive during the normal operating hours of the designated facility unless prior approval has been obtained from the designated facility manager by the COR. Shipments scheduled to arrive at designated facilities on a Sunday or a Federal holiday requires prior facility personnel approval.

All motorized equipment employed in the transportation of captured wild horses and burros shall be incompliance with appropriate State and Federal laws and regulations.

Sides or dividers of all trailers used for transporting wild horses and burros shall be a minimum height of 6 feet 6 inches from the floor. A minimum of one full height partition is required in each stock trailer. All trailers shall be covered with solid material or bars to prevent horses from jumping out.

The contractor shall consider the condition and size of the wild horses and burros, weather conditions, distance to be transported, or other factors when planning for the movement of captured wild horses and burros.

The Government shall provide for any brand and/or veterinary inspection services required for captured wild horses and burros. Prior to shipping across state lines the Government will be responsible for coordinating with the receiving state veterinarian to transport the animals without a health certificate or coggins test. If the receiving state does not agree to grant entry to animals without a current health certificate or coggins test, the Government will obtain them prior to shipment.

When transporting wild horses and burros, drivers shall inspect for downed animals a minimum of every two hours when travelling on gravel roads or when leaving gravel roads onto paved roads and a minimum of every four hours when travelling on paved roads. a)

Euthanasia or Death
The COR/PI will determine if a wild horse or burro must be euthanized and will/may direct the contractor to destroy the animal in accordance with the BLM Animal Health, Maintenance, Evaluation, and Response Instruction Memorandum, 2015-070 (Attachment 2). Any contractor personnel performing this task shall be trained as described in this Memorandum.

Pursuant to the IM 2015-070 the contractor may be directed by the Authorized Officer and/or COR to humanely euthanize wild horses and burros in the field and to dispose of the carcasses in accordance with state and local laws.

Safety and Communication
The nature of work performed under this contract may involve inherently hazardous situations. The primary concern of the contractor shall be the safety of all personnel involved and the humane handling of all wild horses and burros. It is the responsibility of the contractor to provide appropriate safety and security measures to prevent loss, injury or death of captured wild horses and burros until delivery to the final destination.

The BLM reserves the right to remove from service immediately any contractor personnel or contractor furnished equipment which, in the opinion of the COR and/or CO violate contract rules, are unsafe or otherwise unsatisfactory. In this event, BLM will notify the contractor to furnish replacement personnel or equipment within 24 hours of notification. All such replacements must be approved in advance by the COR and/or CO.

Contractor personnel who utilize firearms for purposes of euthanasia will be required to possess proof of completing a State or National Rifle Association firearm safety certification or equivalent (conceal carry, hunter safety, etc.).

All accidents involving wild horses and burros or people that occur during the performance of any task order shall be immediately reported to the COR/PI.

The contractor shall have the means to communicate with the COR/PI and all contractor personnel engaged in the capture of wild horses and burros utilizing a cell/satellite phone or radio at all times during the trapping operations. The Contractor will be responsible for furnishing all communication equipment for contractor use. BLM will provide the frequency for radio communications.

The contractor will provide daily gather activity reports to the COR/PI if they are not present.

Public and Media
Due to increased public interest in the Wild Horse and Burro Gathers, any media or visitation requests received by the contractor shall be forwarded to the COR immediately. Only the COR or CO can approve these requests.

The Contractor shall not post any information or images to social media networks or release any information to the news media or the public regarding the activities conducted under this contract.
If the public or media interfere in any way with the trapping operation, such that the health and well-being of the crew, or horses and burros are threatened, the contractor will immediately report the incident to the COR and trapping operations will be suspended until the situation is resolved as directed by the COR.

1. All motorized equipment employed in the transportation of captured animals shall be in compliance with appropriate State and Federal laws and regulations applicable to the humane transportation of animals. The Contractor shall provide the COR/PI with a current safety inspection (less than one year old) for all motorized equipment and tractor-trailers used to transport animals to final destination.

2. All motorized equipment, tractor-trailers, and stock trailers shall be in good repair, of adequate rated capacity, and operated so as to ensure that captured animals are transported without undue risk or injury.

