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

Environmental Assessment

Wild Horse Gather to Appropriate Management Levels on the Adobe Town, Salt Wells Creek, Great Divide Basin, White Mountain and Little Colorado Herd Management Areas

The BLM's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations. The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

DOI-BLM-WY-D040-2020-0005-EA

Environmental Assessment

for a

Wild Horse Gather to Appropriate Management Levels on the Adobe Town, Salt Wells Creek, Great Divide Basin, White Mountain and Little Colorado Herd Management Areas

Bureau of Land Management
Rock Springs Field Office &
Rawlins Field Office
Wyoming

DOI-BLM-WY-D040-2020-0005-EA

March 2021

Table of Contents

1.0 INTRODUCTION

This Environmental Assessment (EA) has been prepared to analyze and disclose the environmental consequences of gathering wild horses in the Adobe Town, Salt Wells Creek, Great Divide Basin, White Mountain and Little Colorado Herd Management Areas (HMAs), removing excess wild horses, and implementing fertility control treatments to reduce wild horse population growth rates. The BLM has determined, based on review of wild horse population surveys, distribution, and ecological condition data, that an excess population of wild horses exists within these HMAs and proposes to gather and remove excess wild horses to the low Appropriate Management Level (AML). Removing excess wild horses from these HMAs is consistent with Section 3 of the Wild and Free-Roaming Horses and Burros Act of 1971 (WFRHBA), 16 U.S.C. § 1333, as recognized by the Tenth Circuit Court of Appeals in *American Wild Horse Preservation Campaign v. Jewell*, No. 15-8033 (October 14, 2016). Removing wild horses to achieve AML in the HMAs also comports with the 2013 Consent Decree in *Rock Springs Grazing Association v. Salazar* (Civil Action No. 11-CV-263-NDF).

The BLM also has received a written request to remove wild horses from private lands located within and outside the HMA boundaries. Section 4 of the WFRHBA, 16 U.S.C. § 1334, and BLM's regulations direct the BLM to remove stray wild horses from private lands as soon as practicable upon receipt of a written request. BLM has confirmed that wild horses are residing on private land within, and outside, these HMA.s

The proposed action should prevent deterioration of the rangelands and help maintain a "thriving natural ecological balance" (TNEB) and multiple-use relationships for several years.

The Council on Environmental Quality issued new NEPA rules (40 CFR § 1500 et seq.) effective September 14, 2020, which apply to new projects begun on or after September 14, 2020. For this EA, the BLM is using the agency's previous NEPA procedures, in accordance with the regulations that were in place when it initiated this project and solicited public scoping comments.

1.1 Background

The proposed project area includes the Adobe Town, Salt Wells Creek, Great Divide Basin, White Mountain and Little Colorado HMAs, which encompass approximately 3,436,096 acres of public, State and private lands in Carbon, Fremont, Lincoln, Sublette, and Sweetwater counties in southwest Wyoming (see Table 1 and HMA Maps).

Table 1. Project Area and Appropriate Management Level (AML)

HMA	AML	Public Acres (BLM)	State and Private	Total Acres
Adobe Town	610-800	442,428	34,558	476,986
Salt Wells Creek	251-365	689,511	479,777	1,169,288
Great Divide Basin	415-600	559,398	216,791	776,189
White Mountain	205-300	234,527	153,961	388,488
Little Colorado	69-100	610,923	14,221	625,144
Total:	**1,550 – 2,165**	**2,536,787**	**899,308**	**3,436,096**

The total AML for wild horses within these HMAs is 1,550 – 2,165. The AMLs were established in the Green River RMP Record of Decision approved on August 8, 1997 and the Rawlins RMP Record of Decision approved on December 24, 2008. Both planning processes included public involvement. The

AML upper limit is the maximum number of wild horses that can graze while maintaining a thriving natural ecological balance and multiple use relationship on the public lands in the area. Establishing AML as a population range allows for the periodic removal of excess animals (to the low end of the range) and subsequent population growth (to the high end) between removals.

The current estimated 2021 population of wild horses is 5,105. As per BLM Handbook 4700-1 Section 4.2.1, foals do not count toward AML, and are therefore not included in the population estimates, and excess determination. The 2021 population estimate is based on aerial survey flights completed in March of 2019 in the Adobe Town, Salt Wells Creek, Great Divide Basin, White Mountain, and Little Colorado HMAs. This survey, and the analysis of survey data, were conducted in accordance with the United States Geological Survey (USGS) standard operating procedures for the simultaneous double count observer method (Griffin et al. 2020). The estimated numbers of wild horses present in March 2019 (Table 2) include only adults. A 20% annual herd growth rate was added to the 2019 adult survey counts to calculate the 2020 population estimate, and another 20% was added to calculate the 2021 population estimate. As specified in the 2013 Consent Decree, in years when a wild horse population survey was not conducted, the BLM utilized a 20% annual herd growth rate. Table 2 summarizes the results of the 2019 wild horse population survey as well as the current wild horse population estimates for 2020 and 2021.

When the 2019 population survey was completed, an estimated 427 wild horses (12% of the total number counted) were located outside of the HMAs. Approximately 1,047 wild horses (30% of the total number counted) were located on checkerboard lands. It is likely that these numbers have grown roughly in proportion to the total number of wild horses present within these HMAs in 2021.

Table 2. Current wild horse population estimates, and determination of excess wild horses.

HMA	AML Range	2019 Survey Count	2020 Population Estimate*	2021 Population Estimate**	2021 Excess Wild Horses†
Adobe Town	610 - 800	929	1,115	1,338	728
Salt Wells Creek	251 - 345	745	894	1,073	822
Great Divide Basin	415 - 600	1,069	1,283	1,539	1,124
White Mountain	205 - 300	391	469	563	358
Little Colorado	69 - 100	411	493	592	523
Total:	**1,550 – 2,145**	**3,545**	**4,254**	**5,105**	**3,555**

To account for recruitment, a 20 percent annual herd growth rate was included in each population estimate as follows:
*The 2020 population estimate is calculated by adding the estimated annual growth rate (20%) to the estimated numbers of adult wild horses in the 2019 survey count.
**The 2021 population estimate is calculated by adding the estimated annual growth rate (20%) to the 2020 population estimate.
†The number of excess wild horses is calculated by subtracting low AML range from the 2021 population estimate.

Based upon all information available at this time, the BLM has determined that 3,555 excess wild horses are present within the HMAs and need to be removed in order to maintain a thriving natural ecological balance. Based on current estimates, wild horse populations within these HMAs exceed high AML by 2,960, which means the total population is more than double the established high AML. AML was established for these HMAs to help ensure wild horse populations allow for a TNEB. Continued use of forage and water resources at the current population levels is expected to have a detrimental impact to

rangeland health, and overall TNEB if actions are not taken to reduce the population in these areas. These detrimental impacts may be exacerbated if current drought conditions on these HMAs persist.

Historically, the BLM has encountered challenges with managing some of these HMAs due to the presence of a "checkerboard" land ownership pattern, in which every other section is public lands, and the alternate sections are private or state-owned lands (see Glossary). While the Rock Springs Grazing Association (RSGA) (one of the primary private landowners within these HMAs) had historically allowed wild horses to utilize their private lands in the checkerboard, in 2010 RSGA revoked its consent and requested that the BLM remove wild horses in accordance with Section 4 of the WFRHBA (16 U.S.C. 1334). A subsequent lawsuit by the RSGA, *Rock Springs Grazing Association v. Salazar*, No. 11- CV-00263-NDF, (D. Wyo.), was settled through a 2013 Consent Decree and Joint Stipulation for Dismissal ("Consent Decree").

In November 2013, the BLM conducted a gather in the Adobe Town and Salt Wells Creek HMAs to remove wild horses on public and private lands within the HMAs. During this gather the BLM removed 586 wild horses from private and public lands within these HMAs. The BLM treated 40 mares with Porcine Zona Pellucida-22 (a form of immunocontraceptive) and released them back into the Adobe Town HMA. Once wild horses had been removed to low AML, the BLM concluded gather operations leaving some wild horses still within the checkerboard portions of the HMA.

Following this gather the RSGA notified the BLM that they believed this gather was not conducted in accordance with the Consent Decree, which they claimed required that the BLM remove all wild horses from the checkerboard lands. In response to this the BLM conducted a removal in September of 2014. This removal of all wild horses from the checkerboard was conducted under Section 4 of the WFRHBA. The BLM removed a total of 1,263 wild horses from the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs in the 2014 gather.

The decision to conduct the 2014 gather was challenged in *American Wild Horse Preservation Campaign v. Jewell*, No 14-cv-152-NDF (D. Wyo.). On March 3, 2015, the U.S. District Court affirmed the BLM's actions under the WFRHBA but remanded the BLM actions under NEPA. The decision of the District Court was appealed to the United States Court of Appeals for the Tenth Circuit. On October 14, 2016, the Court of Appeals reversed the decision of the District Court and held that BLM had violated both the WFRHBA and the Federal Land Policy and Management Act of 1976 (FLPMA). The Court of Appeals ruled that the BLM had erroneously relied on its authority under Section 4 (the authority to remove wild horses from private lands), to remove animals from public lands. The Court of Appeals also held that the BLM had violated FLPMA by failing to maintain AML within the HMAs, notwithstanding the terms of the Consent Decree.

Another gather was conducted in 2017, in which wild horses were removed on the Adobe Town, Salt Wells Creek and Great Divide Basin HMAs. A total of 1,968 adults and 408 foals were gathered and removed from these HMAs. The American Wild Horse Campaign challenged this gather in District Court (*AWHC v. Zinke* 17-CV-0170-NDF), claiming that BLM did not properly communicate the way foals were being counted for this gather in the EA. While the District Court did not grant a stay to prevent the gather from occurring, it later determined that BLM did not clearly describe the method in which foals would be counted in the EA and Decision. It therefore remanded the EA, FONSI and Decision back to the BLM.

<u>Relationship to the Ongoing Wild Horse RMP Amendment</u>

The BLM Rock Springs and Rawlins Field Offices are currently in the process of amending the RMP for wild horse management in HMAs that include checkerboard land. This includes the Adobe Town, Salt Wells Creek, Great Divide Basin and Salt Wells Creek HMAs. The Little Colorado HMA does not include any checkerboard land and is not included in the RMP Amendment. A Draft EIS was released to the public on January 31, 2020. The actions proposed in this EA address the issue of excess wild horses present on these HMAs, consistent with the current Green River and Rawlins RMPs. The actions considered here would not foreclose any of the alternatives under consideration in the ongoing RMP amendment process.

1.2 Purpose and Need for the Proposed Action

The purpose of the Proposed Action is: 1) to address an overpopulation of wild horses within the HMAs to achieve a TNEB, 2) to prevent deterioration of the rangeland from this overpopulation, 3) to remove wild horses from public lands outside the HMAs in areas not designated for their long-term use, and 4) to remove wild horses from private lands at the landowner's request.

The need for this action derives from the requirements of the WFRHBA and the 2013 Consent Decree. Section 3(b)(2) of the Act, 16 U.S.C. § 1333(b)(2), as amended, directs the BLM to remove excess wild horses to achieve and maintain an appropriate wild horse population size within the established AMLs, to protect rangeland resources from further deterioration associated with the current overpopulation, and restore a TNEB and multiple use relationship on public lands in the area.[1] Removal of wild horses to achieve AML is also consistent with the 2013 Consent Decree and the Federal Land Policy and Management Act (FLPMA).

Section 4 of the WFRHBA, 16 U.S.C. § 1334, directs the BLM to remove wild horses from private land upon the request of the landowner. Wild horses are present on private lands within these HMAs, and the private landowner has requested their removal.

Decision to be Made:
Based on the analysis presented in the EA, the authorized officer will select an alternative that meets the purpose and need for the action. The BLM authorized officer will decide how to respond to the overpopulation of wild horses and the presence of wild horses on private lands. The authorized officer will decide whether to gather, remove, and/or implement population growth suppression strategies for wild horses in the Adobe Town, Salt Wells Creek, Great Divide Basin, White Mountain and Little Colorado HMAs.

The decision to be made would not set or adjust AMLs or livestock use, which were established in the current RMPs and applicable grazing permits. Changes regarding long-term management within the HMAs may be made in future planning processes.

1.3 Relationship to Statutes, Regulations, Land Use Plans, Agreements, and Policies

Statutes and Regulations

[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 vs. Clark, supra at 594, the 'benchmark test' for determining the suitable number of wild horses on the public range is 'thriving natural 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 natural ecological balance (TNEB) between WH&B populations, wildlife, livestock and vegetation, and to protect the range from the deterioration associated with overpopulation of wild horses and burros.'"

The Action Alternatives comport with the WFRHBA, FLPMA, applicable regulations in 43 CFR part 4700, and BLM policies.

Land Use Plans
The Action Alternatives conform with both the 1997 Green River RMP, as amended, and the 2008 Rawlins RMP, as amended.

The Rawlins RMP objectives for managing wild horses are to: 1) Maintain wild horse populations within the AML of the HMA; 2) Manage wild horses to meet the Wyoming Standards for Healthy Rangelands; 3) Identify existing genotypes and phenotypes through recognized means of genetic evaluation and maintain genetic integrity; 4) Maintain the health of wild horse herds at a level that prevents adverse effects to domestic horse populations; 5) Maintain habitat for existing AMLs; and 6) Conduct all activities in compliance with relevant court orders and agreements. The following pertinent Management Actions are identified: 1) Conduct regular, periodic gathers when necessary to maintain AMLs; 2) Utilize monitoring and evaluation data to maintain habitat within HMAs; 3) Conduct animal health monitoring; 4) Employ selective removal criteria during periodic gathers to increase the recognized occurrence of the New World Iberian genotype and associated phenotype above current levels; 5) The AML for the Adobe Town HMA will remain at 700 adults… These AMLs could change based on future monitoring; 6) Manage wild horses to meet the Wyoming Standards for Healthy Rangelands.

The Green River RMP states: "Selective gathering programs will be implemented in each of the wild horse herd management areas. Gathering plans will be prepared for the removal of excess wild horses from inside and outside the wild horse herd management areas. Gathering cycles will vary by plan objectives, resource conditions, and needs. Fertility control will be initiated only if necessary. These actions will aid in stabilizing populations, managing for conditions and special characteristics, and supply an adoptable population (young horses)."

While the Green River RMP states that fertility control will be initiated only if necessary, the BLM has determined that the use of fertility control is necessary at this time. The BLM has conducted gathers on these HMAs in 2010, 2011, 2013, 2014 and 2017. Nationally, there is a shortage of off range corrals and off range pastures relative to the number of wild horses that need to be removed from the range. Furthermore, the BLM recently released an Instruction Memorandum (IM 2020-012) that directed authorized officers to consider the use of fertility control, sex ratio skewing and non-reproducing animals in all gather planning documents. The purpose of this direction was to "reduce population growth rates and extend the time between gathers." After carefully considering all these matters, the BLM has determined that the use of fertility control on these HMAs is necessary at this time.

April 2013 Consent Decree, Rock Springs Grazing Association v. Salazar (Civil Action No. 11-CV-263-NDF)
The proposed action and other action alternatives are consistent with the 2013 Consent Decree, in which BLM agreed to conduct gathers in several of the HMAs within the project area.

Rangeland Health Standards and Guidelines
The proposed action and other action alternatives conform with the BLM Wyoming "Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management" (BLM 1997b) by promoting the health of the public lands within each HMA.

1.4 Scoping and Public Involvement

On November 21, 2019, the BLM announced public scoping for this proposed wild horse gather. The BLM received a total of 556 scoping comment letters from individuals, organizations, and agencies. Of these, 357 letters were unique, 188 were form letters, and 11 were duplicates. All comment letters were reviewed and considered. The BLM identified 899 individual comments (see Appendix A). A summary of these comments is provided in Table 3. The BLM also used an interdisciplinary team to identify potential resource issues associated with the proposed action.

Table 3. Summary of Scoping Comments by Subject

Subject	Number of Comments
AML / TNEB	33
Conflicts with Livestock or Energy Development	129
Conflicts with Wildlife	18
Family Bands	22
Fertility Control & Sex Ratio Skewing	214
Financial Costs & Socioeconomics	55
Genetics	17
Habitat Improvements for Wild Horses	7
Health, Safety and Human Treatment of Wild Horses	25
Helicopter Gathers and Bait Trapping	41
Land Swaps	1
Monitoring Data	7
NEPA Compliance	103
Off Range Corrals and Pastures	22
Past Litigation	18
Population Surveys, Population Growth Rates & Counting of Foals	113
Private Land Rights	7
Public Viewing of Wild Horses	19
Rangeland Health	16
Slaughter of Wild Horses	30
Wild Horses Outside HMAs	2
Total:	**899**

1.5 Issues Identified for Analysis

While many issues may arise during scoping, not all issues raised warrant analysis in an EA. Issues will be analyzed if: 1) an analysis of the issue is necessary to make a reasoned choice between alternatives, or 2) the issue is associated with a significant direct, indirect, or cumulative impact, or where analysis is necessary to determine the significance of the impacts. The BLM has reviewed the topics identified through scoping and determined that the following issues require additional analysis (see section 3).

- How would the proposed population growth suppression activities affect wild horses?
- How would gather operations affect wild horses?

- How would the proposed action affect the genetic diversity of the herd? How would it affect the herd's ability to maintain a self-sustaining population?
- How would the proposed action affect livestock operations within these HMAs?
- How would the concentration of wild horses at trap sites affect vegetation, special status plants and soils?
- How would the proposed action affect rangeland health?
- How would gather operations impact big game habitat on crucial winter range?
- How would the removal of wild horses affect sage-grouse habitat in PHMA?
- How would gather operations affect raptors and migratory birds that are present within these HMAs?
- How would the removal of wild horses affect recreational wild horse viewing?
- How would gather operations affect recreational hunting experiences?

1.6 Issues not Analyzed in Detail

The following issues were identified through scoping but are not analyzed in detail in this document:

Would wild horses removed from the HMAs be euthanized or sent to slaughter?
Under current policy, the BLM does not sell or send wild horses or burros to slaughter. The BLM takes measures to ensure wild horses that are sold or adopted are not sent to slaughter.

Would wild horses be treated humanely as part of this action?
In conducting all wild horse gather, removal and fertility treatment operations, BLM follows a set of best management practices to protect the health and safety of wild horses. PIM 2021-002 establishes policy for the Comprehensive Animal Welfare Program (CAWP). BLM follows this policy in all operations to ensure wild horses are treated humanely. BLM's CAWP is provided in Appendix F.

Should wild horses be treated as a BLM Sensitive Species?
The BLM does not classify wild horses as a sensitive species, as wild horses do not meet the criteria for designation as a BLM Sensitive Species.

How would the concentration of wild horses at trap sites affect cultural resources?
BLM endeavors to locate trap sites in previously disturbed areas. Prior to using any new trap site, BLM archeologists would evaluate the site to ensure no sensitive cultural resources are present. A site would not be cleared for use, if any sensitive cultural resources are present. This will avoid any potential impacts to cultural resources.

How would the proposed action affect mule deer habitat within the Sublette Mule Deer Migration Corridor?
The primary concern with big game migration corridors is the ability of animals to move through the area. The proposed action would not effect the movement of mule deer in this area. Areas of the corridor where limited forage could be a concern are within areas classified as crucial winter range, so the analysis in Section 3.7 considers potential impacts to this habitat.

How would gather operations impact Greater sage-grouse during critical breeding and nesting periods?
By policy, the BLM cannot conduct wild horse gathers by helicopter during the peak foaling period (March 1 to June 30) (see BLM Handbook 4700-1 Section 4.4.4). Timing restrictions to protect sage-grouse during critical breeding and nesting periods span March 15 to June 30. The timing restriction on

helicopter gathers eliminates any potential impact to sage-grouse during critical breeding and nesting periods.

How many additional livestock would be placed on the range following the removal of wild horses?
None of the alternatives in this EA propose adjustments to permitted livestock use following the gather. Changes in the amount of forage allocated for livestock use are done through land use planning decisions. Information regarding the amount of forage permitted for livestock use is provided in Section 3.4 of the EA.

2.0 PROPOSED ACTION AND ALTERNATIVES

This section of the EA describes the action alternatives, and alternatives that were considered but eliminated from detailed analysis. Based upon all information available at this time, the BLM has determined that approximately 3,555 excess wild horses need to be removed from the Adobe Town, Great Divide Basin, Little Colorado, Salt Wells Creek, and White Mountain HMAs (see Table 2) to achieve AML and maintain a thriving natural ecological balance on the range, and to remove wild horses from private lands.

Based on current BLM policy and information compiled during scoping, the BLM has developed the following alternatives:

- Alternative I: No Action Alternative.
- Alternative II: (Proposed Action) Gather to the Low End of AML and Use Non-Permanent Fertility Control Treatments - immunocontraceptives and intrauterine devices (IUDs).
- Alternative III: Gather to the Low End of AML and Do Not Use Fertility Control Treatments.
- Alternative IV: Gather to the Low End of AML and remove excess wild horses, spay 100 mares, neuter 100 studs, and apply immunocontraceptives to remaining released mares and implement sex ratio skewing 60% stallions and 40% mares.

The alternatives were developed to meet the BLM purpose and need for the action. All action alternatives would comply with current BLM policy, including PIM 2021-002, which provides direction on protecting the health and well-being of wild horses during gather and removal activities (see Appendix F). It defines standards, training, and monitoring for conducting safe, efficient, and successful gather operations while ensuring humane care and handling of animals gathered.

Implementation of the selected alternative could occur as early as July of 2021. Depending on program funding and holding space for wild horses, implementation could take place entirely in 2021 (i.e. on all HMAs) or could occur sequentially over the next several years (i.e. gathering a few HMAs each year, until implementation is completed). If implementation occurs over multiple years, there will not be any change to the number of wild horses that would be gathered, removed or treated under any of the alternatives.

Management Actions Common to All Action Alternatives

- All capture and handling activities would be conducted in accordance with the SOPs described in Appendices E and F. Multiple capture sites (traps) would be used to capture wild horses within and outside of the HMAs. Whenever possible, capture sites would be located in previously disturbed areas. Capture techniques would include the helicopter-drive trapping method and/or helicopter-roping from horseback. Bait trapping may also be utilized on a limited basis, as needed.

- An Animal and Plant Health Inspection Service (APHIS) veterinarian would be on-site, as needed, to examine animals and make recommendations to the BLM for care and treatment of wild horses in accordance with IM 2015-070. If an APHIS veterinarian is not available, the BLM would coordinate with a private practice veterinarian for on-call or referral services as needed. On-site inspection by an APHIS veterinarian is required for any animals to be transported across State borders without testing for Equine Infectious Anemia (EIA) prior to transport. Decisions to humanely euthanize animals in field situations would be made in conformance with BLM policy (IM 2015-070). Conditions requiring humane euthanasia occur infrequently and are described in more detail in IM 2015-070.
- Selection of animals for removal and/or release would be guided by IM 2010-135.
- The BLM is committed to the humane treatment and care of wild horses and burros through all phases of its program. The gathering of wild horses will be in accordance with PIM 2021-002 *Wild Horse and Burro Comprehensive Animal Welfare Program* (see Appendix F).
- All wild horses outside of the established boundaries of the HMAs in areas not designated for wild horse management would be removed from these areas.
- Wild horses removed from the range would be shipped to BLM holding facilities in Rock Springs, Wyoming, Wheatland, Wyoming, Cañon City, Colorado and/or any other BLM holding facility, where they would be prepared for adoption or sale to qualified individuals. Wild horses that do not meet adoption age or temperament criteria may be shipped to off range pastures. All shipping activities would be conducted according to BLM policy to ensure the humane treatment of wild horses.
- The BLM would provide the public and media with safe and transparent visitation at wild horse gather operations in accordance with IM 2013-058. To protect spectators, workers and the wild horses, only authorized personnel would be allowed on site during the removal operations. Designated visitor areas will be established at each trap site to allow spectators to view the gather operation from a safe location.
- Advance planning for observation of gather operations can minimize the potential for unanticipated situations to occur and ensure the safety of the animals, staff, and Contractor personnel, as well as the public/media. In response to this, an Incident Command System will be followed during the gather operations as guided by IM 2013-060.
- Wild horses will be gathered primarily via helicopter drive-trapping. As needed, some animals may be captured using helicopter-assisted roping or bait-trapping.
- Helicopter drive-trapping and helicopter-assisted roping would not be conducted between the dates of March 1 and June 30 which is the natural peak foaling period. The BLM Wild Horse and Burro Handbook, H-4700-1, Section 4.4.4 prohibits the capture of wild horses by helicopter during peak foaling periods except in case of emergency.
- After wild horses are captured at a trap site, they would be transported via trailers to a temporary holding facility where they would receive food, water and any needed veterinarian care. Temporary holding facilities and trap sites may be located on either public or private lands in these HMAs, due to the land ownership pattern present in the area (the checkerboard).
- Prior to commencement of gathering operations, the BLM would notify the public with a press release with the location, date, and time associated with the gather operation.
- BLM would inform Wyoming Game and Fish (WG&F) about any gather operations that are likely to occur. WG&F may inform any big game permit holders in the area in advance of the gather activities if deemed necessary.
- All hay fed at trap sites or holding facilities, would be certified as weed free.

- All equipment used for gathering operations shall be cleaned before arrival to minimize the potential spread of noxious and/or invasive weed species.
- To prevent impacts to cultural resources, trap sites and temporary holding facilities would be located in previously disturbed areas. Cultural resource inventory and clearance would be required prior to using new trap sites or holding facilities outside existing areas of disturbance.
- To prevent any impacts to sensitive wildlife species or special status plant species, trap sites and temporary holding facilities would be located in areas where no impacts to these resources would be expected. A wildlife biologist would be consulted for clearance of trap sites and holding facilities.
- While foals do not count toward AML until January 1st of the year after they were born (see BLM Handbook 4700-1 Section 4.2.1), foals will count toward the total number of wild horses to be gathered and removed as part of these actions. Therefore, the 3,555 excess wild horses that will be removed from the range will be comprised of both adults and foals.

