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

# Environmental Assessment

## Adobe Town, Salt Wells Creek, and Great Divide Basin Herd Management Areas Wild Horse Gather

Wyoming High Desert District
Rawlins and Rock Springs Field Offices
August 2017

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.

BLM/WY/PL-17/013+1330

**DOI-BLM-WY-D040-2017-0022-EA**

**Environmental Assessment**

**for**

# Adobe Town, Salt Wells Creek, and Great Divide Basin Herd Management Areas Wild Horse Gather

**Prepared by**

**Bureau of Land Management**
**High Desert District**

**Rock Springs Field Office**
**Rock Springs, Wyoming**

**Rawlins Field Office**
**Rawlins, Wyoming**

**DOI-BLM-WY-D040-2017-0022-EA**

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**Acronyms**

| | |
|---|---|
| AML | Appropriate management level |
| AVMA | American Veterinary Medical Association |
| HMA | Herd Management Area |
| LTP | long-term pasture |
| TNEB | thriving natural ecological balance |
| WFRHBA | Wild Free-Roaming Horses and Burros Act |

# 1.0 Introduction

This Environmental Assessment (EA) has been prepared to analyze and disclose the environmental consequences of a wild horse removal for the Adobe Town, Salt Wells Creek, and Great Divide Basin Herd Management Areas (HMAs) as proposed by the Bureau of Land Management (BLM) Rock Springs Field Office (RSFO) and Rawlins Field Office (RFO).

The BLM Rock Springs and Rawlins Field Offices propose to gather and remove excess wild horses to the low Appropriate Management Level (AML) from the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs. Removing excess wild horses from the HMAs is consistent with the 2013 Consent Decree entered in *Rock Springs Grazing Association v. Salazar* (Civil Action No. 11-CV-263-NDF). Maintaining AML in the HMAs complies with the October 14, 2016 order of the Tenth Circuit Court of Appeals in *American Wild Horse Preservation Campaign v. Jewell*, No. 15-8033.

This Environmental Assessment (EA) has been prepared in accordance with the National Environmental Policy Act (NEPA) to analyze the environmental effects of wild horse gather operations and potential population control methods (including fertility control treatment) to achieve and maintain the established Appropriate Management Level (AML) for the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs. The BLM has determined that wild horse numbers are above AML in these HMAs and that action is necessary to remove excess animals. Wild horse numbers above AML constitute excess wild horses as described in the Wild and Free-Roaming Horses and Burros Act (WFRHBA).

In addition to the excess wild horses that need to be removed within the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs, the BLM has received a written request to remove wild horses from private lands located within and outside the HMA boundaries. In accordance with statute and regulation, the BLM must remove stray wild horses from private lands as soon as practicable upon receipt of a written request.

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. After review of wild horse census, distribution and ecological condition data, it has been determined that an excess population of wild horses exists within the Adobe Town, Saltwells Creek and Great Divide Basin HMAs. There are also wild horses residing outside the Herd Management Areas. It has been determined that a post-gather population of 610 wild horses in Adobe Town, 251 wild horses in Salt Wells Creek and 415 wild horses in Great Divide Basin HMAs will contribute to promoting a thriving natural ecological balance and preserve multiple use relationships.

## 1.1 Background Information

The proposed project area: Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs encompasses approximately 2,427,220 acres of public, State, and private lands in Carbon, Fremont, and Sweetwater counties in southwest Wyoming (Table 1 and Figures 1, 2, and 3).

**Table 1. Project Area**

| HMA | Federal Acres (BLM) | Private | Total Acres |
|---|---|---|---|
| Adobe Town | 443,136 | 34,683 | 469,473 |
| Salt Wells Creek | 691,283 | 480,954 | 1,172,237 |
| Great Divide Basin | 561,098 | 216,066 | 777,164 |
| **Total** | **1,695,517** | **731,703** | **2,427,220** |

Historically the BLM has encountered challenges with managing these HMAs due to the presence of a "checkerboard" landownership pattern, in which every other section is public lands, and the alternate sections are private and state owned lands. While the Rock Springs Grazing Association (RSGA) (the primary private landowner in this area) had previously allowed wild horses to utilize their private lands, in 2011 they notified the BLM that wild horses were no longer welcome on their private lands and requested that the BLM remove them in accordance with Section 4 of the WFRHBA (16 U.S.C. 1334). This section of the Act requires the BLM to remove wild horses from private lands after receiving a written request from the landowner to do so.