3. Only tractor-trailers or stock trailers with a covered top shall be allowed for transporting animals from gather site(s) to temporary holding facilities and from temporary holding facilities to final destination(s). Sides or stock racks of all trailers used for transporting animals shall be a minimum height of 6 feet 6 inches from the floor. Single deck tractor-trailers 40 feet or longer shall have two (2) partition gates providing three (3) compartments within the trailer to separate animals. Tractor-trailers less than 40 feet shall have at least one partition gate providing two (2) compartments within the trailer to separate the animals. Compartments in all tractor-trailers shall be of equal size plus or minus 10 %. Each partition shall be a minimum of 6 feet high and shall have a minimum 5 foot wide swinging gate. The use of double deck tractor-trailers is unacceptable and shall not be allowed.

4. All tractor-trailers used to transport animals to final destination(s) shall be equipped with at least one (1) door at the rear end of the trailer which is capable of sliding either horizontally or vertically. The rear door(s) of tractor- trailers and stock trailers must be capable of opening the full width of the trailer. Panels facing the inside of all trailers must be free of sharp edges or holes that could cause injury to the animals. The material facing the inside of all trailers must be strong enough so that the animals cannot push their hooves through the side. Final approval of tractor-trailers and stock trailers used to transport animals shall be held by the COR/PI.

5. Floors of tractor-trailers, stock trailers and loading chutes shall be covered and maintained with wood shavings to prevent the animals from slipping.

6. Animals to be loaded and transported in any trailer shall be as directed by the COR/PI and may include limitations on numbers according to age, size, sex, temperament and animal condition. The following minimum square feet per animal shall be allowed in all trailers:

a. 11 square feet per adult horse (1.4 linear foot in an 8 foot wide trailer);
b. 8 square feet per adult burro (1.0 linear foot in an 8 foot wide trailer);
c. 6 square feet per horse foal (.75 linear foot in an 8 foot wide trailer);
d. 4 square feet per burro foal (.50 linear feet in an 8 foot wide trailer).

7. The COR/PI shall consider the condition and size of the animals, weather conditions, distance to be transported, or other factors when planning for the movement of captured animals. The COR/PI shall provide for anybrand and/or inspection services required for the captured animals.
8. If the COR/PI determines that dust conditions are such that the animals could be endangered during transportation, the Contractor will be instructed to adjust speed.

Safety and Communications
1. The Contractor shall have the means to communicate with the COR/PI and all contractor personnel engaged in the capture of wild horses and burros utilizing a VHF/FM Transceiver or VHF/FM portable Two-Way radio. If communications are ineffective the government will take steps necessary to protect the welfare of the animals.

a. The proper operation, service and maintenance of all contractor furnished property are the responsibility of the Contractor. The BLM reserves the right to remove from service any contractor personnel or contractor furnished equipment which, in the opinion of the contracting officer or COR/PI violate contract rules, are unsafe or otherwise unsatisfactory. In this event, the Contractor will be notified in writing to furnish replacement personnel or equipment within 48 hours of notification. All such replacements must be approved in advance of operation by the Contracting Officer or his/her representative.

b. The Contractor shall obtain the necessary FCC licenses for the radio system

c. All accidents occurring during the performance of any task order shall be immediately reported to the COR/PI.

Public and Media
Due to heightened public interest in wild horse and burro gathers, the BLM/Contractor may expect an increasing number of requests from the public and media to view the operation.

1. Due to this type of operation (luring wild horses and burros to bait) spectators and viewers will be prohibited as it will have impacts on the ability to capture wild horses and burros. Only essential personnel (COR/PI, veterinarian, contractor, contractor employees, etc.) will be allowed at the trap site during operations.

2. Public viewing of the wild horses and burros trapped may be provided at the staging area and/or the BLM preparation facility by appointment.

3. The Contractor agrees that there shall be no release of information to the news media regarding the removal or remedial activities conducted under this contract.