2.1 Alternative I – No Action Alternative

Under the No Action Alternative, the BLM would not conduct a gather to remove excess wild horses within the project area. There would be no active management to control the size of the wild horse populations at this time. Wild horse populations would continue to exceed AML and would continue to increase by approximately 20% annually. There would be no removal of wild horses from private lands within the HMAs.

The No Action Alternative would not comply with:

- The WFRHBA's directive to protect the range from deterioration associated with an overpopulation of wild horses, and to preserve and maintain a TNEB
- Applicable federal regulations and Bureau policy
- FLPMA's directives to manage public lands on the basis of multiple use and sustained yield, and prevent unnecessary or undue degradation of the public lands
- Wyoming's Rangeland Health Standards and Guidelines for Livestock Grazing Management
- 2013 Consent Decree.

The No Action Alternative is included as a baseline for comparison with the action alternatives, as required under NEPA.

2.2 Alternative II – Proposed Action – Gather to Low End of AML and use Non-permanent Fertility Control

Under the Proposed Action the BLM would gather approximately 4,397 wild horses from these five HMAs (including wild horses that have strayed outside their HMA boundary). Of these, 3,555 would be selectively removed (as per IM 2010-135) as excess wild horses (see Table 2), and 842 would be released back into the HMAs, after mares had been treated with fertility control. An estimated 420 mares would be treated with an immunocontraceptive vaccine, such as PZP or GonaCon, and released back into the HMAs. Approximately 290 mares that are treated with an immunocontraceptive vaccine would also have an IUD inserted. The projected wild horse population remaining on these HMAs following the gather would be about 1,550 wild horses (the low AML for these HMAs, see Table 2). Of these, 19% would have received an IUD, and 27% would have undergone temporary fertility control via an

immunocontraceptive vaccine. For a summary of the actions proposed under this alternative, by HMA, see Table 4.

Table 4. Summary of the Proposed Action by HMA.

HMA	Number to be Gathered	Number to be Permanently Removed	Studs to be Returned Untreated	Mares to be Treated with an Immunocontraceptive Vaccine and Returned to these HMAs	Mares to Receive an IUD
Adobe Town	1,137	728	205	204	150
Salt Wells Creek	912	822	45	45	30
Great Divide Basin	1,308	1,124	92	92	65
White Mountain	478	358	60	60	34
Little Colorado	562	523	20	19	11
Totals:	**4,397**	**3,555**	**422**	**420**	**290**

The short-term goal of the Proposed Action is to return the wild horse population within the HMAs to AML. The long-term goal is to better maintain the wild horse population within AML and reduce the need for subsequent gathers and removals with the use of fertility control treatments, without jeopardizing the genetic health of the population.

The following design features would apply to this alternative:

- Fertility control treatment would be conducted in accordance with the approved standard operating and post-treatment monitoring procedures. Breeding age mares selected for release back to the range would be treated with approved fertility control measures, to reduce reproduction fertility rates of the treated mares.
- Fertility control vaccine administration would be led by trained BLM personnel only.
- Treated mares would be individually marked with a microchip, and a freeze brand on the left hip with the Wyoming registered brand HB and possibly on the neck with a number signifying the HMA where the mare was captured. Any stallions returned to the range would be marked with a microchip.
- Treated mares with IUDs would be freeze branded and photographed for future identification needs.
- Only a qualified veterinarian would insert IUDs.
- IUDs would not be inserted into pregnant mares.
- The fertility control treatment information will be kept with the fertility treatment report completed after each use.
- In order to manage for the long-term genetic health of the HMAs wild horse population, the BLM may choose to implement selective removal of individual horses or release new animals into the herd. Selective removal procedures would prioritize removal of younger horses to allow older, less adoptable, wild horses to be released back to the HMAs. The selection process would involve

retaining wild horses for their preferred conformation, disposition, color, and other features deemed desirable for adoption.

- All wild horses identified to be returned to the HMAs would be selected to maintain a diverse age structure, herd characteristics, and body type (conformation).
- Baseline DNA samples would be taken from 20 mares and 20 stallions returned to each of the HMAs. Instruction Memorandum 2009-062 provides program guidance and policy for the collection of genetic baseline information for wild horse and burro populations. Additionally, for the Adobe Town HMA, reference photographs would be taken of each wild horse from which a DNA sample is collected, to compare visual characteristics with genetic results. This comparison may inform future management actions by determining if visual characteristics can be reliably used to select for New World Iberian genotypes. The BLM recognizes that in sexually reproducing species, each individual's genotype is unique. In the context of wild horse management, the term 'New World Iberian genotype' refers to genetic traits that are associated with New World Iberian breed types. Selective retention criteria used for the wild horses returned to the Adobe Town HMA would be based on readily recognized phenotypic traits of New World Iberian horses (see Appendix D). New World Iberian phenotypes may or may not be related to the presence of specific alleles. However, wild horses that appear to express a relatively high number of the New World Iberian phenotypic traits would be returned to the Adobe Town HMA. DNA sampling and analysis would be done so that genotypic changes and overall genetic health of the wild horses can be monitored, and management practices can be adapted based on the results of this genetic monitoring (see H-4700-1, Section 4.4.6.4).

2.3 Alternative III – Gather and Removal

Under this alternative the BLM would gather and remove approximately 3,555 wild horses from these five HMAs (including wild horses that have strayed outside their HMA boundary). The projected wild horse population remaining on these HMAs following the gather would be about 1,550 wild horses (the low AML for these HMAs, see Table 2). This would leave approximately 610 wild horses in the Adobe Town HMA, 251 in the Salt Wells Creek HMA, 415 in the Great Divide Basin HMA, 205 in the White Mountain HMA and 69 in the Little Colorado HMA. Unlike Alternatives II & IV, no wild horses would undergo population growth suppression treatments.

2.4 Alternative IV – Gather and Removal with Permanent Sterilization, Fertility Control and Mare to Stud Ratio Skewing

Under Alternative IV the BLM would gather approximately 4,397 wild horses from these five HMAs (including wild horses that have strayed outside their HMA boundary). Of these, 3,555 would be selectively removed (as per IM 2010-135) as excess wild horses (see Table 2), and 842 would be released back into the HMAs, after a select number of mares and studs have been treated using a variety of population growth suppression strategies. Approximately 84 mares would be spayed and released back into the HMAs. Approximately 253 mares would be treated with an immunocontraceptive vaccine, such as PZP or GonaCon, and released back into the HMAs. Approximately 126 studs would be gelded and released back into the HMAs. The numbers released back into the HMA would skew the mare to stud ratio so that approximately 60% of the animals are studs and 40% are mares. The projected wild horse population remaining on these HMAs following the gather would be about 1,550 wild horses (the low AML for these HMAs, see Table 2). Of these, 14% would be permanently sterilized and 16% may be temporarily infertile as a result of receiving an immunocontraceptive vaccine. For a summary of the actions proposed under this alternative, by HMA, see Table 5.

Table 5. Summary of Alternative IV by HMA.

HMA	Number to be Gathered	Number to be Permanently Removed	Studs to be Returned		Mares to be Returned	
			Gelded	Un-Gelded	Spayed	Treated with Immunocontraceptive Vaccine
Adobe Town	1,137	728	61	184	41	123
Salt Wells Creek	912	822	14	41	9	27
Great Divide Basin	1,308	1,124	28	83	18	55
White Mountain	478	358	18	54	12	36
Little Colorado	562	523	6	18	4	12
Totals:	**4,397**	**3,555**	**126**	**379**	**84**	**253**

The following design features would apply to this alternative:

  - Fertility control treatment would be conducted in accordance with the approved standard operating and post-treatment monitoring procedures. Breeding age mares selected for release back to the range would be treated with approved fertility control measures, which would slow reproduction of the treated mares.
- Fertility control vaccines would be led by trained BLM personnel only.
- All spay procedures would be done by the Colpotomy or Flank Laparoscopy methodologies. The decision on which to use would be at the discretion of the veterinarian performing the procedure.
- Treated mares would be individually marked with a microchip, and a freeze brand on the left hip with the Wyoming registered brand HB and possibly on the neck with a number signifying the HMA where the mare was captured. Any stallions returned to the range would be marked with a microchip.
- Spaying procedures would not be performed on pregnant mares.
- The fertility control treatment information will be kept with the fertility treatment report completed after each use.
- In order to manage for the long-term genetic health of the HMAs wild horse population, the BLM may choose to implement selective removal of individual horses or release new animals into the herd. Selective removal procedures would prioritize removal of younger horses to allow older less adoptable wild horses to be released back to the HMAs. The selection process would involve retaining wild horses for their preferred conformation, disposition, color, and other features deemed desirable for adoption.
- All wild horses identified to be returned to the HMAs would be selected to maintain a diverse age structure, herd characteristics, and body type (conformation).
- Baseline DNA samples would be taken from 20 mares and 20 stallions returned to each of the HMAs. Instruction Memorandum 2009-062 provides program guidance and policy for the

collection of genetic baseline information for wild horse and burro populations. Additionally, for the Adobe Town HMA, reference photographs would be taken of each wild horse from which a DNA sample is collected, to compare visual characteristics with genetic results. This comparison may inform future management actions by determining if visual characteristics can be reliably used to select for New World Iberian genotypes. The BLM recognizes that in sexually reproducing species, each individual's genotype is unique. In the context of wild horse management, the term 'New World Iberian genotype' refers to genetic traits that are associated with New World Iberian breed types. Selective retention criteria used for the wild horses returned to the Adobe Town HMA would be based on readily recognized phenotypic traits of New World Iberian horses (see Appendix D). New World Iberian phenotypes may or may not be related to the presence of specific alleles. However, wild horses that appear to express a relatively high number of the New World Iberian phenotypic traits would be returned to the Adobe Town HMA. DNA sampling and analysis would be done so that genotypic changes and overall genetic health of the wild horses can be monitored, and management practices can be adapted based on the results of this genetic monitoring (see H-4700-1, Section 4.4.6.4).

2.5 Alternatives Considered but not Analyzed in Detail

Multi-year Gather Plan

Under this alternative the BLM would conduct a gather any time wild horses exceed high AML, for a given period of time (such as 10 years). At this time the Rock Springs and Rawlins Field Offices are in the process of amending their RMPs related to wild horse management (see Relationship to the Ongoing Wild Horse RMP Amendment in Section 1.1). Because changes to wild horse management within these HMAs are likely to occur as a result of this RMP Amendment, the BLM determined that it was not feasible to establish a long term, multi-year gather plan for these HMAs, at this time.

Change the AMLs for the HMAs

This alternative would involve changing the established AMLs to allow for either more, or less, wild horses to be managed within these HMAs. This alternative was not brought forward for detailed analysis because it would not meet the purpose and need, and because it would be outside of the scope of this analysis to address excess wild horses and maintain a thriving natural ecological balance. Furthermore, this gather document and subsequent Decision Record is not the appropriate mechanism for adjusting the AML of an HMA. While the Wild Horses and Burros Management Handbook (H-4700-1) allows for AML to be adjusted through a site-specific environmental analysis, it states that when a Land Use Plan does not outline a process for adjusting the AML, then the Land Use Plan may need to be amended to adjust AML. A Resource Management Plan (RMP) amendment for wild horse management is currently underway for the Great Divide Basin, Salt Wells Creek, Adobe Town and White Mountain HMAs. This RMP amendment is also analyzing possible changes to the AML for each of these HMAs. For these reasons, a change in AML is not considered as part of this EA.

Develop More Water Sources and Remove Fences to Improve Habitat for Wild Horses

Developing additional water sources and removing fences would not address the purpose and need for the action. These measures would not address the excess wild horses present on these HMAs, nor would they remove wild horses from private land. In order to permanently increase the number of wild horses considered appropriate for these HMAs, the BLM would need to change the established AMLs. Adjusting the current AMLs for these HMAs is beyond the scope of this document (see Change the AMLs for the HMAs in this section).

Exclusive Use of Bait and/or Water Trapping

An alternative considered but not carried forward for detailed analysis was the use of bait and/or water trapping (without the use of a helicopter) as the exclusive gather method. This alternative was dismissed from detailed study for the following reasons:

1. The size of the area is too large for the use of this method;
2. The presence of water sources on both private and public lands inside and outside the HMA boundaries would make it difficult to restrict wild horse access to selected water trap sites, and would extend the time required to remove excess wild horses;
3. The aforementioned logistical difficulties would make bait and water trapping in this area ineffective in meeting the purpose and need for the action.

Other Alternative Capture Techniques

This alternative includes capture methods other than helicopters to gather excess wild horses, which were suggested through public comment. As no specific methods were suggested, the BLM identified chemical immobilization, net gunning, and wrangler/horseback drive trapping as potential methods for gathering wild horses. These methods are infeasible in meeting the purpose and need for the action, as discussed below.

Chemical immobilization would not be feasible due to the size of the HMAs and the number of horses that need to be gathered. Furthermore, chemical immobilization is a very specialized technique and is strictly regulated. The BLM does not currently have the capacity to implement this method at the scale required by this project.

Net gunning techniques would also be infeasible due to the size of the HMA and the number of horses that need to be gathered. Net gunning techniques normally used to capture big game also rely on helicopters in close situations. Net gunning heavier animals like horses may be more dangerous to the horse compared to net gunning pronghorn and mule deer. Elk & moose are net gunned, but wild horses are heavier at 900-1,000 pounds making net gunning more difficult and dangerous. Net gunning also requires a capture crew to be on board of the helicopter posing additional risk to more people and to the wild horse in the event of a mishap. This alternative poses high risk to human health and safety therefore it is not under consideration.

Use of wranglers on horseback drive-trapping to remove excess wild horses can be fairly effective on a small scale; however, due to the number of excess wild horses to be removed and the large geographic area of the HMAs this technique would be infeasible. Horseback drive-trapping is also very labor intensive and can be very hazardous to the domestic horses and wranglers during gather operations.

For these reasons, the identified capture methods were eliminated from further consideration and are not analyzed in detail for the proposed action and alternatives.

No Horse Removal, Fertility Control Only

An alternative considered but not carried forward for detailed analysis was the use of fertility control methods only, with no wild horse removal. This alternative does not meet the purpose and need for the action, as the existing population of wild horses within the HMAs is currently above the established AML and excess wild horses need to be removed to comply with the laws, policies, and consent decree described in Section 1.3.

Gathering to High AML

Gathering wild horses to achieve a post-gather population size at the upper level of the AMLs would result in AML being exceeded with the next foaling season. This would be problematic for several reasons. The upper levels of the AML established for an HMA represent the maximum population for which a thriving natural ecological balance can be maintained. The lower level represents the number of animals that should remain in the HMAs following a wild horse gather in order to allow for a periodic gather cycle of approximately every four years and to prevent the population from exceeding the established AML between gathers. The need to gather below the upper range of AML has been recognized by the IBLA, which has held that:

> "…the term AML within the context of the statute to mean[s] that "optimum number" of wild horses which results in a thriving natural ecological balance and avoids a deterioration of the range." (*Animal Protection Institute of America v. Nevada BLM* 1989).
>
> "Proper range management dictates removal of horses before the herd size causes damage to the rangeland. Thus, the optimum number of horses is somewhere below the number that would cause damage. Removal of horses before range conditions deteriorate ensures that horses enjoy adequate forage and an ecological balance is maintained" (*Animal Protection Institute of America et al. v. Rock Springs District BLM* 1991).

Additionally, gathering to the upper range of AMLs would result in the need to follow up with another gather within one year, and could result in over utilization of vegetation resources, damage to the rangeland, and increased stress to wild horses. Furthermore, this alternative would not be consistent with the 2013 Consent Decree. For these reasons, this alternative is not analyzed in detail.

Control of Wild Horse Numbers by Natural Means

This alternative would use natural means, such as natural predation, starvation, and weather, to control the wild horse population. This alternative was eliminated from further consideration because it would violate the WFRHBA, which requires the BLM to protect the range from deterioration associated with an overpopulation of wild horses by removing excess wild horses from the range. It is also substantially similar to the No Action alternative, and would not meet the purpose and need for the proposed action.

The primary "natural means" would be population correction based on the population reaching carrying capacity (NRC 2013). Due to the absence of natural predators for wild horses this would be limited only by vegetation and water. Furthermore, wild horses are a long-lived species with documented foal survival rates exceeding 95%.

This alternative would allow for a steady increase in the wild horse populations which would continue to exceed the carrying capacity of the range and would cause increasing damage to the rangelands until severe range degradation or natural conditions that occur periodically – such as blizzards or extreme drought – cause a catastrophic mortality of wild horses in the HMAs.

For these reasons this alternative would have a severe negative impact on other multiple uses (especially wildlife and livestock) and would not correspond with the multiple use mission established by the FLPMA. Furthermore, this alternative would not be consistent with the 2013 Consent Decree. Finally, this alternative would conflict with the WFRHBA, which requires the BLM to remove excess wild horses to achieve a thriving natural ecological balance.

Remove or Reduce Livestock within the HMA

Under this alternative no wild horses would be removed from these HMAs. Instead, livestock would be removed from these HMAs to provide adequate forage for excess wild horses. This alternative was not brought forward for detailed analysis because it does not meet the purpose and need for the action; it would not allow management of wild horses within AML to promote a TNEB, nor would it remove wild horses from private lands as requested by the landowner.

While the BLM is authorized to remove livestock from HMAs, "if necessary to provide habitat for wild horses or burros, to implement herd management actions, or to protect wild horses or burros from disease, harassment or injury" (43 CFR 4710.5), this authority is usually applied in cases of emergency and not for general management of wild horses, since it cannot be applied in a manner that would be consistent with the existing RMPs (43 CFR 4710.1).

Furthermore, the gather decision is not the appropriate mechanism for adjusting the authorized livestock use within the allotments associated with the HMAs in order to reallocate forage to wild horses. Modifications in long-term multiple use management, such as changes in forage allocations between livestock and wild horses, would have to be evaluated and implemented through the land use planning process.

Manage the Entire Herd as a Non-Breeding Population
Under this alternative all wild horses within these HMAs would undergo permanent sterilization treatment, ensuring that the entire population is non-reproducing. The decision to make an entire herd non-reproducing is beyond the scope of this document, and should be analyzed through a land use planning process. This alternative would be similar to Alternative IV, in which approximately 14% of the total number wild horses remaining in the HMAs would be permanently sterilized.

Utilize Only Mare to Stud Ratio Adjustment to Control Wild Horse Populations
This alternative is substantially similar to Alternative IV, which analyzes the use of mare to stud ratio skewing, but would rely on it to the exclusion of other population growth suppression methods. The impacts analyzed under Alternative IV adequately reflect the impacts that would occur with only conducting mare to stud ratio skewing, without taking other population growth suppression activities.

Gather 100% of the HMA and Treat All Wild Horses Returned to the HMA with Fertility Control
A decision to make an entire herd non-reproducing is beyond the scope of this document, and must be made through the land use planning process. This alternative is substantially similar to Alternatives II and IV, and varies only in the number of animals treated.

Return the HMA to Herd Area Status with Zero AML
This alternative is beyond the scope of this document. Decisions to revert HMAs to Herd Areas, and associated AML changes are made through the land use planning process.

Conduct a Land Exchange
Under this alternative, the BLM and private land owners would conduct a land exchange to extend the "solid block" portion of public land. BLM does not currently have a proposal from a willing party (or group of parties) to a land exchange involving private lands in the project area. Moreover, a land exchange alone would not change AML; such adjustment would require decision-making through a land use planning process. Finally, a land exchange would not meet the purpose and need of the proposed action, as it would not address the presence of excess wild horses within these HMAs.

Move Excess Wild Horses into Nearby Herd Areas

The decision to convert a Herd Area into an area managed for a population of wild horses (an HMA) is beyond the scope of this document. Decisions to convert Herd Areas into HMAs are made through the land use planning process.

3.0 AFFECTED ENVIRONMENT & ENVIRONMENTAL EFFECTS

The area covered by this analysis is within the jurisdiction of the BLM Rock Springs and Rawlins Field Offices, Wyoming. The five HMAs listed in Table 1 encompass approximately 3,436,096 acres of public, private and state land, within Carbon, Fremont, Lincoln, Sublette, and Sweetwater counties in southwest Wyoming, (see HMA Maps). Topography consists of rolling mesas with defined drainages with some mountains and badlands. Elevation varies from approximately 6,400 feet to 9,431 feet. Summers are hot, and winters can range from mild to bitterly cold. Annual precipitation averages 7 inches at lower elevations up to 12 inches (or more) at the higher elevations. Much of the precipitation from summer thunderstorms runs off in numerous drainages. Some of this water is captured in reservoirs or pits. Flowing wells, springs, and creeks are the primary sources of water for wild horses, livestock, and wildlife within these HMAs. The vegetation within these HMAs is comprised primarily of sagebrush steppe and salt desert shrub communities, and includes some juniper woodlands.

3.1 Issue 1: How would the proposed population growth suppression activities affect wild horses?

3.1.1 Affected Environment

The current estimated wild horse population within these HMAs is 5,105 (see Table 2). In 2011, the BLM skewed the ratio of studs to mares (60% to 40%) in the White Mountain and Little Colorado HMAs by selectively returning a certain number of each gender back into the HMAs. Additionally, the BLM treated 40 mares with PZP in 2013 and released them back into the Adobe Town/Salt Wells Creek complex. Because the effects of PZP and mare to stud ratio skewing are not permanent, the BLM estimates that, at this time, approximately 50% of the wild horses are studs and 50% are mares, and that all breeding age wild horses are currently able to bear offspring. No other population growth suppression tactics have been used in these HMAs in the last decade, and none were implemented during the 2010, 2014 or 2017 gathers.

3.1.2 Environmental Effects

3.1.2.1 Alternative I: No Action

Since no population growth suppression strategies would be utilized under the No Action alternative, this alternative would have no direct impact on wild horses. However, as described in Section 3.2.2.1 there would still be excess wild horses present on these HMAs, and a thriving natural ecological balance would not be maintained. Over time, food, water, cover and space would not be adequate to support the growing wild horse population in these HMAs. When this occurs there would be negative impacts to wild horses, as there would be inadequate resources to sustain the population on the range.

When there is an overpopulation of wild horses on the range, there would be an overall degradation of habitat qualities for wild horses, which would negatively impact the overall health of the wild horses in the population. This alternative would result in the wild horses being more concentrated, experiencing more competition for resources, and there would be more trailing and concentrated use near water sources. This would result in more fighting among horses accessing water sources. Water quality and quantity would degrade over time to the detriment of all

rangeland users, including wild horses. Wild horses would also have to travel a greater distance back and forth between water and desirable foraging areas. If an overpopulation of wild horses were to continue on the range, it would eventually lead to large scale degradation of rangeland habitat and large scale die-offs due to starvation.

3.1.2.2 Alternative II: Proposed Action

Under the Proposed Action two primary population growth suppression strategies would be utilized: immunocontraceptive vaccines and IUDs. Under this alternative a total of 420 mares would be treated with an immunocontraceptive vaccine and returned to these HMAs. Of these, 290 open mares would also have an IUD inserted. The number of wild horses treated with fertility control would represent approximately 27% of the population of the HMAs following the removal and treatment activities. This analysis is intended to summarize the potential effects of treating mares with immunocontraceptive vaccines or IUDs. More detailed information, including a literature review related to all the population growth suppression strategies and their potential effects, is provided in Appendix B.

Immunocontraceptive vaccines and IUDs are administered only to breeding age mares. Because the BLM would not gather the entire herd under this alternative, there would be approximately 5 – 15% of the herd remaining that would not undergo any fertility treatment and would still be able to breed normally. Additionally, not all treatments would be successful. Some animals are still able to successfully breed after receiving an immunocontraceptive vaccine, and some IUDs will fall out, thereby becoming ineffective. However, even if only a fraction of the mares in a herd are successfully treated, they can have a large effect on the realized growth rate for the population. In most cases, immunocontraceptive vaccines appears to be temporary and reversible, with most treated mares returning to fertility over time (see Appendix B).

Contraception has been shown to be a humane treatment to slow increases in wild horse populations or, when used with other techniques, to reduce horse population size (Bartholow 2004, de Seve and Boyles-Griffin 2013). All fertility control methods in wild animals 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). Although contraceptive treatments may be associated with a number of effects, those concerns 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).

Successful contraception would be expected to reduce the frequency of future wild horse gathers and their associated impacts (see Section 3.2). Under this alternative, after implementing population growth suppression strategies, the expected future gather frequency for these HMAs would be approximately every 4 years, compared to every 2 years under Alternative II.

Selectively applying contraception to older animals and returning them to the HMA could reduce the compensatory reproduction that often follows removals (Kirkpatrick and Turner 1991). On the other hand, selectively applying contraception to younger animals can slow the rate of genetic diversity loss – a process that tends to be slow in populations of long-lived animal with high levels of genetic diversity – and could reduce growth rates further by delaying the age of first parturition (Gross 2000).

Mares that undergo fertility control treatments would have increased stress from additional handling by humans. Most mares recover from the stress of capture and handling quickly once

released back to the range, and none are expected to suffer long term direct effects from the fertility control treatments, other than becoming temporarily infertile. One expected long-term, indirect effect on wild horses treated with fertility control would be a reduction in the biological stress associated with reproduction, foaling and lactation, which would lead to an improvement in their overall health (Turner and Kirkpatrick 2002). After a treated mare returns to fertility, her future foals would likely be healthier, 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, as a result of managing wild horses within AML and maintaining a TNEB.