4. All information will be released to the news media by the assigned government public affairs officer.

5. If the public or media interfere in any way with the trapping operation, such that the health and wellbeing of the crew, horses and burros is threatened, the trapping operation will be suspended until the situation is resolved.

COR/PI Responsibilities
a. In emergency situations, the COR/PI will implement procedures to protect animals as rehab is initiated, i.e. rationed feeding and watering at trap and or staging area.

b. The COR/PI will authorize the contractor to euthanize any wild horse or burros as an act of mercy.

c. The COR/PI will ensure wild horses or burros with pre-existing conditions are euthanized in the field according to BLM policy.

d. Prior to setting up a trap or staging area on public land, the BLM and/or Forest Service will conduct all necessary clearances (archaeological, T&E, etc.). All proposed sites must be inspected by a government archaeologist or equivalent. Once archaeological clearance has been obtained, the trap or staging area may be set up. Said clearances shall be arranged for by the COR/PI.

e. The COR/PI will provide the contractor with all pertinent information on the areas and wild horses and burros to be trapped.

f. The COR/PI will be responsible to establish the frequency of communicating with the contractor.

g. The COR/PI shall inspect trap operation prior to Contractor initiating trapping.

h. The Contractor shall make all efforts to allow the COR/PI to observe a minimum of at least 25% of the trapping activity.

i. The COR/PI is responsible to arrange for a brand inspector and/or veterinarian to inspect all wild horses and burros prior to transporting to a BLM preparation facility when legally required.

j. The COR/PI will be responsible for the establishing a holding area for administering PZP, gelding of stallions, holding animals in poor condition until they are ready of shipment, holding for EIA testing, etc.

k. The COR/PI will ensure the trailers are cleaned and disinfected before WH&B's are transported. This will help prevent transmission of disease into our populations at a BLM Preparation Facility.

Responsibility and Lines of Communication

The Wild Horse Specialist (COR) or delegate has direct responsibility to ensure human and animal safety. The Field Manager will take an active role to ensure that appropriate lines of communication are established between the field, field office, state office, national program office, and BLM holding facility offices.

All employees involved in the gathering operations will keep the best interests of the animals at the forefront at all times.

All publicity and public contact and inquiries will be handled through the Office of Communications. These individuals will be the primary contact and will coordinate with the COR on any inquiries.

The BLM delegate will coordinate with the corrals to ensure animals are being transported from the capture site in a safe and humane manner and are arriving in good condition.

The BLM require humane treatment and care of the animals during removal operations. These specifications are designed to minimize the risk of injury and death during and after capture of the animals. The specifications will be vigorously enforced.

Resource Protection
Gather sites and holding facilities would be located in previously disturbed areas whenever possible to minimize potential damage to the natural and cultural resources.

Gather sites and temporary holding facilities would not be constructed on wetlands or riparian zones.
Prior to implementation of gather operations, gather sites and temporary holding facilities would be evaluated to determine their potential for containing cultural resources. All gather facilities (including gather sites, gather run- ways, blinds, holding facilities, camp locations, parking areas, staging areas, etc.) that would be located partially or totally in new locations (i.e. not at previously used gather locations) or in previously undisturbed areas would be inventoried by a BLM archaeologist or district archaeological technician before initiation of the gather. A buffer of at least 50 meters would be maintained between gather facilities and any identified cultural resources.

Gather sites and holding facilities would not be placed in known areas of Native American concern.

The contractor would not disturb, alter, injure or destroy any scientifically important paleontological remains; any historical or archaeological site, structure, building, grave, object or artifact; or any location having Native American traditional or spiritual significance within the project area or surrounding lands. The contractor would be responsible for ensuring that its employees, subcontractors or any others associated with the project do not collect artifacts and fossils, or damage or vandalize archaeological, historical or paleontological sites or the artifacts within them.

Should damage to cultural or paleontological resources occur during the period of gather due to the unauthorized, inadvertent or negligent actions of the contractor or any other project personnel, the contractor would be responsible for costs of rehabilitation or mitigation. Individuals involved in illegal activities may be subject to penalties under the Archaeological Resources Protection.