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). 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 range could reduce the compensatory reproduction that often follows removals (Kirkpatrick and Turner 1991).

Contraception may change a herd's age structure, with a relative increase in the fraction of older animals in the herd (NPS 2008). 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 reduce the need to send additional excess horses from this area to off-range holding corrals or pastures for long-term holding.

A principle motivation for using population growth suppression strategies is to reduce population growth rates and maintain herd sizes within AML. Where successful, this would promote improvements in range conditions within these HMAs. This would improve habitat qualities for wild horses, promoting an overall healthier wild horse population. This alternative would result in the wild horses being less concentrated, experiencing less competition for resources, and there would be less trailing and concentrated use near water sources. This would result in 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. Among mares in the herd that remain fertile, a higher level of physical health and future reproductive success would be expected in areas where lower horse and burro population sizes lead to increases in water and forage resources.

Potential impacts to genetic diversity associated with this alternative are discussed in Section 3.3 of this document.

Immunocontraceptive Vaccines

Immunocontraceptive vaccines induce an immune response that causes treated animals to become temporarily infertile. Injection site reactions associated with immunocontraceptive treatments are possible in treated mares (Roelle and Ransom 2009, Bechert et al. 2013, French et al. 2017, Baker et al. 2018), but swelling or local reactions at the injection site are expected to be minor in nature. The primary immunocontraceptive vaccines currently utilized by the BLM include PZP and GonaCon. A detailed description of the direct and indirect effects of these immunocontraceptives are provided below:

PZP Vaccines

PZP vaccines (PZP) have been used on dozens of horse herds by the National Park Service, US Forest Service, the BLM and Native American tribes. The PZP vaccine ZonaStat-H is approved for free ranging wild and feral horses in the United States (EPA 2012). PZP would be applied to treated mares using a large gauge needle and jab-stick into the hip. PZP causes an immune response that produces antibodies that react with the surface of a mare's eggs. Because treated mares do not become pregnant but other ovarian functions remain generally unchanged, PZP can allow a mare to continue having regular estrus cycles throughout the breeding season. PZP vaccines do not appear to interact with other organ systems, as antibodies specific to the PZP protein do not cross-react with tissues outside of the reproductive system (Barber and Fayrer-Hosken 2000).

The PZP vaccine ZonaStat-H can be up to 90% effective at preventing pregnancy in the first year after application (Turner and Kirkpatrick 2002, Turner et al. 2008). Efficacy decreases in subsequent years unless the animal is treated with a booster dose. Application of PZP for fertility control would reduce fertility in a large percentage of mares for at least one year (Ransom et al. 2011).

Although fetuses are not explicitly protected under the WFRHBA, it is prudent to analyze the potential effects of fertility control vaccines on developing fetuses and foals. Any impacts identified in the literature have been found to be transient, and do not influence the future reproductive capacity of offspring born to treated females. 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 showed that when female offspring born to mares treated with PZP during pregnancy eventually breed, they produce healthy, viable foals (Kirkpatrick and Turner 2002). 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).

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) that may be as much as 5-10 years (NPS 2008). 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, NPS 2008). General 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.

Behavioral differences, compared to mares that are fertile, should be considered as potential results of successful contraception. The NAS report (NRC 2013) noted that all forms of fertility suppression have effects on mare behavior, mostly because of the lack of pregnancy and foaling, and concluded that fertility control vaccines were among the most promising fertility control methods for wild horses and burros. 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) delineated wild horse behaviors. 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. Some studies suggest that PZP treated mares may exhibit higher infidelity to their band (Nuñez et al. 2009), though not all studies have consistently found this to be true. At the population level, available research does not provide evidence of the loss of harem structure among any herds treated with PZP. The National Research Council (2013) found that harem changing was not likely to result in serious adverse effects for treated mares.

More detailed information regarding the PZP vaccine is provided in Appendix B.

GonaCon-Equine Vaccine

GonaCon-Equine (GonaCon) is approved for application to free-ranging wild horse herds in the United States (EPA 2013, 2015). GonaCon has been used on feral horses in the Theodore Roosevelt National Park and on wild horses managed by the BLM (BLM 2015). GonaCon would be applied to treated mares using a large gauge needle and jab-stick into the hip.

As with other contraceptives applied to wild horses, the long-term goal of GonaCon is to reduce or eliminate the need for gathers and removals (NRC 2013). GonaCon-Equine contraceptive vaccine is an EPA-approved pesticide (EPA 2009a) that meets BLM requirements for safety to mares and the environment, and is produced in a USDA-APHIS laboratory. GonaCon is a pharmaceutical-grade vaccine, made with aseptic manufacturing technique to deliver a sterile vaccine product (Miller et al. 2013).

GonaCon-Equine can safely be reapplied as necessary to control the population growth rate; booster dose effects may lead to increased effectiveness of contraception. Even after booster treatment of GonaCon, it is expected that most mares would return to fertility at some point. Although the exact timing for the return to fertility in mares boosted more than once with GonaCon-Equine has not been quantified, a prolonged return to fertility would be consistent with the desired effect of using GonaCon (e.g., effective contraception). Females that are successfully contracepted by GonaCon enter a state similar to anestrus, have a lack of or incomplete follicle maturation, and no ovarian cycling (Botha et al. 2008, Nolan et al. 2018). The lack of estrus cycling that results from successful GonaCon vaccination has been compared to typical winter period of anestrus in open mares. Mares treated with GonaCon would be expected to have a better overall body condition and may have a higher likelihood of survival (Goodloe 1991).

Kirkpatrick et al. (2011) raised concerns that anti-GnRH vaccines (like GonaCon) 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. However, anti-GnRH vaccines (like GonaCon) have been used on horses and other animals, including wildlife such as elk, and no adverse impacts have been noticed in these species. Since GnRH is highly conserved across mammalian taxa,

some inferences about the mechanism and effects of GonaCon in horses can be made from studies that used different anti-GnRH vaccines, in horses and other animals.

A single dose of GonaCon to wild horses would be expected to prevent pregnancy in 30%-60% of mares for one year. A smaller number of those mares would 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 may lead to four or more years with relatively high rates (80+%) of additional infertility expected (Baker et al. 2018).

Although fetuses are not explicitly protected under the WFRHBA, it is prudent to analyze the potential effects of fertility control vaccines on developing fetuses and foals. Any impacts identified in the literature have been found to be transient, and do not influence the future reproductive capacity of offspring born to treated females. GonaCon can be injected while a female is pregnant (Miller et al. 2008, Powers et al. 2011, Baker et al. 2013). In these cases, a successfully contracepted mare will be expected to give birth during the following foaling season, but to be infertile during the same year's breeding season. GonaCon had no apparent effect on pregnancies in progress, foaling success, or the health of offspring, in horses (Baker et al. 2013), elk (Powers et al. 2011, 2013), or deer (Miller et al. 2008). Studies have also found that anti GnRH vaccines (like GonaCon) did not affect the fertility of offspring born to treated animals (Powers et al. 2012).

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). However, there were no published differences in mean date of foal production in anti-GnRH vaccine trials in free-roaming horses (Goodloe 1991, Gray et al. 2010). 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. Similarly, we anticipate that GonaCon would not affect foal survival even with an extended birthing season.

Mares treated with GonaCon may be expected to behave similarly to pregnant mares, as a result of having suppressed estrous cycles throughout the breading season. Because of this, any 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).

Mares treated with GonCon are likely to exhibit behavior similar to pregnant mares (Ransom et al. 2014b, Barker et al. 2018). This may lead to a reduction in reproductive behavior that may continue for a time, even after the mares resume estrus cycles (Elhay et al. 2007). GonaCon is not expected to cause an increase in harem infidelity in treated mares, because it is expected that they would behave similarly to a pregnant mare (Ransom et al. 2014b).

More detailed information regarding GonaCon-Equine is provided in Appendix B.

IUDs

The BLM's use of IUDs as a method to control fertility for wild horses is still in the early stages. The BLM inserted IUDs into 8 mares in the Swasey HMA in Utah in 2020. It is too early to know the results of that treatment procedure for those particular mares. However, IUDs have

been used in domestic horses for many years. Existing scientific literature on the use of IUDs in domestic horses allows for inference about expected effects on wild horses. This literature supports that use of certain types of IUDs would be a safe and effective method of fertility control in wild horses. Overall, as with other methods of population growth suppression, use of IUDs and other fertility control measures are expected to help reduce population growth rates, extend the time interval between gathers, and reduce the total number of excess animals that will need to be removed from the range.

IUDs are considered a temporary fertility control method that does not generally cause future sterility (Daels and Hughes 1995). Use of IUDs is an effective fertility control method in women, and IUDs have historically been used in livestock management, including in domestic horses. Insertion of an IUD can be a very rapid procedure, but it does require the mare to be temporarily restrained, such as in a squeeze chute. IUDs in mares may cause physiological effects including discomfort, infection, perforation of the uterus (if the IUD is hard and angular), endometritis, uterine edema (Killian et al. 2008), and pyometra (Klabnik-Bradford et al. 2013).

The exact mechanism by which IUDs prevent pregnancy is uncertain (Daels and Hughes 1995), but the presence of an IUD in the uterus may, like a pregnancy, prevent the mare from coming back into estrus (Turner et al. 2015). However, some domestic mares did exhibit repeated estrus cycles during the time when they had IUDs (Killian et al. 2008, Gradil et al. 2019). The main cause for an IUD to not be effective at contraception is its failure to stay in the uterus (Daels and Hughes 1995). As a result, one of the major challenges to using IUDs to control fertility in mares on the range is preventing the IUD from being dislodged or otherwise ejected over the course of daily activities, which could include, at times, frequent breeding.

At this time, it is thought that any IUD inserted into a pregnant mare may cause the pregnancy to terminate, which may also cause the IUD to be expelled. For that reason, IUDs would only be inserted in non-pregnant (open) mares. Wild mares receiving IUDs would be checked for pregnancy prior to insertion of an IUD. Pregnant mares would not receive an IUD. The IUD is inserted into the uterus using a thin, tubular applicator similar to a shielded culture tube, and would be inserted in a manner similar to that routinely used to obtain uterine cultures in domestic mares. If a mare has a very small, early phase embryo, it is possible that it will fail to be detected in screening, and may develop further, but without causing the expulsion of the IUD. Wild mares with IUDs would be individually marked and identified, so that they can be monitored occasionally and examined, if necessary, in the future, consistent with other BLM management activities.

Due to potential health risks to the mares, the BLM would not use metallic or glass marble IUDs (Turner et al. 2015, Freeman and Lye 2015, Klabnik-Bradford et al. 2013). Soft IUDs likely cause less discomfort than hard IUDs (Daels and Hughes 1995) and will be the preferred type of IUD utilized by the BLM to treat wild horses within these HMAs. It is possible that use of IUDs may cause some level of uterine irritation in treated mares but the level of irritation is not expected to interfere with a return to fertility after IUDs are removed (Daels and Hughes 1995).

The 2013 National Academies of Sciences (NAS) report considered IUDs and suggested that research should test whether IUDs cause uterine inflammation, and should also test how well IUDs stay in mares that live and breed with fertile stallions (NRC 2013). Since that report, a recent study by Holyoak et al. (unpublished data) indicate that a flexible, inert, Y-shaped, medical-grade silicone IUD design prevented pregnancies in all the domestic mares that retained the device, even when exposed to fertile stallions. Domestic mares in that study lived in large

pastures, mating with fertile stallions. Biweekly ultrasound examinations showed that IUDs stayed in 75% of treated mares over the course of two breeding seasons. The IUDs were then removed so the researchers could monitor the mares' return to fertility. Uterine health, as measured in terms of inflammation, was not seriously affected by the IUDs, and most mares became pregnant within months after IUD removal. The overall results are consistent with results from an earlier study (Daels and Hughes 1995), which used O-shaped silicone IUDs. These Y-shaped silicone IUDs are considered a pesticide device by the EPA, in that they work by physical means (EPA 2020). The Y-shaped IUD discussed in this study will be the preferred IUD utilized under this alternative to treat mares on these HMAs.

More detailed information regarding IUDs is provided in Appendix B.

3.1.2.3 Alternative III

Under this alternative, excess wild horses would be gathered and removed from these HMAs, but no population growth suppression strategies would be implemented. Therefore, there would be no direct impacts to wild horses as a result of these strategies. However, failure to take action to control the growth rate of the wild horse population in these areas would require more frequent gathers in future years. Under this alternative, the expected future gather frequency for these HMAs would be approximately every 2 years, compared to every 4 years under Alternatives II and IV. Therefore, stress to wild horses as a result of future gather operations is expected to be higher under this alternative compared to Alternatives II and IV.

3.1.2.4 Alternative IV

Under this alternative approximately 126 studs would be gelded, 84 mares would be spayed and 253 mares would be treated with an immunocontraceptive vaccine. In total 210 wild horses would be permanently sterilized, which would represent 14% of the wild horses remaining in these HMAs following this action. An additional 16% would have undergone temporary fertility control via an immunocontraceptive vaccine. In addition to this, the BLM would skew the ratio of mares to studs in the herd (40% mares to 60% studs).

Because the BLM would not gather the entire herd under this alternative, there would be approximately 5 – 15% of the herd remaining that would not undergo any fertility treatment and would still be able to breed normally. Additionally, not all treatments would be successful, and some animals are still able to successfully breed after receiving an immunocontraceptive vaccine. However, even if only a fraction of the mares in a herd are successfully treated, they can have a large effect on the realized growth rate for the population until the effects of the vaccine wear off.

Contraception has been shown to be a humane treatment to slow increases in wild horse populations or, when used with other techniques, to reduce horse population size (Bartholow 2004, de Seve and Boyles-Griffin 2013). All fertility control methods in wild animals 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). Although contraceptive treatments may be associated with a number of effects, those concerns 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).

Successful contraception would be expected to reduce the frequency of future wild horse gathers and their associated impacts (see Section 3.2). Under this alternative, after implementing

population growth suppression strategies, the expected future gather frequency for these HMAs would be approximately every 4 years, compared to every 2 years under Alternative II.

Animals that undergo fertility control treatments would have increased stress from additional handling by humans. Most wild horses recover from the stress of capture and handling quickly once released back to the range, and none are expected to suffer serious long term effects from the fertility control treatments, other than the direct consequence of becoming infertile. 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), as these animals would no longer experience the biological and social stresses associated with reproduction.

Contraception may change a herd's age structure, with a relative increase in the fraction of older animals in the herd (NPS 2008). 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 reduce the need to send additional excess horses from this area to off-range holding corrals or pastures for long-term holding.

A principle motivation for using population growth suppression strategies is to reduce population growth rates and maintain herd sizes within AML. Where successful, this would promote improvements in range conditions within these HMAs. This would improve habitat qualities for wild horses, promoting an overall healthier wild horse population. This alternative would result in the wild horses being less concentrated, experiencing less competition for resources, and there would be less trailing and concentrated use near water sources. This would result in 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. Among mares in the herd that remain fertile, a higher level of physical health and future reproductive success would be expected in areas where lower horse and burro population sizes lead to increases in water and forage resources.

Impacts to wild horses associated with the use of immunocontraceptive vaccines are discussed in Section 3.1. Those impacts would be the same under this alternative, except that a smaller number of mares would be treated with immunocontraceptive vaccines under this alternative (253 vs 290). Impacts associated with gelding and spaying are discussed below. More detailed information, including a literature review related to all of these population growth suppression strategies, is provided in Appendix B.

Potential impacts to genetic diversity associated with this alternative are discussed in Section 3.3 of this document.

Gelding

Gelding is the surgical removal of the testicles of a male horse. It is also commonly called castration or neutering. This procedure has been used on horses for thousands of years, in many different societies. Gelding has a relatively low complication rate. The expected effects of gelding are well understood. Individuals that undergo this procedure will no longer be able to reproduce for the remainder of their life; the procedure is not reversible. The effectiveness of gelding in terms of reducing herd-level annual growth rates is somewhat limited, however, due to the fact that a small number of fertile studs can successfully breed most fertile mares. Therefore, in order for gelding to be successfully used to reduce population growth rates, it must be paired

with a strategy to also reduce the overall number of fertile females in the herd (such as spaying and/or skewing the ratio of studs to mares).

As part of BLM's SOPs, animals that are candidates for gelding will be screened prior to the procedure to ensure they are in adequate health to safely undergo the treatment. The surgery would be performed by a veterinarian using general anesthesia. The final determination of which specific animals would be gelded would be based on the professional opinion of the attending veterinarian in consultation with the Authorized Officer.

Though gelding males is a common surgical procedure, some level of minor complications after surgery may be expected (Getman 2009). The most common complications are almost always self-limiting, resolving with time and exercise. Individual impacts to the stallions during and following the gelding process should be minimal and would mostly involve localized swelling and bleeding. Complications may include, but are not limited to: minor bleeding, swelling, inflammation, edema, infection, peritonitis, hydrocele, penile damage, excessive hemorrhage, and eventration (Schumacher 1996, Searle et al. 1999, Getman 2009). A small amount of bleeding is normal and generally subsides quickly, within 2-4 hours following the procedure. Some degree of swelling is normal, including swelling of the prepuce and scrotum, usually peaking between 3-6 days after surgery (Searle et al. 1999). Swelling should be minimized through the daily movements (exercise) of the horse during travel to and from foraging and watering areas. Most cases of minor swelling should be back to normal within 5-7 days, more serious cases of moderate to severe swelling are also self-limiting and are expected to resolve with exercise after one to 2 weeks. In some cases, a hydrocele (accumulation of sterile fluid) may develop over months or years (Searle et al. 1999). Serious complications (eventration, anesthetic reaction, injuries during handling, etc.) that result in euthanasia or mortality during and following surgery are rare (less than 5%). Serious complications are generally noted within 3 or 4 hours of surgery but may occur any time within the first week following surgery (Searle et al. 1999). If they occur, they would be treated with surgical intervention when possible, or with euthanasia when there is a poor prognosis for recovery. Gelded studs would be monitored by a veterinarian to ensure they have recovered from the surgery before the veterinarian approves them to be released back onto the range.

It is expected that testosterone levels will decline over time after gelding, though geldings may still exhibit reproductive behaviors (Rios and Houpt 1995, Schumacher 2006). Testosterone levels alone are not a predictor of masculine behavior (Line et al. 1985, Schumacher 2006). In domestic geldings, 20-30% continued to show stallion-like behavior. It is assumed that free roaming wild horse geldings would generally exhibit reduced aggression toward other horses and reduced reproductive behaviors (NRC 2013). Geldings may have a higher survival rate than fertile stallions (Jewell 1997). This is likely due to the decreased energy expenditures associated with reproduction and defending harems. Geldings may continue to behave like a harem stallion, or they may lose their harems and take on the role of a satellite male. They may also form bachelor herds. All of these behaviors have been observed in geldings and seem to vary due to a number of social and environmental circumstances.

More detailed information regarding gelding is provided in Appendix B.

Spaying

Spaying includes a number of different surgical and non-surgical procedures that result in the permanent sterility of a treated mare. For this alternative, only two methods of spaying are

proposed: 1) surgical sterilization via colpotomy and 2) surgical sterilization via flank laparoscopy. A brief description of these two procedures, along with any procedure specific impacts, are provided below under the associated subheading. However, many impacts associated with spaying are similar under either of these procedures. Those impacts are discussed below.

Because spaying would only be performed on open (non-pregnant) mares, there would be no potential risk to pregnancy and unborn foals. Most spay surgeries on mares have low morbidity and with the help of medications, pain and discomfort can be mitigated. While some have speculated that ovariectomy may result in bone density loss in wild horses, there are no scientific, peer reviewed studies that support this hypothesis. Most evidence brought forward in favor of this argument is related to humans, or animals tested in laboratory conditions, where movement and exercise were limited. Where wild horses are very active, covering many miles in a given day, it is unlikely that they would experience bone density loss following an ovariectomy.

In wild horses, contracepted mares tend to be in better body condition that mares that are pregnant or that are nursing foals (Nuñez et al. 2010); the same improvement in body condition is likely to take place in spayed mares. In horses spaying has the potential to increase risk of equine metabolic syndrome (leading to obesity and laminitis), but both blood glucose and insulin levels were similar in mares before and after ovariectomy over the short-term (Bertin et al. 2013). In wild horses the quality and quantity of forage is unlikely to be sufficient to promote over-eating and obesity.

Spaying is not expected to reduce mare survival rates on public rangelands. Individuals receiving fertility control often have reduced mortality and increased longevity due to being released from the costs of reproduction (Kirkpatrick and Turner 2008). Similar to contraception studies, in other wildlife species a common trend has been higher survival of sterilized females (Twigg et al. 2000, Saunders et al. 2002, Ramsey 2005, Jacob et al. 2008, Seidler and Gese 2012).

Any action taken to alter the reproductive capacity of an individual has the potential to affect hormone production and therefore behavioral interactions and ultimately population dynamics (Ransom et al. 2014). Wild horses are instinctually herd-bound and this behavior is expected to continue. Overall, the BLM anticipates that some spayed mares may continue to exhibit estrus behavior which could foster band cohesion. If free-ranging ovariectomized mares show estrous behavior and occasionally allow copulation, interest of the stallion may be maintained, which could foster band cohesion (NRC 2013). In one study, during multiple aerial surveys in years following treatment, all treated individuals appeared to maintain group associations, and there were no groups consisting only of treated females (Collins and Kasbohm 2016). In addition, of solitary animals documented during surveys, there were no observations of solitary treated females (Collins and Kasbohm 2016). These data help support the expectation that ovariectomized mares would not lose interest in or be cast out of the social dynamics of a wild horse herd.

The complexity of social behaviors among free-roaming horses is not entirely centered on reproductive receptivity, and fertility control treatments that suppress the reproductive system and reproductive behaviors should contribute to minimal changes to social behavior (Ransom et al. 2014b, Collins and Kasbohm 2016). BLM expects that wild horse harem structures would continue to exist under this alternative because fertile mares, stallions, and their foals would

continue to be a component of the herd. It is not expected that spaying a subset of mares would significantly change the social structure or herd demographics.

It is unlikely that spayed mares will change their spatial ecology but being emancipated from constraints of lactation may mean they can spend more time away from water sources and increase their home range size. Lactating mares need to drink every day, but during the winter when snow can fulfill water needs or when not lactating, horses can traverse a wider area (Feist & McCullough 1976, Salter 1979).

The free-roaming behavior of wild horses is not anticipated to be affected by mare sterilization, as the definition of free-roaming is the ability to move without restriction by fences or other barriers within a HMA (BLM H-4700-1, 2010) and there are no permanent physical barriers being proposed. Spaying wild horses does not change their status as wild horses under the WFRHBA.

Colpotomy

Spaying via colpotomy involves removing the ovaries utilizing an incision in the vagina of the treated mare. During the procedure, mares would be sedated, however, they would not be completely anesthetized since the procedure must be performed while the mare is standing. Colpotomy is a surgical technique in which there is no external incision, reducing susceptibility to infection. For this reason, ovariectomy via colpotomy has been identified as a good choice for feral or wild horses (Rowland et al. 2018). Ovariectomy via colpotomy is a relatively short surgery, with a relatively quick expected recovery time. This procedure has been conducted for over 100 years, normally on open (non-pregnant), domestic mares. Removal of the ovaries is permanent and 100 percent effective, however the procedure is not without risk.

Complications associated with this procedure are rare (estimated at less than 5%), but could include: pain and discomfort; injury to the cervix, bladder or bowels; delayed vaginal healing; eventration of the bowels; incision site hematoma; intra-abdominal adhesions to the vagina; and chronic lumbar or bilateral hind limb pain. Spayed mares would be monitored by a veterinarian to ensure they have recovered from the surgery before the veterinarian approves them to be released back onto the range.

Flank Laparoscopy

Spaying via flank laparoscopy involves creating three small incisions on the animals flank through which narrow surgical equipment is used to remove the ovaries, including a camera that allows the veterinarian to visualize the entire procedure. During the procedure, mares would be sedated, however, they would not be completely anesthetized since the procedure must be performed while the mare is standing. Flank laparoscopy (Lee and Hendrickson 2008, Devick et al. 2018, Easley et al. 2018) is commonly used in domestic horses for application in mares due to its minimal invasiveness and full observation of the operative field. Ovariectomy via flank laparoscopy was seen as the lowest risk method considered by a panel of expert reviewers convened by USGS (Bowen 2015). Mortality due to this type of surgery, or post-surgical complications, is unlikely, but is a possibility. This procedure can require a relatively long duration of surgery but tends to lead to the lowest post-operative rates of complications. Flank laparoscopy may leave three small (<5 cm) visible scars on one side of the horse's flank, but even in performance horses these scars are considered minimal. It is expected that

the tissues and musculature under the skin at the site of the incisions in the flank will heal quickly, leaving no long-lasting effects on horse health. Monitoring for up to two weeks at the facility where surgeries take place will allow for veterinary inspection of wound healing.

Complications associated with this procedure are rare (estimated at less than 5%), but could include: infection of the incision site, pain and discomfort, colic, bilateral hind limb pain, and peritonitis. Spayed mares would be monitored by a veterinarian to ensure they have recovered from the surgery before the veterinarian approves them to be released back onto the range.

More detailed information regarding spaying is provided in Appendix B.

Mare to Stud Ratio Skewing

Mare to stud ratio skewing (also known as sex ratio skewing) involves adjusting the ratio of mares to studs so that there are more males present in the population than females. Under this alternative, after gathering wild horses, the number returned back onto the range would consist of approximately 60% males and 40% females. Since, with wild horses, the number of actively breeding females is the primary factor determining population growth rates, reducing the number of breeding females can slow the population growth rate, and reduce the frequency of gathers, and the number of wild horses removed from the range. In the absence of other fertility control treatments, a 60:40 sex ratio can temporarily reduce population growth rates from approximately 20% to approximately 15% (Bartholow 2004). Combined with spaying, gelding and immunocontraceptive vaccines, the actual population growth rate would be expected to be less than 15% under this alternative. Over time, the mare to stud ratio would be expected to return to approximately 50:50, with the impacts associated with this action being reduced over time.

Having a larger number of males than females is expected to lead to several demographic and behavioral changes as noted in the NAS report (NRC 2013). Having more fertile males than females should not alter the fecundity of fertile females. Wild mares may be distributed in a larger number of smaller harems. Increased competition and aggression between males may cause a decline in male body condition. Female foraging may be somewhat disrupted by elevated male-male aggression. With a greater number of males available to choose from, females may have opportunities to select more genetically fit sires. There would also be an increase in the genetic effective population size because more stallions would be breeding and existing females would be distributed among many more small harems. This last beneficial impact is one reason that skewing the sex ratio to favor males is listed in the BLM wild horse and burro handbook (BLM 2010) as a method to consider in herds where there may be concern about the loss of genetic diversity; having more males fosters a greater retention of genetic diversity. There are no published accounts of infanticide rates increasing as a result of having a skewed sex ratio in wild horse herds, so this is not expected to be a concern associated with this activity.

It is relatively straightforward to speed the return of skewed sex ratios back to a 50:50 ratio. The BLM wild horse and burro handbook (BLM 2010) specifies that, if post-treatment monitoring reveals negative impacts to breeding harems due to sex ratio manipulation, then mitigation measures could include removing males, not introducing additional males, or releasing a larger proportion of females during the next gather.

More detailed information regarding mare to stud ratio skewing (aka sex ratio skewing) is provided in Appendix B.

3.1.3 Cumulative Effects:

Because the primary impacts under these alternatives would only involve the wild horses present within these five HMAs, the Cumulative Impact Analysis Area (CIAA) for this section is the five HMAs impacted by the proposed action.

The BLM is currently in the process of amending the Rock Springs and Rawlins RMPs for wild horse management regarding the HMAs that contain checkerboard land (Adobe Town, Salt Wells Creek, Great Divide Basin and White Mountain). A Draft EIS was released for public review on January 31, 2020. In the Draft EIS, the BLM's Preferred Alternative is to permanently revert the Salt Wells Creek, Great Divide Basin and White Mountain HMAs to Herd Areas, managed for zero wild horses, and reduce the AML of the Adobe Town HMA. If the RMP Amendment Preferred Alternative is selected and implemented, all wild horses would be permanently removed from these HMAs. The direct and indirect impacts described in this section would still occur (depending on the selected alternative), but would eventually end in those three HMAs where all wild horses are removed. The direct and indirect effects described in this section would be expected to continue in a similar manner in the Adobe Town HMA, if the RMP Amendment Preferred Alternative is selected.

3.1.3.1 Alternative I: No Action

Since no population growth suppression strategies would be utilized under this alternative, there would be no cumulative impacts associated with this alternative. However, cumulative impacts associated with the overpopulation of wild horses would occur as described in Section 3.2.2.1 of this document.

3.1.3.2 Alternative II: Proposed Action

In 2011, wild horses in the White Mountain/Little Colorado complex had their mare to stud ratio skewed (60% males to 40% females). This slowed the population growth rate in the White Mountain HMA so that AML was maintained until 2019. The Little Colorado HMA maintained AML until 2014. In 2013 the BLM treated 40 mares with PZP and released them back into the Adobe Town/Salt Wells Creek complex. The Adobe Town HMA maintained AML until 2017, while the Salt Wells Creek exceeded AML by 2014. Based on all this information, the BLM expects that the effects of PZP have worn off, and that all mares are once again able to bear offspring. Additionally, the BLM expects that the mare to stud ratio in the White Mountain/Little Colorado complex has returned to approximately 50:50. Therefore, while there have been past fertility control efforts in these HMAs, there is not expected to be any residual impacts to these herds that could amplify the direct impacts associated with this alternative.

In recent history, wild horses have been gathered from these HMAs in 2010, 2011, 2013, 2014 and 2017. It is expected that this would change to a ~4 year gather cycle following full implementation of this alternative.

As discussed earlier in this section, if the RMP Amendment Preferred Alternative is selected, then future impacts associated with gathers would be greater while all wild horses are removed from the Great Divide Basin, Salt Wells Creek and White Mountain HMAs. However, following that, gather related impacts would be reduced due to a smaller population of wild horses in the area.

Overall, future impacts to wild horses are expected to be reduced under this alternative.

3.1.3.3 Alternative III

Since no population growth suppression strategies would be implemented under this alternative, there would be no associated cumulative impacts. However, there would be a future impact to wild horses as more frequent gathers would be required following implementation of this alternative. The BLM estimates that wild horses would need to be gathered from these HMAs approximately every 2 years under this alternative.

3.1.3.4 Alternative IV

A history of population growth suppression strategies utilized on these HMAs in recent history are provided in Section 3.1.3 of this EA. No wild horses have been spayed or gelded on these HMAs. As discussed in Section 3.1.3 all past population growth suppression strategies are no longer impacting wild horses on these HMAs, so there is not expected to be any residual impact to these herds that could amplify the direct impacts associated with this alternative.

3.2 Issue 2: How would gather operations affect wild horses?

3.2.1 Affected Environment

Wild horses were present in the project area at the time the WFRHBA was signed in 1971. It is unknown exactly how long wild horses have populated these areas, but historic documents indicate they have been in the area for over 100 years. The AML for these HMAs was most recently established by the 1998 Green River RMP and the 2008 Rawlins RMP. The AML for each of these HMAs is provided in Table 2.

There are an estimated 5,105 adult wild horses present on these five HMAs at this time. This number is based on the most recent wild horse population surveys that took place in the spring of 2019, with adjustments based on an annual estimated population growth rate of 20%. Since 2012 the estimated population of wild horses in these HMAs has fluctuated between 1,652 and 5,105 (see Table 6).

Table 6. Estimated Wild Horse Population by HMA (2012 – 2021).

Year*	Adobe Town	Salt Wells Creek	Great Divide Basin	White Mountain	Little Colorado	Totals:
2012	433	572	439	135	73	**1,652**
2013	520	686	504	235	88	**2,033**
2014	566	728	618	152	138	**2,202**
2015	851	607	559	268	330	**2,615**
2016	684	696	542	221	306	**2,449**
2017	1,123	976	737	270	335	**3,441**
2018	741	551	754	278	391	**2,715**
2019	929	745	1,069	391	411	**3,545**
2020	1,115	894	1,283	469	493	**4,254**
2021	1,338	1,073	1,539	563	592	**5,105**

*Estimated population of adult wild horses as of January 1st of the listed year.

Wild horses were last removed from the Adobe Town, Salt Wells Creek and Great Divide Basin HMAs in 2017 (see Table 7). Wild horses were last removed from the White Mountain and Little Colorado HMAs in 2011 (see Table 7).

Past use of population growth suppression strategies on these HMAs are described in Section 3.1.3 of this document.

3.2.2 Environmental Effects

Impacts Associated with All Action Alternatives (II, III and IV)
All action alternatives would involve gathering and removing excess wild horses, and placing them in off range corrals and pastures. The following discussion describes impacts associated with this process that would occur under any action alternative (i.e. all alternatives except for the No Action alternative), followed by a discussion of impacts specific to each alternative.

Gather Related Impacts

The BLM has been conducting wild horse gathers since the mid-1970s. During this time, methods and procedures have been identified and refined to minimize stress and effects to wild horses during gather operations. The SOPs in Appendix E would be implemented to ensure a safe and humane gather operation and would minimize potential stress and injury to wild horses.

In wild horse gathers that utilize helicopters and motorized vehicles, gather-related mortality averages approximately 1% (Scasta 2020). Approximately six-tenths of one percent (0.6%) of the captured animals could potentially require humane euthanasia due to pre-existing conditions and in accordance with BLM policy (GAO 2008). These data confirm 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 (and burros) from the public lands.

As a further measure, it is BLM policy to only use helicopters to assist in the removal of wild horses from July 1 through February 28. The use of helicopters to assist in the capture of wild horses is prohibited during the six weeks before and the six weeks that follow peak foaling. The peak of foaling falls within about a two-week period during mid-April to mid-May for most wild horse herds. Therefore, the use of helicopters to capture wild horses is prohibited during March 1-June 30, except in emergencies.

Individual, direct effects to wild horses include the handling stress associated with the gathering, capture, sorting, handling, and transportation of the animals. The intensity of these effects varies by individual horse and is indicated by behaviors ranging from nervous agitation to physical distress. When being herded to trap site corrals by the helicopter, wild horses may sustain injuries bruises, scrapes, or cuts to feet, legs, face, or body from rocks, brush or tree limbs. Rarely will wild horses encounter barbed wire fences and will receive wire cuts. These injuries are very rarely fatal and are treated on-site until a veterinarian can examine the animal and determine if additional treatment is necessary.

Other injuries may occur after a wild horse has been captured and is either within the trap site corral, the temporary holding corral, during transport between facilities, or during sorting and handling. Occasionally, wild horses may sustain a spinal injury or a fractured limb but serious injuries requiring humane euthanasia occur in less than 1% of wild horses captured, on average (Scasta 2020). Similar injuries could be sustained if wild horses were captured through bait and/or water trapping, as the animals still need to be sorted, aged, transported, and otherwise handled following their capture. These injuries result from kicks and bites, or from collisions with corral panels or gates.

To minimize the potential for injuries from fighting, the animals are transported from the trap site to the temporary (or short-term) holding facility where they are sorted as quickly and safely as possible, then

moved into large holding pens where they are provided with hay and water. On many gathers, no wild horses are injured or die. On some gathers, due to the temperament of the horses, they are not as calm and injuries are more frequent.

Indirect individual effects are those which occur to individual wild horses after the initial event. These may include miscarriages in mares, increased social displacement, and conflict in studs. These effects, like direct individual effects, are known to occur intermittently during wild horse gather operations. An example of an indirect individual impact would be the brief 1-2 minute skirmish between older studs, which ends when one stud retreats. Injuries typically involve a bite or kick with bruises which do not break the skin. Like direct individual effects, the frequency of these effects varies with the population and the individual. Observations following capture indicate the rate of miscarriage varies, but can occur in about 1% to 5% of the captured mares, particularly if the mares are in very thin body condition or in poor health.

A few foals may be orphaned during a gather. This can occur if the mare rejects the foal, the foal becomes separated from its mother and cannot be matched up 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 the mother rejected it or died. These foals are usually in poor, unthrifty condition. Every effort is made to provide appropriate care to orphan foals. Veterinarians may be called to administer electrolyte solutions or orphan foals may be fed milk replacer as needed to support their nutritional needs. Orphan foals may be placed in a foster home in order to receive additional care. Despite these efforts, some orphan foals may die or be humanely euthanized as an act of mercy if the prognosis for survival is very poor.

Through the capture and sorting process, wild horses are examined for health, injury and other defects using the humane care and treatment methods as described in BLM PIM 2021-002 (see Appendix F). Decisions to humanely euthanize animals in field situations would be made in conformance with BLM policy. The policy described in IM 2015-070 is used as a guide to determine if animals meet the criteria and should be euthanized. Animals that are euthanized for non-gather related reasons include those with old injuries (broken or deformed limbs) that cause lameness or prevent the animal from being able to maintain an acceptable body condition (greater than or equal to body condition score of 3); old animals that have serious dental abnormalities or severely worn teeth and are not expected to maintain an acceptable body condition, and wild horses that have serious physical defects such as club feet, severe limb deformities, or sway back. Many of these defects can cause pain to the affected animal. Some of these conditions have a causal genetic component and the animals should not be returned to the range to avoid amplifying the incidence of the problem in the population. All euthanasia activities would be conducted using methods acceptable to the American Veterinary Medical Association (AVMA).

Wild horses not captured may be temporarily disturbed and moved into another area during the gather operation. With the exception of changes to herd demographics from removals, direct population effects have proven to be temporary in nature with most, if not all, effects disappearing within hours to several days of release. No observable effects associated with these impacts would be expected within one month of release, except for a heightened awareness of human presence.

By maintaining wild horse population size within the AML, there would be a lower density of wild horses across the HMAs, reducing competition for resources and allowing wild horses to utilize their preferred habitat. Maintaining population size within the established AML would be expected to improve forage quantity and quality, and promote healthy, self-sustaining populations of wild horses in a thriving natural

ecological balance and multiple use relationship on the public lands in the area. Deterioration of the range associated with wild horse overpopulation would be avoided. Managing wild horse populations in balance with the available habitat and other multiple uses would lessen the potential for individual animals or the herd to be affected by drought, and would avoid or minimize the need for emergency gathers, which would reduce stress to the animals and increase the success of these herds over the long term.

Gather and removal operations can disrupt harem structure when members of the harem are captured and removed. However, as a whole, gather and removal operations will not permanently disrupt the overall social structure of the herd. Harems will continue to form, stallions will defend their harems, and satellite males will continue to operate on the periphery of the harem.

Transport, Off Range Corrals, and Adoption (or Sale) Preparation Impacts

Approximately 3,555 excess wild horses would be removed. Animals would be transported from the capture/temporary holding corrals to the designated BLM off range corral. From there, they would be made available for adoption or sale to qualified individuals or relocated to off range pastures.

Wild horses selected for removal from the range are transported to the receiving off range corral in a straight deck semi-trailers or goose-neck stock trailers. Vehicles are inspected by the BLM Contracting Officer's Representative (COR) or Project Inspector (PI) prior to use to ensure wild horses can be safely transported and that the interior of the vehicle is in a sanitary condition. Wild horses are typically segregated by age and sex and loaded into separate compartments. A small number of mares may be shipped with foals. 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 an animal to be seriously injured or die during transport.

Upon arrival at the off range corral, recently captured wild horses are off-loaded by compartment 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 situation. At the off range corral, a veterinarian examines each load of horses and provides 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 (such as severe tooth loss or wear, club feet, and other severe congenital abnormalities) would be humanely euthanized using methods acceptable to the AVMA. The BLM has established best management practices to ensure the health and safety of wild horses in off range facilities. This includes isolating sick horses, and utilizing veterinarians to care for sick or injured horses, as well as vaccinating and deworming wild horses kept in off range facilities (see IM 2015-070).

Wild horses in very thin condition or animals with treatable injuries are sorted and placed in hospital pens, fed separately and/or treated for their injuries as indicated. Recently captured wild horses, generally mares, in very thin condition may have difficulty transitioning to feed. Some of these animals are in such poor condition that it is unlikely they would have survived if left on the range. Similarly, some mares may lose their pregnancies. 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.

After recently captured wild horses have transitioned to their new environment, they are prepared for adoption or sale. Preparation involves freeze-marking the animals with a unique identification number, drawing a blood sample to test for equine infections anemia, vaccination against common diseases,

microchipping, castration, and de-worming. 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 are rare, but can occur.

At off range corrals, a minimum of 700 square feet is provided per animal. Mortality at off range corrals averages approximately 5% per year (GAO 2008, page 51), 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.

Adoption or Sale with Limitations, and Off Range Pastures

Adoption applicants are required to have at least a 400-square-foot corral with panels that are at least six feet tall for horses over 18 months of age. Applicants are required to provide adequate shelter, feed, and water. The BLM retains title to the horse for one year and the horse and the facilities are inspected to assure the adopter is complying with BLM requirements. After one year, the adopter may take title to the horse, at which point the horse becomes the property of the adopter. Adoptions are conducted in accordance with 43 CFR 4750.

Potential buyers must fill out an application and be pre-approved before they may buy a wild horse. A sale-eligible wild horse is any animal that is more than 10 years old; or has been offered unsuccessfully for adoption three times. The application also specifies that all buyers are not to re-sell the animal to slaughter buyers or anyone who would sell the animal to a commercial processing plant. Sales of wild horses are conducted in accordance with IM 2019-026.

Between 2007 and 2009, nearly 62% of excess wild horses or burros were adopted and about 8% were sold with limitation to qualified individuals. Animals 5 years of age and older are generally transported to off-range pastures.

Potential effects to wild horses from transport to, adoption, sale or off range pastures are similar to those previously described. One difference is that when shipping wild horses for adoption, sale or off range pastures, animals may be transported for a maximum of 24 hours. Immediately prior to transportation, and after every 18-24 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 approximately 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 the stress of offloading and reloading is likely to be greater than the stress involved in the additional period of uninterrupted travel.

Off range pastures are designed to provide excess wild horses with humane, life-long care in a natural setting off the public rangelands. There, wild horses are maintained in grassland pastures large enough to allow free-roaming behavior and with the forage, water, and shelter necessary to sustain them in good condition. More than 37,000 wild horses, that are in excess of the existing adoption or sale demand (because of age or other factors), are currently located on private land pastures in Iowa, Kansas, Missouri, Montana, Nebraska, Oklahoma, South Dakota, Utah, and Wyoming. Located in mid or tall grass prairie regions of the United States, these off range pastures are highly productive grasslands as compared to more arid western rangelands. These pastures comprise about 400,000 acres (an average of about 8-10 acres per animal). The majority of these animals are older in age.

Mares and geldings are segregated into separate pastures. Although the animals are placed in off range pastures, they remain available for adoption or sale to qualified individuals who are interested in adopting or purchasing a larger number of animals. No reproduction occurs in the off range pastures, but foals born to pregnant mares are gathered and weaned when they reach about 8-10 months of age and are then shipped to off range corrals 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 the 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 very thin condition and are not expected to improve to a body condition score of 3 or greater due to age or other factors. Natural mortality of wild horses in off range pastures averages approximately 8% per year, but can be higher or lower depending on the average age of the horses pastured there (GAO 2008, page 52).

Euthanasia and Sale without Limitation

While the WFRHBA authorizes humane euthanasia and sale without limitation of healthy horses for which there is no adoption demand, Congress prohibited the use of appropriated funds between 1987 and 2004 and again starting in 2009 through the appropriations language each fiscal year through 2021 for this purpose. Sales of wild horses are conducted in accordance with IM 2019-026.

3.2.2.1 Alternative I: No Action

Under this alternative, no wild horses would be removed at this time. As a result, wild horses would not be subject to any individual direct or indirect impacts described in the action alternatives as a result of a gather operation. By 2021, wild horse populations would be expected to grow to about 6,126 wild horses, almost 3 times over high AML for these HMAs. Projected population increases would be expected to result in further deterioration of the range, and eventually lead to long-term impacts to both the health of the rangeland and the wild horse herds. Overall, wild horse populations under this alternative would not support a TNEB. Competition for available forage and water resources would continue to increase as the numbers of wild horses increase. Lactating mares, foals, and older animals would be affected most severely. Social stress would also be expected to increase among animals as they fight to protect their position at scarce forage and water sources. Potential for injuries to all age classes of animals would be expected to increase.

Areas closest to the water would experience severe utilization and degradation. Over time, the animals would also deteriorate in body condition as a result of declining quality and quantity of forage and increasing distances traveled to and from water to find forage. Many wild horses, especially mares with foals, would be put at risk due to a lack of forage and water, or would be expected to move outside the HMA boundaries in search of forage and water, potentially risking injury/death of animals and resulting in increasing damage to public, private, and State lands.

3.2.2.2 Alternative II: Proposed Action

Under this alternative the BLM would gather approximately 4,397 wild horses. An estimated 3,555 wild horses would be permanently removed from the HMAs and shipped to off range corrals. An estimated 422 studs would be returned to the range. Approximately 420 mares would be treated with an immunocontraceptive vaccine and returned to the range. Of the 420 mares treated with an immunocontraceptive vaccine, approximately 290 would also have an IUD implanted.

As a result of these actions, approximately 4,397 wild horses would experience the stress associated with a helicopter gather, as described earlier in this section. Of these, approximately

420 mares would undergo additional stress associated with fertility control treatments (see Section 3.1). Approximately 3,555 wild horses would be shipped to off range corrals and eventually either be adopted, sold, or shipped to off range pastures.

However, under this alternative, the impacts associated with gathers are expected to be reduced in the long term as a result of implementing population growth suppression strategies. The BLM estimates that following implementation of this alternative, wild horses would not need to be gathered from these HMAs for approximately 4 years (compared to a 2 year gather cycle under Alternative III). This will reduce the overall stress placed on wild horses in these HMAs associated with gather operations over the long term.

Additionally, this alternative will help maintain a thriving natural ecological balance, which will ensure wild horses have adequate access to forage, water, cover and space in these HMAs. Maintaining wild horses within AML, and slowing the population growth rate, will improve the condition of vegetation, water and soil resources within these HMAs (see Section 3.5). This in turn will ensure there are healthy wild horses, on healthy rangelands, which is the ultimate goal of the BLM wild horse program.

3.2.2.3 Alternative III

Under this alternative the BLM would gather and remove approximately 3,555 wild horses. As a result, these wild horses would experience the stress associated with a helicopter gather, as described earlier in this section. These animals would also undergo the impacts associated with transportation to off range corrals, adoption, purchase, and/or shipping to long term pastures as described earlier in this section.

Under this alternative, long term gather related impacts are expected to be higher than Alternatives II and IV. Because no population growth suppression strategies would be implemented under this alternative, these HMAs would likely need to be gathered again in approximately 2 years (compared to a 4 year gather cycle under Alternatives II and IV). This will lead to more frequent gather related impacts to wild horses in these HMAs, along with higher overall gather related stress to these animals.

This alternative will help maintain a thriving natural ecological balance, which will ensure wild horses have adequate access to forage, water, cover and space in these HMAs. However, a thriving natural ecological balance will only be maintained for approximately 2 years under this alternative. Maintaining wild horses within AML will improve the condition of vegetation, water and soil resources within these HMAs (see Section 3.5). This in turn will ensure there are healthy wild horses, on healthy rangelands, which is the ultimate goal of the BLM wild horse program.

3.2.2.4 Alternative IV

Under this alternative the BLM would gather approximately 4,397 wild horses. An estimated 3,555 wild horses would be permanently removed from the HMAs and shipped to off range corrals. An estimated 126 studs would be gelded and returned to the range. Approximately 379 studs would be returned to the range without being gelded. Approximately 253 mares would be treated with an immunocontraceptive vaccine and returned to the range. In addition to this, approximately 84 mares would be spayed.

As a result of these actions, approximately 4,397 wild horses would experience the stress associated with a helicopter gather, as described earlier in this section. Of these, approximately 337 mares and 126 studs would undergo additional stress associated with fertility control

treatments (see Section 3.1). The ratio of mares to studs would also be skewed (see Section 3.1). Approximately 3,555 wild horses would be shipped to off range corrals, and eventually either adopted or shipped to off range pastures.

However, under this alternative, the impacts associated with gathers are expected to be reduced in the long term as a result of implementing population growth suppression strategies. The BLM estimates that following implementation of this alternative, wild horses would not need to be gathered from these HMAs for approximately 4 years (compared to a 2 year gather cycle under Alternative III). This will reduce the overall stress placed on wild horses in these HMAs associated with gather operations over the long term.

Additionally, this alternative will help maintain a thriving natural ecological balance, which will ensure wild horses have adequate access to forage, water, cover and space in these HMAs. Maintaining wild horses within AML, and slowing the population growth rate, will improve the condition of vegetation, water and soil resources within these HMAs (see Section 3.5). This in turn will ensure there are healthy wild horses, on healthy rangelands, which is the ultimate goal of the BLM wild horse program.

3.2.3 Cumulative Effects

Because the primary impacts under these alternatives would only involve the wild horses present within these five HMAs, the CIAA for this section is the five HMAs impacted by the proposed action.

Since 2010, a total of 7,241 wild horses have been removed from these HMAs, with gathers occurring in 2010, 2011, 2013, 2014 and 2017 (see Table 7).

Table 7. Number of Wild Horses Removed from HMAs During Gather Operations (2010 – 2017).

HMA	2010	2011	2012	2013	2014	2015	2016	2017
Adobe Town	1,939*	0	0	589*	47	0	0	645
Salt Wells Creek		0	0		688	0	0	922
Great Divide Basin	0	990	0	0	526	0	0	401
White Mountain	0	326	0	0	0	0	0	0
Little Colorado	0	168	0	0	0	0	0	0
Totals:	**1,939**	**1,484**	**0**	**589**	**1,261**	**0**	**0**	**1,968**

*For Adobe Town and Salt Wells historic data only shows how many wild horses were removed from the complex as a whole in 2010 and 2013. There is no information on how many wild horses were removed from each individual HMA in those years.

The BLM is currently in the process of amending the Rock Springs and Rawlins RMPs for wild horse management regarding the HMAs that contain checkerboard land (Adobe Town, Salt Wells Creek, Great Divide Basin and White Mountain). A Draft EIS was released for public review on January 31, 2020. In the Draft EIS, the BLM's Preferred Alternative is to permanently revert the Salt Wells Creek, Great Divide Basin and White Mountain HMAs to Herd Areas, managed for zero wild horses, and reduce the AML of the Adobe Town HMA. If the RMP Amendment Preferred Alternative is selected and implemented, all wild horses would be permanently removed from these HMAs. The direct and indirect impacts described in this section would still occur (depending on the selected alternative), but would

eventually end in those three HMAs where all wild horses are removed. The direct and indirect effects described in this section would be expected to continue in a similar manner in the Adobe Town HMA, if the RMP Amendment Preferred Alternative is selected.

3.2.3.1 Alternative I: No Action

Since no wild horse gathers would occur under this alternative, there would be no impacts associated with gathering horses under this alternative. However, cumulative impacts associated with the overpopulation of wild horses would occur. Wild horses have exceeded AML on these HMAs 8 out of the last 10 years, even though gathers were conducted in 5 of the last 10 years. Therefore, this alternative would have a cumulative impact on wild horses by allowing an overpopulation to continue to exist. Since wild horses exceeded AML most years during the past decade, these animals have likely already been affected by the stress associated with overpopulation. This alternative would continue and exacerbate these impacts.

3.2.3.2 Alternative II: Proposed Action

Wild horses have been gathered from these HMAs in 5 out of the last 10 years (see Table 7). Cumulative impacts are expected to be reduced under this alternative, since the use of population growth suppression strategies would likely reduce the frequency of future gathers and the associated stress to the wild horses. Cumulative impacts associated with fertility control are discussed in Section 3.1.3 of this document.

3.2.3.3 Alternative III

Wild horses have been gathered from these HMAs in 5 out of the last 10 years (see Table 7). Frequent gathers on these HMAs likely increase stress associated with gathers and human handling for these wild horses. Cumulative impacts associated with wild horse gathers are expected to be similar to those occurring over the past decade under this alternative, as the gather cycle would remain approximately every 2 years.

3.2.3.4 Alternative IV

Wild horses have been gathered from these HMAs in 5 out of the last 10 years (see Table 7). Cumulative impacts are expected to be reduced under this alternative, since the use of population growth suppression strategies would likely reduce the frequency of future gathers. Cumulative impacts associated with fertility control are discussed in Section 3.1.3 of this document.

3.3 Issue 3: How would the proposed action affect the genetic diversity of the herd? How would it affect the herds ability to maintain a self-sustaining population?

3.3.1 Affected Environment

Most wild horses in these HMAs have mixed ancestry. BLM's wild horse handbook directs that a minimum population size of 50 effective breeding animals is recommended to maintain adequate genetic diversity (H-4700-1 Section 4.4.6.3). This is typically achieved by maintaining a total population of 150 – 200 wild horses. If the BLM cannot maintain a population of 150 – 200 animals, there are recommended management actions that can help maintain genetic diversity in the herd (H-4700-1 Section 4.4.6.4). Since low AML is over the 150-200 animals in the Adobe Town, Salt Wells Creek, Great Divide Basin and White Mountain HMAs, the BLM expects that these herds are likely to maintain adequate genetic diversity over time. The Little Colorado Herd, with a low AML of 69, has a higher

probability of low genetic diversity. However, interchange with wild horses from the White Mountain HMA likely helps to maintain adequate genetic diversity in this herd as well.

Metapopulation Considerations

Because of history, context, and periodic introductions, wild horses that live in the five HMAs analyzed here should not be considered as truly isolated populations (NRC 2013). Rather, managed herds of wild horses should be considered as components of interacting metapopulations, connected by interchange of individuals and genes due to both natural and human-facilitated movements. These animals are part of a larger metapopulation (NRC 2013) that has demographic and genetic connections with other BLM-managed herds in Wyoming, Colorado, Nevada, Utah, and beyond. Wild horse herds in the larger metapopulation have a background of diverse domestic breed heritage, probably caused by natural and intentional movements of animals between herds.

The 2013 National Academies of Sciences (NAS) report included other evidence that shows that the herds in these five HMAs are not genetically unusual, with respect to other wild horse herds. 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 indicate virtually no differentiation. Values of 0.10 indicate very little differentiation. 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 all these herds had pairwise Fst values that were less than 0.05 with at least 30 other sample sets. These results suggest that herds in these five HMAs are extremely similar, genetically, to a high number of other BLM-managed herds, supporting the interpretation that these horses are components in a highly connected metapopulation that includes horse herds in many other HMAs.

Genetic Analyses of the HMAs

The BLM periodically collects hair samples from wild horses within these HMAs to test the current genetic health of the herd. Below is a discussion, by HMA, regarding the results of the most recent genetic analysis for each herd.

Adobe Town

Genetic variability samples were collected in 2017 for the Adobe Town HMA. The genotypes of those samples were analyzed by Dr. E. Gus Cothran, Department of Veterinary Integrative Bioscience, Texas A&M University. His conclusions and recommendations regarding genetic variability in the Adobe Town herd are summarized here:

> "Genetic variability of this herd is high. The values related to allelic diversity in particular suggest a herd with highly mixed ancestry. This view is consistent with the similarity values seen and the heterozygosity measures. The herd ancestry likely includes some Spanish component based upon this data and the data from 2003 and 2012… Current variability levels are good and this herd has shown no obvious change in diversity levels since 2012. Re-sampling of the herd should be considered by 2022 to check for changes in variation. However, unless there is some serious change in population size resampling could be delayed for two to three additional years." (Cothran 2020).

Dr. Cothran's report shows that New World Iberian Breeds are about equally represented in the genetics as a number of other breeds, including Old World Iberian Breeds, Oriental and Arabian Breeds, and North American Gaited Breeds. Based on this information, it is unlikely that many horses in the Adobe Town HMA represent a predominantly New World Iberian Breed in their ancestry. The Rawlins RMP (2008) directs that BLM will "[e]mploy selective removal criteria during periodic gathers to increase the recognized occurrence of the New World Iberian genotype and associated phenotype above current levels". The presence of the New World Iberian Breed genotype at similar levels to those observed in the past demonstrates that past gathers have not likely affected the presence of this genotype within the Adobe Town herd.

Salt Wells Creek

Genetic variability samples were collected in 2010 for the Salt Wells Creek HMA. The genotypes for those samples were analyzed by Dr. Cothran at Texas A&M University. His conclusions and recommendations regarding genetic variability in the Salt Wells Creek herd are summarized here:

> "Genetic variability of this herd in general is on the high side but some of the diversity may be related to unrecognized population subdivision. Even if this is true, the *Ho* values indicated good levels of genetic variation. Genetic similarity results suggest a herd with mixed ancestry. Current variability levels are high enough that no action is needed at this point" (Cothran 2011b).

Great Divide Basin

Genetic variability samples were collected in 2011 for the Great Divide Basin HMA. The genotypes for those samples were analyzed by Dr. Cothran at Texas A&M University. His conclusions and recommendations regarding genetic variability in the Great Divide Basin herd are summarized here:

> "Genetic variability of this herd in general is high but understanding the diversity of this herd is somewhat complicated. This herd was previously sampled in 2003. At that time the sample consisted of two subdivisions of the herd area labeled North and South. Genetic variability levels of both groups were relatively high but not quite as high as seen here. Much of the high variability was attributed to mixing of the two groups and that would fit the herd now. However, the herds did not appear to be a single population but maintained some independence. This may not be the case now as the almost zero *Fis* is what would be expected for a single interbreeding group and not a subdivided population. The high percentage of variation that is at risk also is consistent with a formally subdivided population now interbreeding. Genetic similarity results suggest a herd with mixed ancestry. Current variability levels are high enough that no action is needed, however, if population size drops below 150 breeding age animals, diversity levels can change quickly." (Cothran 2012b).

White Mountain

Genetic variability samples were collected in 2011 for the White Mountain HMA. The genotypes of those samples were analyzed by Dr. Cothran at Texas A&M University. His conclusions and recommendations regarding genetic variability in the White Mountain herd are summarized here:

> "Genetic variability of this herd in general is on the high side but there is a high percentage of variation that is at risk and individual heterozygosity is below average by a small amount. The patterns seen here are very similar to what was seen in 2000 based upon blood typing. It was suggested then that there may be some gene flow into the population

> and that is consistent with the current data. The very high allelic diversity but high proportion of alleles at low frequency is just what would be expected if there was a small influx of horses into the herd at different times. It is possible there is introgression from the two neighboring HMAs with Salt Wells being the more probable based upon level of differentiation. Genetic similarity results suggest a herd with mixed ancestry… Current variability levels are high enough that no action is needed at this point but the herd should be monitored closely due to the high proportion of rare alleles. This is especially true if it is known that the herd size has seen a recent decline." (Cothran 2012c).

Little Colorado

Genetic variability samples were collected in 2011 for the Little Colorado HMA. The genotypes of those samples were analyzed by Dr. Cothran at Texas A&M University. His conclusions and recommendations regarding genetic variability in the Little Colorado herd is summarized here:

> "Genetic variability of this herd in general is on the high side but compared to 2007 there has been a loss of observed heterozygosity. Every other measure of genetic variation was essentially the same with what differences there were attributable to sampling variation. The change in *Ho* is accompanied by a change in *Fis* from a negative to a positive value. This could be an indication in a loss of population size which has resulted in greater inbreeding (positive *Fis*). However, this would not be expected in a period of only 5 years. Genetic similarity results suggest a herd with mixed ancestry… Current variability levels are high enough that no action is needed at this point but the herd should be monitored closely due to the observed change in in *Ho*. This is especially true if it is known that the herd size has seen a recent major reduction in size." (Cothran 2012a).

3.3.2 Environmental Effects

3.3.2.1 Alternative I: No Action

Since no gathers would occur, and no population growth suppression strategies would be implemented under this alternative, wild horse populations would continue to grow. As a result, the BLM would expect the genetic diversity of these herds to improve under this alternative, with a reduced likelihood for inbreeding over the long term.

3.3.2.2 Alternative II: Proposed Action

Under this alternative 3,555 wild horses would be permanently removed from these HMAs and 420 wild horses would be treated with a temporary fertility control treatment. Those horses that are permanently removed from these HMAs will no longer contribute to the genetic diversity of these herds. Those treated with temporary fertility control would also not contribute to the genetic diversity of these herds, until the effects of the treatments wear off. It is possible that a small portion of those treated will become permanently infertile. These animals would no longer contribute to the genetic diversity of the herd.

The BLM does not expect a negative impact to the New World Iberian genotype in the Adobe Town HMA as a result of this alternative. Wild horses that express traits consistent with this genotype (see Appendix D) will be returned to the Adobe Town HMA. Furthermore, because the treatments proposed under this alternative would only temporarily induce infertility in treated mares, they would have little effect on the occurrence of the New World Iberian genotype. This will help preserve and promote the New World Iberian genotype consistent with the requirements of the Rawlins RMP.

Overall, this alternative is not expected to affect the genetic diversity of the herd to the point where inbreeding depression is expected. These herds are expected to maintain an adequate number of breeding animals, in the long term, to maintain adequate genetic diversity and maintain a self-sustaining population. The BLM would continue to monitor the genetic condition of these herds and take appropriate actions if genetic diversity drops below an acceptable level. Such actions may include maximizing the number of breeding age wild horses within the herd, adjusting the sex ratio in favor of males to increase the number of harems and effective breeding males, or periodically introducing 1-2 young mares from other herds living in similar environments.

3.3.2.3 Alternative III

Under this alternative 3,555 wild horses would be permanently removed from these HMAs. Those horses that are permanently removed from these HMAs will no longer contribute to the genetic diversity of these herds. Overall impact to genetic diversity is expected to be less than Alternative II and IV since no population growth suppression strategies would be implemented under this alternative.

The BLM does not expect a negative impact to the New World Iberian genotype in the Adobe Town HMA as a result of this alternative. Wild horses that express traits consistent with this genotype (see Appendix D) will be returned to the Adobe Town HMA. This will help preserve and promote the New World Iberian genotype consistent with the requirements of the Rawlins RMP.

Overall, this alternative is not expected to affect the genetic diversity of the herd to the point where inbreeding depression is expected. These herds are expected to maintain an adequate number of breeding animals to maintain adequate genetic diversity and maintain a self-sustaining population. The BLM would continue to monitor the genetic condition of these herds and take appropriate actions if genetic diversity drops below an acceptable level. Such actions may include maximizing the number of breeding age wild horses within the herd, adjusting the sex ratio in favor of males to increase the number of harems and effective breeding males, or periodically introducing 1-2 young mares from other herds living in similar environments.

3.2.2.4 Alternative IV

Under this alternative an estimated 3,555 wild horses would be permanently removed from the HMAs. An estimated 126 studs would be gelded and returned to the range. Approximately 379 studs would be returned to the range without being gelded. Approximately 253 mares would be treated with an immunocontraceptive vaccine and returned to the range. In addition to this, approximately 84 mares would be spayed. Those horses that are permanently removed from these HMAs, gelded or spayed will no longer contribute to the genetic diversity of these herds. Those treated with temporary fertility control would also not contribute to the genetic diversity of these herds, until the effects of the treatments wear off. It is possible that a small portion of those treated will become permanently infertile. These animals would no longer contribute to the genetic diversity of the herd. Even after all population growth suppression strategies are implemented, approximately 1,087 animals (or 70%) of these herds would remain untreated and able to reproduce.

The BLM does not expect a negative impact to the New World Iberian genotype in the Adobe Town HMA as a result of this alternative. Wild horses that express traits consistent with this genotype (see Appendix D) will be returned to the Adobe Town HMA and would not be spayed

or gelded. If any undergo immunocontraceptive vaccine treatment the effects would only temporarily induce infertility in treated mares; therefore, they would have little effect on the occurrence of the New World Iberian genotype in the long term. This will help preserve and promote the New World Iberian genotype consistent with the requirements of the Rawlins RMP.

Overall, this alternative is not expected to affect the genetic diversity of the herd to the point where inbreeding depression is expected. These herds are expected to maintain an adequate number of breeding animals, in the long term, to maintain adequate genetic diversity and maintain a self-sustaining population. The BLM would continue to monitor the genetic condition of these herds and take appropriate actions if genetic diversity drops below an acceptable level. Such actions may include maximizing the number of breeding age wild horses within the herd, adjusting the sex ratio in favor of males to increase the number of harems and effective breeding males, or periodically introducing 1-2 young mares from other herds living in similar environments.

3.3.3 Cumulative Effects

Because the primary impacts under these alternatives would only involve the wild horses present within these five HMAs, the CIAA for this section is the five HMAs impacted by the proposed action. The primary events that can have an impact on the genetic diversity of a wild horse population, and their ability to maintain a self-sustaining population, are gathers and sudden die offs. Since populations have been steadily increasing within these HMAs over the past decade, the cumulative effects analysis will focus on impacts associated with past gathers.

The BLM is currently in the process of amending the Rock Springs and Rawlins RMPs for wild horse management regarding the HMAs that contain checkerboard land (Adobe Town, Salt Wells Creek, Great Divide Basin and White Mountain). A Draft EIS was released for public review on January 31, 2020. In the Draft EIS, the BLM's Preferred Alternative is to permanently revert the Salt Wells Creek, Great Divide Basin and White Mountain HMAs to Herd Areas, managed for zero wild horses, and reduce the AML of the Adobe Town HMA. If the RMP Amendment Preferred Alternative is selected and implemented, all wild horses would be permanently removed from three of these HMAs. The direct and indirect impacts described in this section would still occur (depending on the selected alternative), but would eventually end in those three HMAs where all wild horses are removed, as there would no longer be a herd in these areas for which genetic diversity would be a concern. All wild horses that would be removed from the range, under the Preferred Alternative, would cease to contribute to the genetic diversity of wild horses within the greater metapopulation. The direct and indirect effects described in this section would be expected to continue in a similar manner in the Adobe Town HMA, if the RMP Amendment Preferred Alternative is selected.

3.3.3.1 Alternative I: No Action

Since genetic diversity would be expected to improve under this alternative, there would be no negative cumulative impacts associated with this alternative.

3.3.3.2 Alternative II: Proposed Action

Since 2010, a total of 7,241 wild horses have been removed from these HMAs. Once removed, those animals no longer contributed to the genetic diversity of these herds. Additionally, in 2011 the BLM used PZP (in the Adobe Town/Salt Wells Creek complex) and sex ratio skewing (in the White Mountain/Little Colorado complex). The BLM expects that the effects of these fertility treatments have since worn off, and all breeding age animals within these HMAs are able to reproduce. The BLM has not noticed any signs of inbreeding depression in these HMAs, and the

population continues to grow at a high rate. This indicates that genetic diversity is adequate in these HMAs.

Since the effects of past fertility treatments have likely worn off, they are not expected to have a cumulative effect with fertility treatments proposed in this alternative. Furthermore, since the wild horse population has increased, and is currently the highest it's been in the last decade, this removal and treatment is not expected to have a cumulative impact on genetic diversity when combined with past gathers.

3.3.3.3 Alternative III

The cumulative impacts associated with this alternative would be the same as those described under Alternative II (Section 3.3.3.2).

3.3.3.4 Alternative IV

The cumulative impacts associated with this alternative would be the same as those described under Alternative II (Section 3.3.3.2).

3.4 Issue 4: How would the proposed action affect livestock operations within these HMAs?

3.4.1 Affected Environment

There are 32 livestock grazing allotments that fully or partially overlap these five HMAs. Table 8 provides a summary of permitted Animal Unit Months (AUMs) for these allotments, by HMA. An AUM is the amount of forage needed to sustain one cow or five sheep for a month. An estimated 191,791 active livestock AUMs are currently permitted within these five HMAs. However, many livestock operators currently only utilize a portion of their permitted use. From 2010 through 2020, livestock operators used (on average) 96,487 (or 50%) of their annual permitted livestock AUMs within these HMAs. In comparison, wild horses had an average population of 3,001 from 2012 through 2021, requiring 36,013 AUMs annually. At their current population of 5,105, wild horses within these HMAs consume an estimated 61,260 AUMs. At their high AML (2,145) wild horses would use 25,740 AUMs.

Annual fluctuations in the use of authorized livestock AUMs are common and are the result of user demands, climatic conditions, and/or an effort to preserve or improve rangeland health. Some livestock users within the planning area have reduced their use levels in recent years as a result of wild horse populations exceeding AML, which can negatively impact livestock operations (see Section 3.4.2). Livestock grazing on specific allotments is authorized during established seasons of use. Most of the allotments are operated under grazing strategies incorporating rest, seasonal rotations, deferment, and prescribed use levels that provide for adequate plant recovery time to enhance rangeland health. The majority of these allotments are considered lower-elevation allotments, and livestock turnout in these allotments typically occurs from March to May. Some livestock operators (especially sheep operators) move their livestock to USFS-administered allotments from July to October. There are several BLM-administered allotments at higher elevations where grazing does not begin until June. Typically, the season of use for these allotments is four to six months.

Numerous range improvements (such as fences or water developments) have been installed within the planning area to help manage livestock distribution and season of use, while protecting sensitive riparian habitat. Many of these range improvements benefit multiple resource values, including wild horses and wildlife. There is a limited amount of fencing within these HMAs.

The BLM allocated forage for livestock use through the 1997 Green River RMP and the 2008 Rawlins RMP.

Table 8. Grazing allotments within HMAs, their corresponding permitted AUM allocations and the estimated permitted active livestock AUMs located within the HMA.

HMA	Allotment	% of Allotment Within HMA	Permitted Active AUMs on Allotment	Estimated Active AUMs within HMA*
Adobe Town (RSFO)	Rock Springs	5%	107,991	8,071
	Total:		**107,991**	**8,071**
Adobe Town (RFO)	Adobe Town	100%	1,820	1,820
	Continental	100%	2,830	2,830
	Corson Springs	97%	1,189	1,189
	Cow Creek	100%	709	709
	Crooked Wash	67%	5,602	3,064
	Espitalier	100%	2,775	2,775
	Grindstone Springs	100%	413	413
	Little Powder Mountain	100%	1,534	1,534
	Powder Mountain	100%	1,304	1,304
	Red Creek	100%	2,612	2,612
	Rotten Springs	100%	1,423	1,423
	Sand Creek	100%	2,839	2,839
	Willow Creek	100%	1,680	1,680
	Total:		**26,730**	**24,183**
Great Divide Basin	Bush Rim	55%	3,277	1,808
	Continental Peak	100%	5,769	5,712
	Red Desert	100%	9,758	9,744
	Rock Springs	17%	107,991	18,650
	Total:		**126,795**	**35,914**
Salt Wells Creek	Alkali Creek	100%	2,283	2,283
	Circle Springs	100%	946	946
	Crooked Wash	100%	5,602	2,351
	Horseshoe Wash	35%	3,103	1,089
	Mellor Mountain	99%	6,101	6,009
	Pine Mountain	5%	7,763	418

HMA	Allotment	% of Allotment Within HMA	Permitted Active AUMs on Allotment	Estimated Active AUMs within HMA*
	Rife	100%	508	508
	Rock Springs	36%	107,991	38,068
	Salt Wells	99%	2,618	2,587
	Vermillion Creek	100%	5,298	5,298
	Total:		**142,213**	**59,556**
White Mountain	Highway-Gasson	95%	5,208	5,000
	Lombard	6%	6,643	378
	Rock Springs	13%	107,991	13,685
	Total:		**119,842**	**19,063**
Little Colorado	Big Sandy	100%	3,480	3,480
	Boundary	100%	2,996	2,996
	Eighteen Mile	100%	18,994	18,994
	Figure 4	100%	6,644	6,644
	Highway-Gasson	5%	5,208	208
	Lombard	94%	6,643	6,265
	Rock Springs	<1%	107,991	345
	Sublette	100%	6,072	6,072
	Total:		**158,028**	**45,004**

3.4.2 Environmental Effects

3.4.2.1 Alternative I: No Action

Under this alternative, wild horse population control methods would not be implemented. This alternative would allow wild horse populations to increase within the project area and likely expand into nearby non-HMA areas in Wyoming and Colorado. Since livestock and wild horses compete for similar resources (food and water), livestock use would be directly impacted by an ever-growing overpopulation of wild horses, both within and outside the HMAs. In response to the overpopulation of wild horses, livestock operators may have to reduce, or remove, their livestock from the range in order to ensure their stock are adequately fed, and to prevent excessive impacts to rangeland resources.

The current wild horse population is several times above their forage allocation. Without removing excess wild horses, heavy to severe utilization would likely occur in future years, especially during times of drought. The indirect impacts of taking no action would impact rangeland health; increase competition between livestock, wild horses and wildlife for the available forage and water; reduced quantity and quality of forage and water; and impact livestock operators who utilize these grazing allotments.

Displacement of livestock under this alternative would be slow and indirect. It is possible that livestock operators would need to maintain range improvements more frequently due to the increased number of wild horses that would use them. In some cases, livestock operators may maintain their water sources, only to find that wild horses have made full use of the water source,

leaving little for livestock use. If livestock operators are forced to remove their livestock from the range, they would likely cease maintaining their range improvements altogether. As the wild horse population increases, range conditions would deteriorate. Since it can take a long time for rangelands to recover from impacts associated with overgrazing, it is likely that rangelands would continue to be in a degraded condition even if excess wild horses are removed from the range in future years.

3.4.2.2 Alternative II: Proposed Action

Operations involved in removing wild horses may temporarily cause some disturbance to livestock present during the removal process. Livestock operators within the gather area would be notified prior to the gather, enabling them to take precautions and avoid conflict with gather operations.

Reducing wild horse populations within established AMLs would promote a thriving natural ecological balance. This would help ensure adequate forage and water is available for livestock, as well as wild horses, and other wildlife species. As a result, competition between livestock and wild horses for these resources would be reduced. Because fertility control methods would be implemented under this alternative, it is expected that it will take longer for wild horses to exceed AML in these HMAs. This will promote a more long-lasting thriving natural ecological balance, which will promote good rangeland health, and adequate forage and water for all resource values, including livestock. This would provide a greater benefit to livestock operations, and other resource values, compared to Alternative III, where no fertility control would be used.

3.4.2.3 Alternative III

Operations involved in removing wild horses may temporarily cause some disturbance to livestock present during the removal process. Livestock operators within the gather area would be notified prior to the gather, enabling them to take precautions and avoid conflict with gather operations.

By taking actions to maintain wild horses within established AMLs, this alternative would promote a thriving natural ecological balance. This would help ensure adequate forage and water is available for livestock, as well as wild horses, and other wildlife species. As a result, competition between livestock and wild horses for these resources would be reduced. However, because no fertility control methods would be implemented under this alternative, these conditions are expected to be short lived, with wild horses likely exceeding AML within approximately 2 years following the gather. If another gather is conducted at that time, then a thriving natural ecological balance will be maintained, which will benefit livestock operations. However, if a gather is delayed, then the impacts associated with competition when there is a wild horse overpopulation (see Section 3.4.2.1) would occur. For this reason, this alternative is expected to provide less of a benefit to livestock operations compared to Alternatives II and IV.

3.4.2.4 Alternative IV

Since fertility control methods would be implemented under this alternative, impacts to livestock operations would be the same as those described for Alternative II (Section 3.4.2.2).

3.4.3 Cumulative Effects

The CIAA for livestock grazing is the area within these five HMAs. The primary impact identified that could have potential cumulative effects is competition for resources (primarily water and forage). Livestock, wild horses and wildlife all compete for these resources. All of these species have the

potential to utilize the entire CIAA. However, most competition occurs in areas near water, which represent a small percent of the landscape, but play a disproportionally important role in providing habitat for wildlife, livestock and wild horses. Other activities that remove available forage can contribute to the cumulative impact on livestock operations, as well as wild horses and other wildlife species. These can include: wildland fires, mining activities, oil and gas development, roadways, railways, utility lines and other structures. Total disturbance from all these other activities is estimated at less than 3% of the area included in these HMAs.

Because the BLM expects the number of wildlife present within the CIAA to remain the same under all alternatives, wildlife would contribute to competition for scarce resources. Under Alternative I there would be a greater overall cumulative impact to livestock, due to the presence of more wild horses, and the same number of wildlife, competing with livestock for forage and water. This cumulative impact would be reduced in a similar way under Alternatives II, III and IV. However, since wild horse population growth rates would be higher under Alternative III, future competition between wild horses, wildlife and livestock would be higher under this alternative, compared to Alternatives II and IV.

3.5 Issue 5: How would the concentration of wild horses at trap sites affect vegetation, special status plants, and soils?

3.5.1 Affected Environment

The predominant vegetation communities present within the project area are sagebrush steppe and salt desert shrub communities. Most soils within the area are Entisols, which are highly undeveloped soils with low amounts of organic matter. Many of these soils can be susceptible to excessive erosion if the associated vegetation is removed.

While some invasive species are present within the area (primarily Halogeton (*Halogeton glomeratus*)), they primarily occupy areas that have been disturbed. A large scale effort to reduce or maintain invasive plant species and noxious weeds has taken place in this area for decades. As a result of these efforts, it is estimated that invasive species occupy less than 3% of the landscape.

There are two federally listed plant species that may occur within the project area: Blowout penstemon (*Pentemon haydenii*) and Ute Ladies'-Tresses (*Spiranthes diluvialis*). While there is potential habitat for these species within the project area, there are no known current populations present in this area.

The following BLM Wyoming sensitive plant species may occur within the project area:

- Beaver Rim phlox (*Phlox pungens*)
- Cedar Rim thistle (*Cirsium aridum*)
- Green River greenthread (*Thelesperma caespitosum*)
- Limber pine (*Pinus flexilis*)
- Ownbey's thistle (*Cirsium ownbeyi*)
- Small rockcress (*Boechera pusilla*)
- Cedar Mountain Easter daisy (*Townsendia microcephala*)
- Dune wildrye (*Elymus simplex* var. *luxurians*)
- Large-fruited bladderpod (*Lesquerella macrocarpa*)
- Meadow pussytoes (*Antennaria arcuata*)
- Precocious milkvetch (*Astragalus proimanthus*)
- Stemless beardtongue (*Penstemon acaulis* var. *acaulis*)

- Trelease's racemose milkvetch (*Astragalus racemosus*)
- Uinta greenthread (*Thelesperma pubescens*)
- Tufted twinpod (*Physaria condensata*)
- Wyoming tansymustard (*Descurainia torulosa*)

3.5.2 Environmental Effects

When managed within AML, wild horses are not expected to cause undue impacts to vegetation resources, soils, or sensitive plant species. However, when wild horse population numbers greatly exceed AML, it is possible that these resources may be impacted by wild horse trampling and grazing activities. However, since all action alternatives would remove excess wild horses to maintain the population within AML, these impacts are not expected under these alternatives.

The primary potential impact to vegetation, soils and sensitive plant species are associated with the use of trap sites and holding corrals as part of the gather process. Since these facilities would be required under any action alternative, the associated impacts are discussed together in one section.

3.5.2.1 Alternative I: No Action

Because there would be no gather activities under this alternative there would be no potential impacts to vegetation resources, soils or special status plant species related to trap sites or corrals. However, all of these resources may be impacted by a continued overpopulation of wild horses.

Wild horses can impact vegetation resources (including special status plant species) by consuming forage, and by trampling. However, wild horses can also benefit soils by adding organic material and nutrients as they defecate. Soils can become compacted in areas where wild horses frequently travel, and removal of vegetation from grazing/trampling can leave soils vulnerable to erosion. These impacts are likely to be greater near water resources, and are reduced as distance to water increases. Since wild horses occupy the range year-round, these impacts can be greater than similar impacts from livestock that occur only during specified seasons of use.

Dispersed grazing, which typically occurs when wild horses are managed within AML, causes minimal impact to these resource values, with impacts focused primarily near water sources. As such, impacts from wild horses are expected to be minimal when they are managed within AML. However, when there is an overpopulation of wild horses, impacts to these resource values are expected to increase, especially during drought years. Impacts will occur at further distances from water, and more areas will be impacted from wild horse trailing, as animals search farther from water for adequate forage. Under these conditions, there is a greater potential for impacts to special status plant species, either from grazing activities or trampling. These conditions could also promote the establishment and spread of invasive plant species and noxious weeds.

If an overpopulation of wild horses continues for an extended period of time, it would likely cause long term negative impacts to rangeland resources, including a long term decrease in available forage. If this were to occur, degraded resource conditions may remain even after excess wild horses are removed from the range.

If no gathers are conducted in future years, populations of wild horses might eventually stabilize at very high numbers at their food-limited ecological carrying capacity. At these levels, range

conditions would greatly deteriorate which would adversely affect the native vegetation species, soils and the habitat for special status species.

Perennial vegetation would continue to experience year-round grazing pressure by wild horses. In addition to this, perennial vegetation would continue to experience grazing pressure from permitted livestock activities. At high grazing pressure, desirable perennial vegetation can decrease in vigor and abundance. Soil erosion and plant health would continue to be most greatly affected around water locations, and to a lesser extent away from water sources. If wild horses are left unmanaged, damage to riparian areas may occur due to potential destruction of vegetation along streambanks. Erosion could increase and contribute to downstream sediment and salinity issues. Watershed health throughout the area would continue to decrease, resulting in increased sediment and salinity delivery into local and regional drainages.

As native plant health deteriorates and plant cover, vigor, and litter would be reduced, soil erosion increases, and a long-term loss of productivity would occur. More desirable species, such as Indian ricegrass (*Achnatherum hmenoides*), needle-and-thread (*Hesperostipa comata*), and bottlebrush squirreltail (*Elymus elymoides*), would be reduced or lost from the native plant communities. Plant species that are less desirable or more grazing resistant, such as western wheatgrass (*Pascopyrum smithii*), thickspike wheatgrass (*Elymus lanceolatus*) and weeds, would be increased in terms of their composition within the affected plant communities. Similar results could occur in the isolated riparian habitats with sedges, rushes and grasses being replaced with Baltic rush (*Juncus arcticus*) and weedy species. In cases of extreme wild horse overpopulations, a large amount of bare ground would be expected, spreading longer distances from water sources.

3.5.2.2 Alternatives II, III and IV

Under these alternatives, the impacts associated with an overpopulation of wild horses would be avoided (see Section 3.5.2.1). However, there would be potential impacts to vegetation, special status plants, and soils as a result of gather activities, though these impacts would be less frequent under Alternatives II and IV as a result of implementing population growth suppression strategies.

Impacts to vegetation, special status plant species, and soils are most likely to occur in areas where wild horses congregate for extended periods of time. During a wild horse gather, the primary areas where this is likely to occur are at trap sites and temporary holding corrals. Prior to using any trap site or temporary holding corral, a team of BLM resource specialists inspect the site to ensure there are no sensitive plant species or cultural resources present. They also ensure the site would not have a negative impact on any wildlife species.

Trap sites consist of two primary areas, the wings and the corral. The wings are constructed by driving metal t-posts into the ground at certain intervals and then connecting a material to the posts to create a “soft” barrier. The wings are typically established on two sides and funnel wild horses into a corral at the end of the trap site. Because of the size of the area encompassed by the wings (typically 2 or more acres) and the relatively small number of wild horses that occupy this area at any given time, impacts to vegetation and soils are expected to be minimal and temporary in this area.

The corral portion of the trap site typically occupies a much smaller area (typically less than ½ acre). Within the corral portion of the trap site, wild horses are more concentrated for extended periods of time. This will likely lead to trampling of any vegetation inside the corral area, and

some soil compaction. If a trap site is used for multiple days and a large number of horses are trapped in that area, it is possible that the corral portion of the trap will be primary bare ground by the time the operation is complete. To minimize impacts to vegetation and soils, the BLM typically tries to establish trap sites in areas that are already disturbed, such as trap sites used in previous gathers.

Impacts to vegetation and soils are expected to be greater at temporary holding corrals. These corrals (which are typically less than ½ acre) typically hold a large number of wild horses while they are sorted, inspected, and doctored (if needed), prior to shipping them to off range corrals. Furthermore, they are typically used throughout the duration of a gather, which can last a month or more. In comparison, trap sites are typically only used for a few days until all needed horses have been gathered from a given area. As a result, the BLM expects that all vegetation within the area will be trampled, leaving only bare ground by the end of the gather. Also, soil compaction is expected to be higher in these areas. The BLM typically only utilizes 1 -2 temporary holding corrals during a gather. As mentioned earlier, all such sites are inspected by BLM resource specialists to ensure there will be no deleterious impacts to special status plants, cultural resources, or wildlife. Consideration is also given to potential for erosion and the loss of the vegetation within the area when the site is picked. The BLM typically chooses sites that have already been disturbed to minimize impacts to vegetation and soil resources.

Overall, impacts to vegetation and soils at trap sites and holding corrals are expected to be temporary. After these facilities are removed, vegetation typically returns to the area, and compaction to soils will decrease over time. However, if the same trap site is used in multiple gathers, these impacts may be exacerbated (see Section 3.5.3).

3.5.3 Cumulative Effects

Because trap sites and temporary corrals would be inspected by BLM resource specialists prior to use, to ensure no sensitive plant species are present, there are no potential cumulative impacts to sensitive plant species associated with this proposal.

The CIAA for vegetation and soil resources is the project area, including the entire area encompassed by the five HMAs. Vegetation and soils can be impacted by other grazing animals, such as livestock. See Section 3.4 of this EA for details on the amount of forage permitted for livestock use, and how much forage is typically consumed in a given year. Other activities that destroy vegetation and impact the soil surface can also contribute to the cumulative impact on vegetation and soils. These can include: wildland fires, mining activities, oil and gas development, roadways, railways, utility lines and other structures. Total disturbance from all these other activities is estimated at less than 3% of the area included in these HMAs.

3.5.3.1 Alternative I: No Action

Current and historic livestock grazing is the primary activity contributing to the cumulative impacts that this alternative would have on vegetation and soil resources in the CIAA. See Section 3.4 of this EA for details on the amount of forage permitted for livestock use, and how much forage is typically consumed in a given year. In addition, wild horses have exceeded AML in 8 out of the last 10 years. Section 3.2.1 describes the history of the wild horse populations in these HMAs (see Table 6 in particular). As a result of wild horses exceeding AML over the majority of the past decade, the impacts described in Section 3.5.2.1 would be compounded by both the duration of time during which an overpopulation of wild horses existed and through an increasing population of wild horse.

3.5.3.2 Alternative II, III and IV

If the same locations are used for trap sites and temporary holding facilities, the impacts to vegetation and soils in these areas may be compounded over time. By disturbing these sites every few years, gather activities can prevent stable, perennial vegetation from permanently establishing on these sites. Additionally, soils may not have adequate time to recover from compaction before the site is impacted again. This can lead to a greater amount of soil compaction than would occur if a site was only used once. Additionally, it is likely that vegetation in these locations would be limited to early seral species, primarily annuals, and possibly invasive species. The cumulative impacts across the CIAA would be limited, however, when trap sites and corrals are placed in areas that have already been disturbed.

3.6 Issue 6: How would the proposed action affect rangeland health?

3.6.1 Affected Environment

Rangeland health is generally described as the "degree to which the integrity of the soil and ecological processes of rangeland ecosystems are sustained. Rangeland health exists when ecological processes are functioning properly to maintain the structure, organization and activity of the system over time" (H-4180-1). BLM Wyoming has developed standards for healthy rangelands (BLM 1997b). The Wyoming Standards for Healthy Rangelands are:

Standard 1: Within the potential of the ecological site (soil type, landform, climate, and geology), soils are stable and allow for water infiltration to provide for optimal plant growth and minimal surface runoff.

Standard 2: Riparian and wetland vegetation has structural, age, and species diversity characteristics of the stage of channel succession and is resilient and capable of recovering from natural and human disturbance in order to provide forage and cover, capture sediment, dissipate energy, and provide for ground water recharge.

Standard 3: Upland vegetation on each ecological site consists of plant communities appropriate for the site which are resilient, diverse, and able to recover from natural and human disturbance.

Standard 4: Rangelands are capable of sustaining viable populations and a diversity of native plant and animal species appropriate to the habitat. Habitats that support or could support threatened species, endangered species, species of special concern, or sensitive species will be maintained or enhanced.

Standard 5: Water quality meets State standards.

Standard 6: Air quality meets State standards.

The BLM periodically reviews the condition of public rangelands relative to these standards and determines the condition of rangeland health. Table 9 summarizes the most recent results of Land Health Standards Evaluations for the grazing allotments that are located within these five HMAs.

Table 9. Summary of most recent Land Health Standards Evaluation by allotment.

Allotment	Associated HMAs	Wyoming Rangeland Health Standards Not Met						Wild Horses Potential Causal Factor?
		1	2	3	4	5	6	
Adobe Town	Adobe Town							
Alkali Creek	Salt Wells Creek							

Allotment	Associated HMAs	Wyoming Rangeland Health Standards Not Met						Wild Horses Potential Causal Factor?
		1	2	3	4	5	6	
Big Sandy	Little Colorado							
Boundary	Little Colorado							
Bush Rim	Great Divide Basin		X					No
Circle Springs	Salt Wells Creek							
Continental	Adobe Town							
Continental Peak	Great Divide Basin							
Corson Springs	Adobe Town							
Cow Creek	Adobe Town							
Crooked Wash (Hiawatha Tridistrict)	Adobe Town							
Eighteen Mile	Little Colorado		X					No
Espitalier	Adobe Town							
Figure 4	Little Colorado							
Grindstone Springs	Adobe Town							
Highway-Gasson	White Mountain Little Colorado		X					No
Horseshoe Wash	Salt Wells Creek							
Little Powder Mountain	Adobe Town							
Lombard	White Mountain Little Colorado		X					No
Mellor Mountain	Salt Wells Creek		X					No
Powder Mountain	Adobe Town							
Red Creek	Adobe Town							
Red Desert	Great Divide Basin							
Rife	Salt Wells Creek							
Rock Springs	Adobe Town Salt Wells Creek Great Divide Basin White Mountain Little Colorado		X					Yes
Rotten Springs	Adobe Town							
Salt Wells	Salt Wells Creek		X					No
Sand Creek	Adobe Town							
Sublette	Little Colorado							
Vermillion Creek	Salt Wells Creek		X					Yes
Willow Creek	Adobe Town							

3.6.2 Environmental Effects

3.6.2.1 Alternative I: No Action

No gather-related impact to rangeland health would occur under this alternative. However, because the wild horses would continue to exceed high AML it is likely that impacts to vegetation and soils (see Section 3.5) would lead to failure to meet numerous rangeland health standards.

An overpopulation of wild horses would likely impact water source first, causing a degradation of rangeland health in riparian areas (Wyoming Standard 2). Degraded stream conditions and the addition of contaminants from wild horse fecal matter could lead to a failure to meet Wyoming water quality standards (Wyoming Standard 5). Following this, greater impacts in upland vegetation communities would likely lead to decreased plant vigor and productivity and evidence of excessive erosion (Wyoming Standards 1 and 3). All these factors would lead to a reduction in the quality of habitat for wildlife species (Wyoming Standard 4). Overall, failure to maintain wild horses within AML is expected to compromise the integrity of the soil and the ecological processes of the rangeland ecosystem, leading to an overall reduction in rangeland health within these HMAs and failure to meet TNEB.

3.6.2.2 Alternative II: Proposed Action

Impacts to vegetation and soils associated with gather operations (see Section 3.5) would be small and localized, and would not be expected to have an impact on the overall health of the rangeland within these HMAs. However, taking action to maintain wild horses within AML would likely maintain or improve current rangeland health conditions.

The impacts an overpopulation of wild horses can have on rangeland health are described in Section 3.6.2.1. This alterative would remove excess wild horses, and thereby promote a thriving natural ecological balance and promote rangeland health. The use of population growth suppression strategies would also promote an improvement in rangeland health by reducing the frequency at which wild horses exceed AML. Overall, this alternative is expected to help maintain or improve current rangeland health conditions.

3.6.2.3 Alternative III

Impacts to vegetation and soils associated with gather operations (see Section 3.5) would be small and localized, and would not be expected to have an impact on the overall health of the rangeland within these HMAs. However, taking action to maintain wild horses within AML would likely maintain or improve current rangeland health conditions.

The impacts an overpopulation of wild horses can have on rangeland health are described in Section 3.6.2.1. This alterative would remove excess wild horses, and thereby promote a thriving natural ecological balance and promote rangeland health. Overall, this alternative is expected to help maintain or improve current rangeland health conditions.

3.6.2.4 Alternative IV

Impacts to rangeland health under this alternative would be the same as those described for Alternative II (Section 3.6.2.2).

3.6.3 Cumulative Effects

The CIAA for rangeland health is the area within these five HMAs. Rangeland health can be affected by a variety of factors, including: grazing animals, wildlife, energy development, climatic conditions, historic uses, pollution, conditions upstream from a river or stream, and urban expansion. Because Section 3.6.2 already discusses how each alternative would contribute to rangeland health conditions, and because cumulative impacts would be similar under each action alternative, this section will talk generally about other conditions that affect rangeland health, rather than discussing them by alternative.

The local climate has been trending warmer and drier over the past few decades. This has caused some water sources (especially smaller springs and streams) to go dry. Drying water sources have caused an

increase in impacts from wild horses, livestock and wildlife at the remaining water sources. Furthermore, drying conditions have affected the abundance and vigor of some vegetation communities. These conditions can exacerbate impacts to rangeland health related to an overpopulation of wild horses.

Livestock utilize most of the area within these HMAs, but their use is most concentrated near water sources. Section 3.4 of this EA provides a detailed discussion regarding the level of grazing use that occurs on these rangelands from livestock operations. Impacts to rangeland health from livestock grazing are often similar to wild horses, with a few important distinctions. Livestock do not tend to range out as far as wild horses when searching for forage, therefore their impacts to rangeland health are more heavily concentrated near water sources. However, livestock typically only occupy the range for a portion of the year, whereas wild horses utilize the area year round. The BLM is constantly coordinating with livestock operators to adjust grazing programs to promote rangeland health on each grazing allotment. Wild horse use on the range is primarily unmanaged, outside of maintaining animals within AML. Because wild horses and livestock can impact rangeland health, the BLM must consider both uses in balance in order to promote healthy rangelands. The BLM does this by maintaining wild horses within AML and limiting livestock grazing use within the terms established in grazing permits.

Other activities that occur on the range can impact rangeland health. These can include: wildland fires, mining activities, oil and gas development, roadways, railways, utility lines and other structures. Total disturbance from all these other activities is estimated at less than 3% of the area included in these HMAs.

3.7 Issue 7: How would gather operations impact big game habitat on crucial winter range?

3.7.1 Affected Environment

Big game populations within these HMAs include moose, elk, mule deer, white-tailed deer, and pronghorn antelope; over 55 percent of the planning area is considered crucial big game habitat. All of the HMAs in the area contain designated Crucial Winter Range (CWR) habitat for big game species. Table 10 summarizes the acreage of big game CWR habitat by HMA. There is significant overlap in CWR for different species within each HMA.

Table 10. Summary of acres of big game CWR habitat by HMA.

HMA	HMA Acres	Pronghorn CWR	Elk CWR	Mule-Deer CWR
Adobe Town	469,473	56,000	2,400	59,000
Salt Wells Creek	1,172,237	123,000	8,800	122,000
Great Divide Basin	777,164	137,500	91,800	254,000
White Mountain	383,798	217,000	35,500	0
Little Colorado	630,759	246,000	22,600	40,900
Total:	**3,433,431**	**779,500**	**161,100**	**475,900**

3.7.2 Environmental Effects

3.7.2.1 Alternative I: No Action

Under the No Action Alternative there would be no direct or indirect impacts associated with gather operations to big game species. However, this alternative would have a negative impact on big game due to continued high use of the native habitat and ever-increasing population size of wild horses through time. This alternative would allow wild horse populations to continue to increase within the HMAs, and nearby areas, as no wild horse population management would

take place. Heavy utilization of vegetation would be expected to occur. Populations of wild horses might eventually stabilize at very high numbers at their food-limited ecological carrying capacity. At these population levels, range conditions would deteriorate, which would affect the native vegetation species as well as seasonal habitats for big game species.

3.7.2.2 Alternative II: Proposed Action

Under Alternative II, helicopter drive-trapping and assisted roping operations may be conducted in the analysis area from July 1 through February 28. Helicopter herding represents a high intensity, but transient source of disturbance that would become increasingly concentrated and more frequent near the trap site. Most big game would be on their summer ranges during this timeframe. By July, offspring would be sufficiently mobile to avoid disturbances, with little risk of separation from adults. It is doubtful that dispersed helicopter herding and the initially intense, but short-term and relatively predictable gathering/holding activities would contribute substantially to deterioration in animal fitness at the population level, but big game would tend to avoid or be displaced from areas within 0.5 to 1 mile of helicopter herding activities. It is anticipated that displaced animals would return, more or less, to pre-disturbance distribution soon after gather operations at an individual site were complete.

Gather related effects would be similar to those discussed above if conducted July through late fall. If operations extend into the winter and late winter months of December through February when adverse weather and forage conditions exert their greatest influence on big game condition (i.e., on severe winter ranges) and when animals are most concentrated (i.e., winter concentration areas), the adverse impacts to big game could be exacerbated. Although disturbances would be short-term, energy expended by animals repeatedly avoiding gather activity or fleeing close helicopter approach, particularly in more open sagebrush terrain and under snowpack conditions, may influence the subsequent condition (e.g., winter fitness, gestation) of those animals affected. An extended gather strategy, depending on the duration and frequency of operations on these ranges, may have adverse consequences on a relatively small portion of the big game population, but would provide a measure of flexibility in scheduling gathers to avoid important big game hunting seasons.

Administration of fertility control treatments to wild horses would not be expected to have any direct influence on big game populations. Indirectly, reductions in the wild horse growth rate would be expected to reduce the need and frequency of gather operations and those impacts to wildlife species discussed above.

Long-term improvements in rangeland condition associated with wild horse removal are expected to far outweigh the short-term and localized impacts associated with gather operations.

3.7.2.3 Alternative III

Direct and indirect impacts to big game and their habitats associated with gather operations would be similar to those discussed under Alternative II. However, gather operations, and their impacts, would be expected to occur more frequently due to lack of fertility control treatments.

3.7.2.4 Alternative IV

Direct and indirect impacts to big game and their habitats associated with gather operations would be similar to those discussed under Alternative II. Gather operations are expected to occur less frequently with the use of fertility control treatments.

3.7.3 Cumulative Effects

The CIAA for big game is the project area, plus any part of a big game herd unit that extends outside of the planning area, an area that encompasses 7,464,699 acres. The primary impact identified that could have potential cumulative effects is competition for resources (such as water and forage) between wild horses, livestock and wildlife. Because Section 3.7.2 already discusses how each alternative would impact big game habitat, and because cumulative impacts would be similar under each action alternative, this section will talk generally about other conditions that affect big game habitat, rather than discussing them by alternative.

Other disruptive activities that occur within the CIAA for big game species include wildland fires, mining activities, oil and gas development, roadways, railways, utility lines and other structures. Overall, these disturbances represent approximately 5% of the CIAA. These activities can degrade big game habitat and inhibit migration. This decrease in overall habitat can increase the potential for competition with wild horses and livestock for resources.

Livestock utilize most of the area within these HMAs, but their use is most concentrated near water sources. Section 3.4 of this EA provides a detailed discussion regarding the level of grazing use that occurs on these rangelands from livestock operations and wild horse use.

Failure to gather wild horses would result in continued season-long grazing use, exacerbating detrimental effects on wildlife resources, particularly in preferred use areas. Shifts in ground cover composition resulting from inappropriate levels of growing season use by wild horses compounded by authorized livestock use would reduce the suitability and utility of affected shrub-steppe habitat in the longer term and may be irreversible without extraordinary management intervention.

3.7.4 Mitigation

As outlined in Section 2.0, helicopter gather operations would not occur between March 1 and June 30 due to peak foaling period, which encompasses a portion of the big game CWR timeframe. In addition to this, the portions of the HMAs that are within big game CWR habitat would be subject to the timing restriction dates (November 15 to April 30), particularly for trap and holding pen sites. This limitation would substantially reduce impacts associated with helicopter gather operations. In the long-term, the benefits to big game habitat and overall rangeland conditions associated with removal of wild horses would far outweigh the expected nominal and short-term impacts to big game associated with wild horse population management.

3.8 Issue 8: How would the removal of wild horses affect sage-grouse habitat in PHMA?

3.8.1 Affected Environment

The Greater sage-grouse (*Centrocercus urophasianus*), an iconic western species, inhabits much of the sagebrush-steppe habitat in these HMAs. The sagebrush-steppe habitat type is abundant across the HMAs. Sage-grouse habitat consists of large, intact and mostly treeless landscapes with sagebrush, native bunchgrasses, wildflowers and wet meadows. These big areas are called sagebrush-steppe or sagebrush shrublands. The climate is semi-arid, with cold winters and hot summers. Each of the HMAs in the planning area contains significant expanses of sage-grouse Priority Habitat Management Areas (PHMA), as outlined in Table 11. Most of the areas of each HMA that are outside of sage-grouse PHMA still contain sage-grouse habitat and are considered General Habitat Management Areas (GHMA). Sagebrush within these PHMAs provide nesting, forage and cover resources for sage-grouse.

Table 11. Summary of Sage-grouse PHMA acres by HMA.

HMA	HMA Acres	Sage-grouse PHMA
Adobe Town	469,473	59,100
Salt Wells Creek	1,172,237	341,200
Great Divide Basin	777,164	254,600
White Mountain	383,798	263,500
Little Colorado	630,759	383,200
Total:	**3,433,431**	**1,301,600**

The presence of wild horses is associated with a reduced degree of greater sage-grouse lekking behavior (Muñoz et al. 2021). Moreover, increasing densities of wild horses, measured as a percentage above AML, are associated with decreasing greater sage-grouse population sizes, measured by lek counts (Coates 2020). Horses are primarily grazers (Hanley and Hanley 1982), but shrubs – including sagebrush – can represent a large part of a horse's diet (Nordquist 2011).

3.8.2 Environmental Effects

3.8.2.1 Alternative I: No Action

Under the No Action Alternative there would be no direct or indirect impacts to sage-grouse associated with gather operations. However, this alternative would have a negative impact on sage-grouse due to continued high use of the native habitat and ever-increasing population of wild horses through time. This alternative would allow wild horse populations to continue to increase within the HMAs, and nearby areas, as no wild horse population management would take place. Heavy utilization of vegetation would be expected to occur. Decreases in vegetative ground cover can lead to increased predation rates on sage-grouse, as the reduction in vegetative cover makes it easier for predators to spot their prey. Populations of wild horses might eventually stabilize at very high numbers at their food-limited ecological carrying capacity. At these population levels, range conditions would deteriorate which would affect the native vegetation species as well as the habitat quality for sage-grouse within PHMA and GHMA.

3.8.2.2 Alternative II: Proposed Action

The removal of excess wild horses from the HMAs and associated non-HMA areas would cause temporary trampling of some vegetation and soil compaction, particularly at the trap sites and holding locations. Since impacts to vegetation and soils would be temporary, and gather activities would occur outside of lekking periods, this is not expected to have an overall negative impact to sage-grouse. Wild horse populations at the lower end of AML would prevent wild horses from over utilizing vegetation and further reducing vegetative ground cover. The quality of habitat within the PHMA throughout these HMAs could improve. Vegetation composition, cover, and vigor could improve or be maintained near water sources where wild horses tend to congregate. An improvement in vegetation habitat condition could lead to improved wild horse distribution, which would prevent over-utilization and reduction in vegetation cover. Vegetative diversity and health should improve in areas where excess wild horses are removed.

Removing wild horses to the low end of AML and using fertility control measures would allow the habitat to recover for a longer period of time as the number of wild horses would not increase as fast as without these reproductive controls. At these population levels, range conditions would maintain or improve the native vegetation plant communities, within PHMA, for sage-grouse.

3.8.2.3 Alternative III

Direct and indirect impacts associated with the removal of wild horses to the low end of AML would be similar to those discussed under Alternative II. Gather operations are expected to occur more frequently due to lack of fertility control treatments. The quality of sage-grouse habitat should be maintained and improved in areas where excess wild horses are removed.

3.8.2.4 Alternative IV

Direct and indirect impacts associated with removal of wild horses to the low end of AML would be similar to those discussed under Alternative II. Gather operations are expected to occur less frequently with the use of fertility control treatments. The quality of sage-grouse habitat should be maintained and improved in areas where excess wild horses are removed.

3.8.3 Cumulative Effects

The CIAA for sage-grouse is the Greater South Pass PHMA, Continental Divide PHMA and the Salt Wells PHMA. This area encompasses approximately 5,164,486 acres. A variety of factors can negatively impact the quality of sage-grouse habitat within this area, including: energy development, construction of roadways that fragment habitat, wildfires that destroy large stands of sagebrush, degraded habitat from overgrazing (both from livestock and wild horses) and construction of projects that provide perch sites for predators of sage-grouse. Overall, within the CIAA total disturbance is estimated at approximately 5%. Wild horses are present through a large portion of the CIAA, including other HMAs that are outside of the project area. Livestock graze through the vast majority of the CIAA.

Failure to gather wild horses would result in continued season-long grazing use, exacerbating detrimental effects on wildlife resources, particularly in preferred use areas. Shifts in ground cover composition resulting from inappropriate levels of growing season use by wild horses compounded by authorized livestock use would reduce the suitability and utility of affected shrub-steppe habitat in the longer term and may be irreversible without extraordinary management intervention. Strong reductions in the density and height of herbaceous ground cover from collective ungulate grazing would be expected to depress nest success and or breeding densities, particularly to ground nesting and near-ground nesting bird species like sage-grouse. Progressive deterioration of native ground cover communities, particularly in sagebrush-steppe habitats, would contribute to the cumulative range-wide deterioration and modification/loss of sagebrush habitats and the proliferation of invasive annual grasses. Removing excess wild horses would reduce these cumulative impacts to sage-grouse habitat. This reduction in impacts would occur until wild horse populations again exceed AML. Therefore, these cumulative impacts would be greatest under Alternative I, since no wild horses would be removed from the range. They would be lowest under Alternatives II and IV because wild horse population growth rates would be reduced under these alternatives.

3.8.4 Mitigation

As outlined in Section 2.0, helicopter gather operations would not occur between March 1 and June 30 due to the peak foaling period, which encompasses the sage-grouse breeding, nesting and early brood-rearing period. This limitation would substantially reduce impacts associated with helicopter gather operations (e.g., noise, human activity, potential for nest trampling/disruption). Similarly, restrictions on the timing of gather operations would reduce the potential for disrupting courtship/breeding activities and minimize impacts to nesting and early brood-rearing habitat. By policy, the BLM does not conduct helicopter gathers from March 1st through June 30th. In the long-term, the benefits to sagebrush communities and overall rangeland conditions associated with removal of wild horses would far outweigh the expected nominal and short-term impacts to sage-grouse PHMAs associated with wild horse population management.

3.9 Issue 9: How would gather operations affect raptors and migratory birds that are present within these HMAs?

3.9.1 Affected Environment

Raptor and migratory bird nesting areas are dispersed throughout the project area. Cliffs and rock outcrops may support the nesting functions of golden eagle, ferruginous hawk, red-tailed hawk, prairie and peregrine falcons, as well as other raptor species. Migratory birds nest in most habitats associated with the project area. There are dozens of known (historic and recent) raptor nests documented throughout the project area.

3.9.2 Environmental Effects

3.9.2.1 Alternative I: No Action

Alternative I would have a negative impact due to continued high use of the native habitat and increasing population size of wild horses through time. This alternative would allow wild horse populations to continue to increase within the HMAs and nearby areas as no wild horse population management would take place. Heavy utilization of vegetation would be expected to occur. Populations of wild horses might eventually stabilize at very high numbers at their food-limited ecological carrying capacity. At these population levels, range conditions would deteriorate which would affect the nesting and foraging habitat for raptor and migratory bird species. Raptor nest habitat would not be directly affected by declining range conditions, but degraded herbaceous ground cover would indirectly affect raptors through reduced abundance and diversity of avian and mammalian prey.

3.9.2.2 Alternative II: Proposed Action

Helicopter based gather activities may coincide with the later reproductive activities of raptors and migratory birds from early July through mid-August. The relatively infrequent circumstance where active raptor nests would be subjected to brief and close approach by helicopter activity late in the nesting sequence would not be expected to prompt prolonged nest absences or have any substantive influence on chick survival. Preparation and gathering work in July and August may infrequently impact late nesting attempts of raptors, including golden eagle and BLM-sensitive raptors. There may be potential for inadvertent nest trampling/disruption for ground and low shrub nesting bird species. Assuming most nesting activity would have been completed by early July, gather operations in a particular area are not expected to impact many nesting birds. This level of impact would have no discernible influence on population-level abundance or reproductive performance, even at the smallest landscape level. There are no identified impacts resulting from this alternative during winter months when migratory birds are not nesting within the project area.

Surveys of suitable raptor, or other migratory bird, nesting habitat would be conducted by RSFO or RFO staff on those trap sites proposed for use or development during the breeding period. In the event an active raptor nest is found in the vicinity of trapping operations, these sites would be afforded a buffer to effectively isolate nesting activity from disruptions generated by wild horse trapping operations.

Administration of fertility control treatments would not be expected to have any direct influence on raptor or migratory bird populations. Indirectly, reductions in the wild horse growth rate would be expected to reduce the need and frequency of gather operations and those impacts to species discussed above.

Long-term improvements in rangeland condition associated with wild horse removal are expected to far outweigh the short-term and localized impacts associated with gather operations.

3.9.2.3 Alternative III

Direct and indirect impacts to raptor and migratory bird species and habitats from gather operations would be similar to those discussed under Alternative II. Gather operations are expected to occur more frequently due to lack of fertility control treatments.

3.9.2.4 Alternative IV

Direct and indirect impacts to raptor and migratory bird species and habitats from gather operations would be similar to those discussed under Alternative II. Gather operations are expected to occur less frequently with the use of fertility control treatments.

3.9.3 Cumulative Effects

The CIAA for raptors and migratory birds is the project area. Livestock grazing, energy development, wildfires, and wild horse use are the primary activities that have or are currently influencing rangeland conditions that provide nesting, forage and cover resources for raptor and migratory bird species in the analysis area. Total disturbance within the CIAA is estimated at less than 3%. For any project approved on public land, the BLM implements timing restrictions and buffers to protect nesting habitat during critical periods, which should minimize cumulative impacts to raptors and migratory birds. Shifts in ground cover composition resulting from inappropriate levels of growing season use by wild horses compounded by authorized livestock use would reduce the suitability and utility of affected shrub-steppe habitat in the longer term and may be irreversible without extraordinary management intervention. Removing excess wild horses would reduce these cumulative impacts to migratory bird habitat. This reduction in impacts would occur until wild horse populations again exceed AML. Therefore, these cumulative impacts would be greatest under Alternative I, since no wild horses would be removed from the range. They would be lowest under Alternatives II and IV because wild horse population growth rates would be reduced under these alternatives.

3.9.4 Mitigation

As outlined in the Section 2.0, helicopter gather operations would not occur between March 1 and June 30 due to peak foaling, which encompasses a large portion of the raptor and migratory bird nesting period. This limitation would substantially reduce impacts associated with helicopter gather operations (e.g., noise, human activity, potential for nest trampling/disruption). Similarly, restrictions on trap locations outlined in Section 2.0 would reduce the potential for disrupting nesting and foraging activities and minimize impacts to nesting success. In the long-term, the benefits to sagebrush communities and overall rangeland conditions associated with removal of wild horses would far outweigh the expected nominal and short-term impacts to raptor nests and nesting success associated with wild horse population management.

3.10 Issue 10: How would the removal of wild horses affect recreational wild horse viewing?

3.10.1 Affected Environment.

Some members of the public enjoy viewing wild horses within these HMAs. Some people (residents and nonresidents) make special trips to see wild and free-roaming horses in their natural environment. This provides a potential draw for tourism in the area. The two most popular areas for wild horse viewing are along the Pilot Butte Wild Horse Scenic Loop Byway, close to the cities of Rock Springs and Green River; and in the Salt Wells Creek HMA, near Mellor Mountain. Viewing opportunities can be directly

affected by the number of wild horses that are present on the range. When more wild horses are present, it is easier to encounter a wild horse herd when driving through the HMAs.

3.10.2 Environmental Effects

3.10.2.1 Alternative I: No Action

The No Action Alternative would lead to increased opportunities to view wild horses, as more animals would be present on the range. However, heavy utilization of vegetation would occur over time, which would impact some of the aesthetic values associated with wild horse viewing opportunities. If excess wild horses remain on the range for an extended period of time, wild horse health would be expected to decline due to increased competition for scarce resources. As wild horse health declines or wild horses leave the HMAs in search of food and water, the aesthetic value of wild horse viewing opportunities would be negatively affected.

3.10.2.2 Alternative II: Proposed Action

Alternative II would allow for continued viewing of healthy wild horses in the HMAs, though fewer horses would be present making it potentially more difficult to locate animals. Using temporary population growth suppression strategies would maintain the wild horse population at a lower level for a longer period. The aesthetic values provided with wild horse viewing would be enhanced as habitat conditions within the HMAs improve, and the body condition of the wild horses is maintained or improved. The number of viewing opportunities would be reduced under this alternative because it would result in fewer wild horses to view. However, this reduction in the number of wild horses within these HMAs is not expected to have an impact on local tourism related to wild horses, since there would still be at least 1,550 wild horses available for viewing within these HMAs.

3.10.2.3 Alternative III

Direct and indirect impacts associated with viewing wild horses in these HMAs would be similar to those discussed under Alternative II. However, under this alternative, wild horse viewing opportunities may be slightly better because wild horse populations would grow faster, providing more wild horses to encounter.

3.10.2.4 Alternative IV

Impacts associated with viewing wild horses in the HMAs under this alternative would be the same as those discussed under Alternative II.

3.10.3 Cumulative Effects

The CIAA for wild horse viewing is the project area. The BLM is currently in the process of amending the Rock Springs and Rawlins RMPs for wild horse management regarding the HMAs that contain checkerboard land (Adobe Town, Salt Wells Creek, Great Divide Basin and White Mountain). A Draft EIS was released for public review on January 31, 2020. In the Draft EIS, the BLM's Preferred Alternative is to permanently revert the Salt Wells Creek, Great Divide Basin and White Mountain HMAs to Herd Areas, managed for zero wild horses, and reduce the AML of the Adobe Town HMA. If the RMP Amendment Preferred Alternative is selected and implemented, all wild horses would be permanently removed from these HMAs. If this were to occur, there would be a cumulative impact on opportunities to view wild horses in the CIAA. In the long term, wild horses would only be available to view in the Adobe Town HMA, once the RMP Amendment Preferred Alternative was implemented.

3.11 Issue 11: How would gather operations affect recreational hunting experiences?

3.11.1 Affected Environment.

Hunting is a popular recreational experience on the lands encompassed by these HMAs. This area provides premier hunting opportunities for elk, mule-deer and pronghorn. Many of the hunting units in this area feature premier limited entry draws, that are highly sought after. The primary hunting season for big game in this area runs from August 15th – October 31st each year.

3.11.2 Environmental Effects

Potential impacts to recreational hunting experiences primarily would come from the potential for low flying helicopters to disrupt wildlife, making it more difficult for hunters to locate and approach an animal. Because this impact would be the same under any action alternative, the associated impacts are discussed together in one section.

3.11.2.1 Alternative I: No Action

Under the No Action Alternative, there would be no direct impacts to recreational hunting opportunities related to gather operations. However, under this alternative habitat conditions for big game are expected to be reduced (see Sections 3.5, 3.6 and 3.7). This could impact hunting experiences by reducing big game populations in this area, and by degrading the natural setting, which is part of the experience that recreational hunters enjoy.

3.11.2.2 Alternative II, III and IV

Under these alternatives, the impacts associated with an overpopulation of wild horses would be avoided (see Section 3.11.2.1). However, there would be potential impacts to recreational hunting experiences as a result of gather activities.

Low flying helicopters can disrupt wildlife making it more difficult for hunters to locate and approach an animal. It is possible for gather operations to occur during open hunting seasons, including on opening days. While the BLM can strive to avoid conducting gathers on the opening day of a hunt, it is not always practical to do so (due to limitations associated with the gather operation contracts). Impacts to hunters would be temporary and limited to those areas where trapping is actively occurring (approximately an 8 mile radius around a trap site).

3.11.3 Cumulative Effects

A variety of factors can impact hunting experiences including weather conditions, the number of other hunters present, and activities that cause a lot of noise (e.g., logging, construction). While the BLM does not currently have any project planned that would be expected to cause excessive noise within these HMAs at the same time gather operations would take place, it is possible that activities taking place on private land could contribute to the cumulative impacts of gather operations by creating additional noise and disturbance for wildlife. Because impacts associated with gather operations would be temporary and limited, the cumulative impacts are also expected to be temporary and limited.

4.0 TRIBES, INDIVIDUALS, ORGANIZATIONS, or AGENCIES CONSULTED

Tribes, individuals, organizations, and agencies were included in the scoping process. A letter soliciting scoping comments for the proposed wild horse gather in the Adobe Town, Salt Wells Creek, Great Divide

Basin, White Mountain and Little Colorado HMAs was mailed to 160 recipients on November 21, 2019. The BLM has consulted with Native American Tribes regarding this action, including: Eastern Shoshone, Northern Arapaho, Shoshone Bannock and the Ute Tribe of the Uintah and Ouray Reservation. Tribal consultation may continue throughout this process.

See Section 1.4 for more information regarding the results of public scoping.

5.0 LIST OF PREPARERS

Name	Title
Jay D'Ewart	Wild Horse & Burro Specialist, RSFO
Spencer Allred	Supervisory Rangeland Management Specialist
Mark Snyder	Supervisory Wildlife Biologist
Gavin Lovell	Assistant Field Manager – Resources, RSFO
Eddie Vandenberg	Wild Horse & Burro Specialist, RFO
Tim Novotny	Assistant Field Manager – Resources, RFO

REFERENCES

Baker, D.L., J.G. Powers, M.O. Oehler, J.I. Ransom, J. Gionfriddo, and T.M. Nett. 2013. Field evaluation of the Immunocontraceptive GonaCon-B in Free-ranging Horses (*Equus caballus*) at Theodore Roosevelt National Park. Journal of Zoo and Wildlife Medicine 44:S141-S153.

Baker D.L., J.G. Powers, J.I. Ransom, B.E. McCann, M.W. Oehler, J.E. Bruemmer, N.L. Galloway, D. C. Eckery, and T. M. Nett. 2018. Reimmunization increases contraceptive effectiveness of gonadotropin-releasing hormone vaccine (GonaCon-Equine) in free-ranging horses (Equus caballus): Limitations and side effects..PLoS ONE 13(7): e0201570.

Barber, M.R., and R.A. Fayer-Hosken. 2000. Evaluation of somatic and reproductive immunotoxic effects of the porcine zone pellucida vaccination. Journal of Experimental Zoology 286:641-646.

Bartholow, J.M. 2004. An economic analysis of alternative fertility control and associated management techniques for three BLM wild horse herds. USGS Open-File Report 2004-1199.

Bechert, U., J. Bartell, M. Kutzler, A. Menino, R. Bildfell, M. Anderson, and M. Fraker. 2013. Effects of two porcine zona pellucida immunocontraceptive vaccines on ovarian activity in horses. The Journal of Wildlife Management 77:1386-1400.

Bertin, F. R., K. S. Pader, T. B. Lescun, and J. E. Sojka-Kritchevsky. 2013. Short-term effect of ovariectomy on measures of insulin sensitivity and response to dexamethasone administration in horses. American Journal of Veterinary Research 74:1506–1513.

Bowen, Z. 2015. Assessment of spay techniques for mare in field conditions. Letter from US Geological Survey Fort Collins Science Center to D. Bolstad, BLM. November 24, 2015. Appendix D in Bureau of Land Management, 2016, Mare Sterilization Research Environmental Assessment, DOI-BLM-O-B000-2015-055-EA, Hines, Oregon.

Botha, A.E., M.L. Schulman, H.J. Bertschinger, A.J. Guthrie, C.H. Annandale, and S.B. Hughes. 2008. The use of a GnRH vaccine to suppress mare ovarian activity in a large group of mares under field conditions. Wildlife Research 35:548-554.

Bureau of Land Management (BLM) 1997a. Record of Decision and Green River Resource Management Plan. BLM/WY/PL-97-027+1610. BLM Wyoming State Office, Rock Springs District Office, October 1997.

BLM. 1997b. Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the State of Wyoming.

BLM. 2008. Record of Decision and Rawlins Resource Management Plan. BLM/WY/PL-08/007+1610. BLM Wyoming State Office, High Desert District Office, December 2008.

BLM. 2010. BLM-4700-1 Wild Horses and Burros Management Handbook. Washington, D.C.

BLM. 2015. Ely District Water Canyon wild horse growth suppression pilot program; environmental assessment. Bureau of Land Management, Ely District Office, Ely, Nevada.

Coates, P.S. 2020. Sage-grouse leks and horses. Presentation of unpublished USGS research results to the Free-Roaming Equid and Ecosystem Sustainabilty Network summit. October 2020, Cody, Wyoming. https://extension.usu.edu/freesnetwork/summit-2020. Accessed February 19, 2021.

Coit, V.A., F.J. Dowell, and N.P.Evans. 2009. Neutering affects mRNA expression levels for the LH-and GnRH-receptors in the canine urinary bladder. Theriogenology 71:239-247.

Collins, G. H., and J. W. Kasbohm. 2016. Population dynamics and fertility control of feral horses. Journal of Wildlife Management 81: 289-296.

Cothran, E. Gus 2011a. “Genetic Analysis of the Salt Wells Creek HMA, Manual Gap subgroup, WY”. Department of Veterinary Integrative Bioscience, Texas A&M University. College Station, TX. Report to BLM.

Cothran, E. Gus 2011b. “Genetic Analysis of the Salt Wells Creek HMA, Miller Mountain Trap, WY.” Department of Veterinary Integrative Bioscience, Texas A&M University. College Station, TX. Report to BLM.

Cothran, E. Gus 2012a. "Genetic Analysis of the Little Colorado HMA, WY." Department of Veterinary Integrative Bioscience, Texas A&M University. College Station, TX. Report to BLM.

Cothran, E. Gus 2012b. "Genetic Analysis of the Great Divide Basin HMA, WY." Department of Veterinary Integrative Bioscience, Texas A&M University. College Station, TX. Report to BLM.

Cothran, E. Gus 2012c. "Genetic Analysis of the White Mountain HMA, WY." Department of Veterinary Integrative Bioscience, Texas A&M University. College Station, TX. Report to BLM.

Cothran, E. Gus 2020. "Genetic Analysis of the Adobe Town, HMA 2017." Department of Veterinary Integrative Bioscience, Texas A&M University. College Station, TX. Report to BLM.

Daels, P.F, and J.P. Hughes. 1995. Fertility control using intrauterine devices: an alternative for population control in wild horses. Theriogenology 44:629-639.

de Seve, C.W. and S.L. Boyles-Griffin. 2013. An economic model demonstrating the long-term cost benefits of incorporating fertility control into wild horse (Equus caballus) management in the United States. Journal of Zoo and Wildlife Medicine 44(4s:S34-S37).

Devick, I.F., B.S. Leise, S.Rao, and D.A. Hendrickson. 2018. Evaluation of post-operative pain after active desufflation at completion of laparoscopy in mares undergoing ovariectomy. Canadian Veterinary Journal 59:261-266.

Dong, F., D.C. Skinner, T. John Wu, and J. Ren. 2011. The Heart: A Novel Gonadotrophin-Releasing Hormone Target. Journal of Neuroendocrinology 23:456-463.

Easley, J.T., K.C. McGilvray, D.A. Hendrickson, J. Bruemmer, and E.S. Hackett. 2018. Vessel sealer and divider instrument temperature during laparoscopic ovariectomy in horses. Veterinary Surgery 47: O26-O31.

Elhay, M., A. Newbold, A. Britton, P. Turley, K. Dowsett, and J. Walker. 2007. Suppression of behavioural and physiological oestrus in the mare by vaccination against GnRH. Australian Veterinary Journal 85:39-45.

Environmental Protection Agency (EPA). 2009. Pesticide Fact Sheet: Mammalian Gonadotropin Releasing Hormone (GnRH), New Chemical, Nonfood Use, USEPA-OPP, Pesticides and Toxic Substances. US Environmental Protection Agency, Washington, DC

EPA. 2012. Porcine Zona Pellucida. Pesticide fact Sheet. Office of Chemical Safety and Pollution Prevention 7505P. 9 pages.

EPA. 2013. Notice of pesticide registration for GonaCon-Equine. US Environmental Protection Agency, Washington, DC.

EPA. 2015. Label and CSF Amendment. November 19, 2015 memo and attachment from Marianne Lewis to David Reinhold. US Environmental Protection Agency, Washington, DC.

Feist, J. D., and D. R. McCullough. 1976. Behavior patterns and communication in feral horses. Zietschrift für Tierpsychologie 41:337–371.

Freeman, C.E., and S.K. Lyle. 2015. Chronic intermittent colic in a mare attributed to uterine marbles. Equine Veterinary Education 27:469-473.

French, H., E. Peterson, R. Ambrosia, H. Bertschinger, M. Schulman, M. Crampton, R. Roth, P. Van Zyl, N. Cameron-Blake, M. Vandenplas, and D. Knobel. 2017. Porcine and recombinant zona pellucida vaccines as immunocontraceptives for donkeys in the Caribbean. Proceedings of the 8th International Wildlife Fertility Control Conference, Washington, D.C.

Garrott, R.A. and L. Taylor. 1990. Dynamics of a Feral Horse Population in Montana. Journal of Wildlife Management 54 (4): 603-612.

Garrott, R.A., and M.K. Oli. 2013. A Critical Crossroad for BLM's Wild Horse Program. Science 341:847-848.

Getman, L.M. 2009. Review of castration complications: strategies for treatment in the field. AAEP Proceedings 55:374-378.

Goodloe, R.B., 1991. Immunocontraception, genetic management, and demography of feral horses on four eastern US barrier islands. UMI Dissertation Services.

Government Accountability Office (GAO). 2008. Bureau of Land Management; Effective Long-Term Options Needed to Manage Unadoptable Wild Horses. Report to the Chairman, Committee on Natural Resources, House of Representatives, GAO-09-77.

Gradil, C.M., C.K. Uricchio, and A. Schwarz. 2019. Self-Assembling Intrauterine Device (Upod) Modulation of the Reproductive Cycle in Mares. Journal of Equine Veterinary Science 83: 102690.

Griffin, Paul, Ph.D. 2020. "This appendix includes scientific literature reviews addressing five topics: effects of gathers, effects of wild horses and burros on rangeland ecosystems, effects of fertility control vaccines and sex ratio manipulations, effects of sterilization, and effects of intrauterine devices (IUDs)." This scientific literature review was compiled by the BLM's Wild Horse and Burro Program Research Coordinator (Paul Griffin, Ph.D.) and is considered current as of October 2020.

Griffin, P.C., L.S. Ekernas, K.A. Schoenecker, and B.C. Lubow. 2020. Standard operating procedures for wild horse and burro double-observer aerial surveys: U.S. Geological Survey Techniques and Methods, book 2, chap. A16.

Gray, M.E., D.S. Thain, E.Z. Cameron, and L.A. Miller. 2010. Multi-year fertility reduction in free-roaming feral horses with single-injection immunocontraceptive formulations. Wildlife Research 37:475-481.

Gross, J.E. 2000. A dynamic simulation model for evaluating effects of removal and contraception on genetic variation and demography of Pryor Mountain wild horses. Biological Conservation 96:319-330.

Hampton, J.O., T.H. Hyndman, A. Barnes, and T. Collins. 2015. Is wildlife fertility control always humane? Animals 5:1047-1071.

Hanley, T. A., and K. A. Hanley. 1982. Food resource partitioning by sympatric ungulates on Great Basin rangeland. Journal of Range Management 35(2):152-158.

Hobbs, N.T., D.C. Bowden and D.L. Baker. 2000. Effects of Fertility Control on Populations of Ungulates: General, Stage-Structured Models. Journal of Wildlife Management 64:473-491.

Hsueh, A.J.W. and G.F. Erickson. 1979. Extrapituitary action of gonadotropin-releasing hormone: direct inhibition ovarian steroidogenesis. Science 204:854-855.

Jacob, J., G. R. Singleton, and L. A. Hinds. 2008. Fertility control of rodent pests. Wildlife Research 35:487.

Jewell, P. A. 1997. Survival and behaviour of castrated Soay sheep (Ovis aries) in a feral island population on Hirta, St. Kilda, Scotland. Journal of Zoology 243:623–636.

Khodr, G.S., and T.M. Siler-Khodr. 1980. Placental luteinizing hormone-releasing factor and its synthesis. Science 207:315-317.

Killian, G., D. Thain, N.K. Diehl, J. Rhyan, and L. Miller. 2008. Four-year contraception rates of mares treated with single-injection porcine zona pellucida and GnRH vaccines and intrauterine devices. Wildlife Research 35:531-539.

Kirkpatrick, J.F. and J.W. Turner. 1991. Compensatory reproduction in feral horses. Journal of Wildlife Management 55:649-652.

Kirkpatrick, J.F. and A. Turner. 2002. Reversibility of action and safety during pregnancy of immunization against porcine zona pellucida in wild mares (*Equus caballus*). Reproduction Supplement 60:197-202.

Kirkpatrick, J.F. and A. Turner. 2003. Absence of effects from immunocontraception on seasonal birth patterns and foal survival among barrier island wild horses. Journal of Applied Animal Welfare Science 6:301-308.

Kirkpatrick, J. F., and A. Turner. 2008. Achieving population goals in a long-lived wildlife species (Equus caballus) with contraception. Wildlife Research 35:513.

Kirkpatrick, J.F., R.O. Lyda, and K. M. Frank. 2011. Contraceptive vaccines for wildlife: a review. American Journal of Reproductive Immunology 66:40-50.

Klabnik-Bradford, J., M.S. Ferrer, C. Blevins, and L. Beard. 2013. Marble-induced pyometra in an Appaloosa mare. Clinical Theriogenology 5: 410.

Lee, M., and D. A. Hendrickson. 2008. A review of equine standing laparoscopic ovariectomy. Journal of Equine Veterinary Science 28:105–111.

Line, S. W., B. L. Hart, and L. Sanders. 1985. Effect of prepubertal versus postpubertal castration on sexual and aggressive behavior in male horses. Journal of the American Veterinary Medical Association 186:249–251.

Miller, L.A., J.P. Gionfriddo, K.A. Fagerstone, J.C. Rhyan, and G.J. Killian. 2008. The Single-Shot GnRH Immunocontraceptive Vaccine (GonaCon™) in White-Tailed Deer: Comparison of Several GnRH Preparations. American Journal of Reproductive Immunology 60:214-223.

Muñoz, Diana A.; Coates, Peter S.; Ricca, Mark A. 2021. Free-roaming horses disrupt greater sage-grouse lekking activity in the Great Basin. Journal of Arid Environments. Volume 184, January 2021, 104304.

National Park Service (NPS). 2008. Environmental Assessment of Alternatives for Managing the Feral Horses of Assateague Island National Seashore. NPS Assateague Island National Seashore.

National Research Council (NRC). 2013. Using science to improve the BLM wild horse and burro program: a way forward. National Academies Press. Washington, DC.

Nolan, M.B., H.J. Bertschinger, and M.L. Schulman. 2018. Antibody response and safety of a novel recombinant Zona Pellucida vaccine formulation in mares. Journal of Equine Veterinary Science 66:97.

Nordquist, M. K. 2011. Stable isotope diet reconstruction of feral horses (Equus caballas) on the Sheldon National Wildlife Refuge, Nevada, USA. Thesis, Brigham Young University, Provo, Utah.

Nuñez, C.M.V., J.S. Adelman, C. Mason, and D.I. Rubenstein. 2009. Immunocontraception decreases group fidelity in a feral horse population during the non-breeding season. Applied Animal Behaviour Science 117:74-83.

Nuñez, C.M., J.S. Adelman, and D.I. Rubenstein. 2010. Immunocontraception in wild horses (*Equus caballus*) extends reproductive cycling beyond the normal breeding season. PLoS one, 5(10), p.e13635.

Powell, D.M. 1999. Preliminary evaluation of porcine zona pellucida (PZP) immunocontraception for behavioral effects in feral horses (Equus caballus). Journal of Applied Animal Welfare Science 2:321-335.

Powers, J.G., D.L. Baker, T.L. Davis, M.M. Conner, A.H. Lothridge, and T.M. Nett. 2011. Effects of gonadotropin-releasing hormone immunization on reproductive function and behavior in captive female Rocky Mountain elk (Cervus elaphus nelsoni). Biology of Reproduction 85:1152-1160.

Powers, J.G., D.L. Baker, M.G. Ackerman, J.E. Bruemmer, T.R. Spraker, M.M. Conner, and T.M. Nett. 2012. Passive transfer of maternal GnRH antibodies does not affect reproductive development in elk (Cervus elaphus nelson) calves. Theriogenology 78:830-841.

Powers, J.G., D.L. Baker, R.J. Monello, T.J. Spraker, T.M. Nett, J.P. Gionfriddo, and M.A. Wild. 2013. Effects of gonadotropin-releasing hormone immunization on reproductive function and behavior in captive female Rocky Mountain elk (Cervus elaphus nelsoni). Journal of Zoo and Wildlife Medicine meeting abstracts S147.

Ramsey, D. 2005. Population dynamics of brushtail possums subject to fertility control. Journal of Applied Ecology 42:348–360.

Ransom, J.I. and B.S. Cade. 2009. Quantifying equid behavior: A research ethogram for free-roaming feral horses. U.S. Geological Survey Techniques and Methods Report 2-A9.

Ransom, J.I., B.S. Cade, and N.T. Hobbs. 2010. Influences of immunocontraception on time budgets, social behavior, and body condition in feral horses. Applied Animal Behaviour Science 124:51-60.

Ransom, J.I., J.E. Roelle, B.S. Cade, L. Coates-Markle, and A.J. Kane. 2011. Foaling rates in feral horses treated with the immunocontraceptive porcine zona pellucida. Wildlife Society Bulletin 35:343-352.

Ransom, J.I., N.T. Hobbs, and J. Bruemmer. 2013. Contraception can lead to trophic asynchrony between birth pulse and resources. PLoS one, 8(1), p.e54972.

Ransom, J.I., J.G. Powers, N.T. Hobbs, and D.L. Baker. 2014a. Ecological feedbacks can reduce population-level efficacy of wildlife fertility control. Journal of Applied Ecology 51:259-269.

Ransom, J.I., J.G. Powers, H.M. Garbe, M.W. Oehler, T.M. Nett, and D.L. Baker. 2014b. Behavior of feral horses in response to culling and GnRH immunocontraception. Applied Animal Behaviour Science 157: 81-92.

Rios, J. F. I., and K. Houpt. 1995. Sexual behavior in geldings. Applied Animal Behaviour Science 46:133–133.

Roelle, J.E., and J.I. Ransom. 2009. Injection-site reactions in wild horses (*Equus caballus*) receiving an immunocontraceptive vaccine: U.S. Geological Survey Scientific Investigations Report 2009–5038.

Roelle, J.E., F.J. Singer, L.C. Zeigenfuss, J.I. Ransom, F.L. Coates-Markle, and K.A. Schoenecker. 2010. Demography of the Pryor Mountain Wild Horses, 1993-2007. U.S. Geological Survey Scientific Investigations Report 2010–5125.

Rowland, A.L., K.G. Glass, S.T. Grady, K.J. Cummings, K. Hinrichs, and A.E. Watts. 2018. Influence of caudal epidural analgesia on cortisol concentrations and pain-related behavioral responses in mares during and after ovariectomy via colpotomy. Veterinary Surgery 2018:1-7. DOI: 10.1111/vsu.12908

Salter, R. E. Biogeography and habitat-use behavior of feral horses in western and northern Canada. In Symposium on the Ecology and Behaviour of Wild and Feral Equids 129–141 (1979).

Saunders, G., J. McIlroy, M. Berghout, B. Kay, E. Gifford, R. Perry, and R. van de Ven. 2002. The effects of induced sterility on the territorial behaviour and survival of foxes. Journal of Applied Ecology 39:56–66.

Scasta, John Derek. 2020. Mortality and operational attributes relative to feral horse and burro capture techniques based on publicly available data from 2010-2019. Journal of Equine Veterinary Science 86 (2020) 102893.

Schumacher, J. 1996. Complications of castration. Equine Veterinary Education 8:254-259.

Schumacher, J. 2006. Why do some castrated horses still act like stallions, and what can be done about it? Compendium Equine Edition Fall: 142–146.

Searle, D., A.J. Dart, C.M. Dart, and D.R. Hodgson. 1999. Equine castration: review of anatomy, approaches, techniques and complications in normal, cryptorchid and monorchid horses. Australian Veterinary Journal 77:428-434.

Seidler, R. G., and E. M. Gese. 2012. Territory fidelity, space use, and survival rates of wild coyotes following surgical sterilization. Journal of Ethology 30:345–354.

Turner, J.W., and J.F. Kirkpatrick. 2002. Effects of immunocontraception on population, longevity and body condition in wild mares (Equus caballus). Reproduction (Cambridge, England) Supplement, 60, pp.187-195.

Turner, J.W, A.T. Rutberg, R.E. Naugle, M.A. Kaur, D.R.Flanagan, H.J. Bertschinger, and I.K.M. Liu. 2008. Controlled-release components of PZP contraceptive vaccine extend duration of infertility. Wildlife Research 35:555-562.

Turner, R.M., D.K. Vanderwall, and R. Stawecki. 2015. Complications associated with the presence of two intrauterine glass balls used for oestrus suppression in a mare. Equine Veterinary Education 27:340-343

Twigg, L. E., T. J. Lowe, G. R. Martin, A. G. Wheeler, G. S. Gray, S. L. Griffin, C. M. O'Reilly, D. J. Robinson, and P. H. Hubach. 2000. Effects of surgically imposed sterility on free-ranging rabbit populations. Journal of Applied Ecology 37:16–39.

LIST OF ACRONYMS

AML	Appropriate Management Level
AO	Authorized Officer
AUM	Animal Unit Months
BLM	Bureau of Land Management
BMP	Best Management Practice
BOR	Bureau of Reclamation
CEQ	Council on Environmental Quality
CIAA	Cumulative Impact Analysis Area
CFR	Code of Federal Regulation
CWR	Crucial Winter Range
DOI	Department of the Interior
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FLPMA	Federal Land Policy and Management Act of 1976
GnRH	Gonadotropin Releasing Hormone
HMA	Herd Management Area
IM	Instruction Memorandum
LUP	Land Use Plan
NAS	National Academies of Science
NEPA	National Environmental Policy Act
PHMA	Priority Habitat Management Area
PZP	Porcine Zona Pellucida
RFO	Rawlins Field Office
RMP	Resource Management Plan
RSFO	Rock Springs Field Office

RSGA	Rock Springs Grazing Association
TNEB	Thriving Natural Ecological Balance
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WFRHBA	Wild Free-Roaming Horses and Burros Act of 1971
WGFD	Wyoming Game and Fish Department

GLOSSARY

Allotment: An area of land designated and managed for livestock grazing. Allotments generally consist of BLM-administered lands but may include other federally managed, state-owned, and private lands. An allotment may include one or more separate pastures. Livestock numbers and periods of use are specified for each allotment.

Amendment: The process for considering or making changes in the terms, conditions, and decisions of approved RMPs or Management Framework Plans using the prescribed provisions for resource management planning appropriate to the proposed action or circumstances. Usually only one or two issues are considered that involve only a portion of the planning area.

Animal Unit: Considered to be one mature cow of about 1,000 pounds (450 kg), either dry or with calf up to 6 months of age, or their equivalent, consuming about 26 pounds of forage/day on an oven dry basis.

Animal Unit Month (AUM): The amount of forage necessary for the sustenance of one cow or its equivalent for a period of 1 month (43 CFR 4100.0-5). For the purpose of calculating grazing fees, an animal unit month is defined as a month's use and occupancy of range by one cow, bull, steer, heifer, horse, burro, mule, 5 sheep or 5 goats over the age of 6 months (43 CFR 4130.8-1(c)).

Appropriate Management Level: The number of adult horses or burros (expressed as a range with an upper and lower limit) to be managed within an HMA.

Authorized Officer: Any employee of the BLM to whom authority has been delegated to perform the duties described.

Best Management Practices (BMPs): A suite of techniques that guide or may be applied to management actions to aide in achieving desired outcomes.

Big Game: Large species of wildlife that are hunted, such as elk, deer, bighorn sheep, moose, and pronghorn.

Checkerboard: This term refers to a land ownership pattern of alternating sections of federal-owned lands with private or state-owned lands for 20 miles on either side of a land grant railroad (e.g. Union

Pacific, Northern Pacific, etc.). On land status maps this alternating ownership is either delineated by color coding or alphabetic code resulting in a "checkerboard" visual pattern (see diagram below for a visual explanation of this land ownership pattern).

BLM	Private	BLM
Private	BLM	Private
BLM	State	BLM

Code of Federal Regulations (CFR): The official, legal tabulation of regulations directing Federal Government activities.

Consent Decree: An agreement or settlement that resolves a dispute between two parties without admission liability or guilt. In this document "Consent Decree" refers to an April 2013 settlement agreement between the RSGA and the BLM. The purpose of this consent decree was to settle a dispute related to wild horse use of private land within the checkerboard.

Council on Environmental Quality (CEQ): An advisory council to the President of the United States established by the National Environmental Policy Act of 1969. It reviews federal programs for their effect on the environment, conducts environmental studies, and advises the President on environmental matters.

Cumulative Impact (Effect): The impact on the environment that results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Direct Impacts (Effects): Direct impacts are caused by the action and occur at the same time and place.

Disturbance: A discrete event, either natural or human induced, that causes a change in the existing condition of an ecological system.

Endangered Species: Any plant or animal species that is in danger of extinction throughout all or a significant portion of its range, as defined by the U.S. Fish and Wildlife Service under the authority of the Endangered Species Act of 1973.

Environmental Assessment (EA): Concise, analytical documents, authorized by the National Environmental Policy Act (NEPA) of 1969, that are prepared with public participation to determine whether an Environmental Impact Statement (EIS) is needed for a particular project or action. If an EA determines an EIS is not needed, the EA documents compliance with NEPA requirements.

Environmental Impact Statement (EIS): A document required by the National Environmental Policy Act (NEPA) for certain actions "significantly affecting the quality of the human environment." An EIS is a tool for decision making. It describes the positive and negative environmental effects of a proposed

action, and it usually also lists one or more alternative actions that may be chosen instead of the proposed action.

Erosion: The wearing away of the land surface by running water, wind, ice, or other geological agents.

Federal Lands: As used in this document, lands owned by the United States, without reference to how the lands were acquired or what federal agency administers the lands. The term includes mineral estates or coal estates underlying private surface but excludes lands held by the United States in trust for Indians, Aleuts, or Eskimos. (See also Public Land.)

Federal Land Policy and Management Act of 1976 (FLPMA) as amended: Public Law 94-579. October 21, 1976, often referred to as the BLM' s "Organic Act," which provides the majority of the BLM's legislated authority, direction, policy, and basic management guidance.

Forage: All browse and herbaceous foods available to grazing animals that may be grazed or harvested for feeding.

General Habitat Management Areas (GHMA): Occupied (seasonal or year-round) habitat outside of priority habitat. These areas have been identified by the BLM in coordination with respective state wildlife agencies.

Genetic Diversity: The variation in genetic information available among a population, such as a wild horse herd. For purposes of this document adequate genetic diversity means adequate levels of genetic heterozygosity.

Habitat: An environment that meets a specific set of physical, biological, temporal, or spatial characteristics that satisfy the requirements of a plant or animal species or group of species for part or all of their life cycle. In wildlife management, the major components of habitat are food, water, cover and the adequate juxtaposition of the three.

Herd Area: The geographic area identified as having been used by a herd of wild horses or burros as its habitat in 1971.

Herd Management Area (HMA): Areas established by the Authorized Officer for the maintenance of wild horse and burro herds. Herd management areas are established in consideration of the appropriate management level for the herd, the habitat requirements of the animals, the relationships with other uses of the public and adjacent private lands, and the constraints contained in 43 CFR 4710.4.

Impacts (or Effects): Consequences (the scientific and analytical basis for comparison of alternatives) as a result of a proposed action. Effects may be either direct, which are caused by the action and occur at the same time and place, or indirect, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable, or cumulative.

Indirect Impacts (Effects): Indirect impacts are caused by the action and occur later in time or further removed in distance.

Interdisciplinary Team: A group of individuals with different training, representing the physical sciences, social sciences, and environmental design arts, assembled to solve a problem or perform a task. The members of the team proceed to a solution with frequent interaction so that each discipline may provide insights on any stage of the problem, and disciplines may combine to provide new

solutions. The number and disciplines of the members preparing the plan vary with circumstances. A member may represent one or more discipline or program interest.

Land Health Standard: A description of the physical and biological conditions or degree of function required for healthy, sustainable lands (e.g., land health standards).

Land Use Plan: A set of decisions that establish management direction for land within an administrative area, as prescribed under the planning provisions of FLPMA; an assimilation of land-use-plan-level decisions developed through the planning process, regardless of the scale at which the decisions were developed.

Monitoring: The orderly collection, analysis, and interpretation of resource data to evaluate progress toward meeting management objectives. This process must be conducted over time in order to determine whether or not management objectives are being met. Monitoring also includes observations to evaluate baseline (i.e., pre-activity) conditions, evaluation of whether activities met desired goals and permit requirements (implementation monitoring), and evaluation of how well mitigation measures protected resource conditions (effectiveness monitoring).

Multiple Use: Management of the public lands and their various resource values so that they are used in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; the use of some land for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and non-renewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output, as provided in the Multiple Use Sustained Yield Act and FLPMA.

National Environmental Policy Act of 1969 (NEPA): The National Environmental Policy Act (NEPA) [42 U.S.C. 4321 et seq.] was signed into law on January 1, 1970. The Act establishes national environmental policy and goals for the protection, maintenance, and enhancement of the environment and provides a process for implementing these goals within the federal agencies. The Act also establishes the Council on Environmental Quality (CEQ).

Non-reproducing Herd: A wild horse herd composed of sterilized wild horses (either stallions or mares) to aid in controlling on the range population numbers. Such herds are maintained by periodically introducing sterilized wild horses from other HMAs to compensate for mortality.

Noxious Weeds: A plant species designated by federal or State law as generally possessing one or more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insects or disease; or nonnative, new, or not common to the United States.

Off Range Corral – Also known as short term holding facilities. After wild horses are removed from the range they are brought to off range corrals. In these corrals wild horses are separated, doctored, and prepared for adoption, or shipping to off range pastures.

Off Range Pasture – Also known as long term holding facilities. Animals that have not been adopted, or are unlikely to be adopted, are shipped to off range pastures. These pastures are typically highly productive grasslands that can support a large number of grazing animals. Wild horses brought to off range pastures will live out the rest of their life in these areas, until they die of natural causes.

Open Mare: A mare that is not currently pregnant.

Permittee: A person or company authorized to use or occupy BLM-administered land.

Policy: This is a statement of guiding principles, or procedures, designed and intended to influence planning decisions, operating actions, or other affairs of the BLM. Policies are established interpretations of legislation, executive orders, regulations, or other presidential, secretarial, or management directives.

Population: A group of organisms, all the same species, which occupies a particular area. The term is used to refer to the number of individuals of a species within an ecosystem or of any group of like individuals.

Priority Habitat Management Area (PHMA): Sage-grouse priority habitats are areas that have the highest conservation value to maintaining or increasing Sage-grouse populations. These areas would include breeding, late brood-rearing, winter concentration areas, and where known, migration or connectivity corridors. Sage-grouse Priority Habitat Management Area includes core plus connectivity habitat.

Public Lands: As used in this document, federally owned surface or mineral estate specifically administered by the BLM.

Range Improvement: The term range improvement means any activity, structure or program on or relating to rangelands which is designed to improve production of forage, change vegetative composition, control patterns of use, provide water, stabilize soil and water conditions, and provide habitat for wild horses, livestock and wildlife. The term includes, but is not limited to, structures, treatment projects, and use of mechanical means to accomplish the desired results.

Resource Damage: Damage to any natural or cultural resources that results in impacts such as erosion, water pollution, degradation of vegetation, loss of archeological resources, or the spread of weeds.

Resource Management Plan (RMP): A land use plan as prescribed by the Federal Land Policy and Management Act that establishes, for a given area of land, land-use allocations, coordination guidelines for multiple-use, objectives, and actions to be achieved.

Riparian: Referring to or relating to areas adjacent to water or influenced by free water associated with streams or rivers on geologic surfaces occupying the lowest position in the watershed. (See also Wetlands.)

Riparian Area: A form of wetland transition between permanently saturated wetlands and upland areas. These areas exhibit vegetation or physical characteristics reflective of permanent surface or subsurface water influence. Lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels are

typical riparian areas (See BLM Manual 1737). Included are ephemeral streams that have vegetation dependent upon free water in the soil. All other ephemeral streams are excluded.

Riparian Communities: Communities of vegetation associated with either open water or wetlands. Examples are cottonwood and willow communities, meadows, aspens near water sources, and other trees, grasses, forbs, and shrubs associated with water.

Rock Springs Grazing Association (RSGA): A private organization that owns and/or leases a large amount of private land within the checkerboard.

Runoff: The total stream discharge of water, including both surface and subsurface flow, usually expressed in acre-feet of water yield.

Scoping: The process of identifying the range of issues, management concerns, preliminary alternatives, and other components of an environmental assessment, environmental impact statement or land-use planning document. It involves both internal and public viewpoints.

Sensitive Species: Those species designated by a State Director, usually in cooperation with the State agency responsible for managing the species and state natural heritage programs. They are those species that: (1) could easily become endangered or extinct in a state; (2) are under status review by the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service; (3) are undergoing significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution; (4) are undergoing significant current or predicted downward trends in population or density such that federal listing, proposal, or candidate status may become necessary; (5) typically have small and widely dispersed populations, or (6) inhabit ecological refugia or other specialized or unique habitats.

Shrub: A plant that has persistent woody stems and a relatively low growth habit, and that generally produces several basal shoots instead of a single bole.

Solid-block: Areas where BLM managed lands are more concentrated in larger blocks of land. This is in contrast to checkerboard lands where land ownership alternates every square mile (see Checkerboard in Glossary). See the diagram below for a visual explanation of this land ownership pattern, as compared with checkerboard.

SOLID-BLOCK											
C	H	E	C	K	E	R	B	O	A	R	D

Special Status Species: Proposed species, listed species, and candidate species under the Endangered Species Act; state-listed species; and BLM State Director-designated sensitive species (see BLM Manual 6840—Special Status Species Policy).

Surface Disturbance: Any disturbance that causes the destruction or alteration of vegetation and the disturbance of the soil surface, and that will cause a lasting impact to the affected area.

1. Long-term removal occurs when vegetation is physically removed through activities that replace the vegetation community, such as a road, power line, well pad or active mine. Long-term removal may also result from any activities that cause soil mixing, soil removal, and exposure of the soil to erosive processes.
2. Short-term removal occurs when vegetation is removed in small areas, but is restored to desirable vegetation communities within a few years (<5) of disturbance, such as a successfully reclaimed pipeline, or successfully reclaimed drill hole or pit.
3. Habitat rendered unusable due to numerous anthropogenic disturbances.
4. Anthropogenic surface disturbances are surface disturbances meeting the above definitions which result from human activities.

Surface Disturbing Activity: An action that alters vegetation, surface/near surface soil resources, and/or surface geologic features, beyond natural site conditions and on a scale that affects other Public Land values. Examples of surface disturbing activities may include: operation of heavy equipment to construct well pads, roads, pits and reservoirs; installation of pipelines and power lines; and conducting several types of vegetation treatments (e.g. prescribed fire, etc.). Surface disturbing activities may be either authorized or prohibited (WY-IB-2007-029).

Threatened Species: Any plant or animal species defined under the Endangered Species Act as likely to become endangered within the foreseeable future throughout all or a significant portion of its range; listings are published in the *Federal Register* as determined by the US Fish and Wildlife Service and the Secretary of Interior.

Watershed: The area of land, bounded by a divide, that drains water, sediment, and dissolved materials to a common outlet at some point along a stream channel (Dunne and Leopold, 1978), or to a lake, reservoir, or other body of water. Also called drainage basin or catchment.

Wetlands: Those areas that are inundated by surface water or groundwater with a frequency sufficient to support, and under normal circumstances do or would support, a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mudflats, and natural ponds.