This led to a legal challenge by the RSGA against the BLM in *Rock Springs Grazing Association v. Salazar*, No. 11- CV-00263-NDF, (D. Wyo.). This proceeding was settled when on April 3, 2013, the United States District Court for Wyoming approved a Consent Decree and Joint Stipulation for Dismissal (hereafter referred to as the "Consent Decree"). The court found this decree to be a "fair, reasonable, equitable and adequate settlement of RSGA's claims against the BLM, and which does not on its face violate the law or public policy."

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 (PZP, a fertility control drug) 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 felt 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. The removal of all wild horses from the checkerboard was conducted

solely under Section 4 of the WFRHBA. During this removal the BLM removed a total of 1,263 wild horses from the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs.

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 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 Management and Policy Act of 1976 (FLPMA). The Court of Appeals ruled that the BLM had erroneously relied on its authority to remove strayed animals on private lands under Section 4, 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.

**Figure 1. Adobe Town HMA**

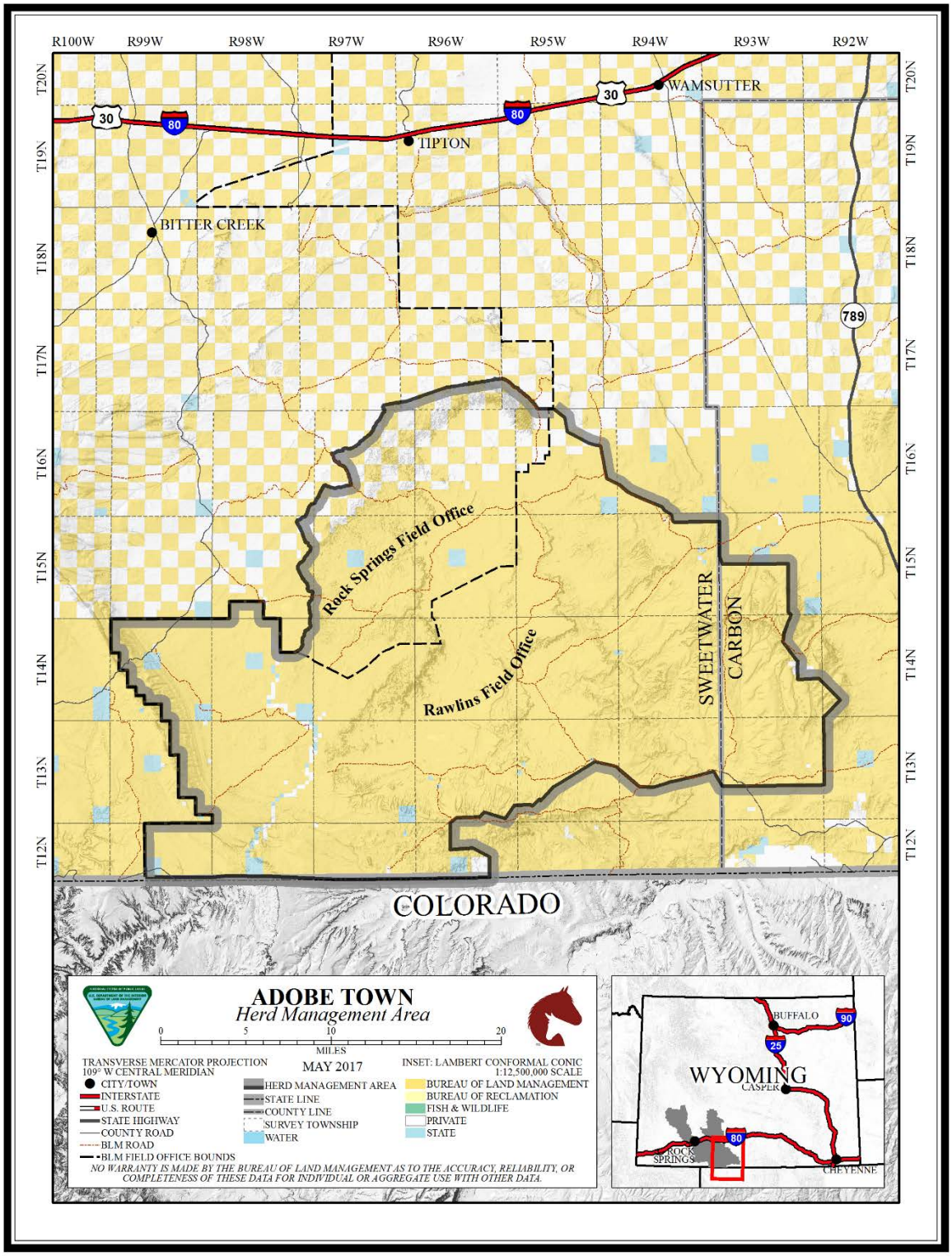


**Figure 2. Salt Wells Creek HMA**

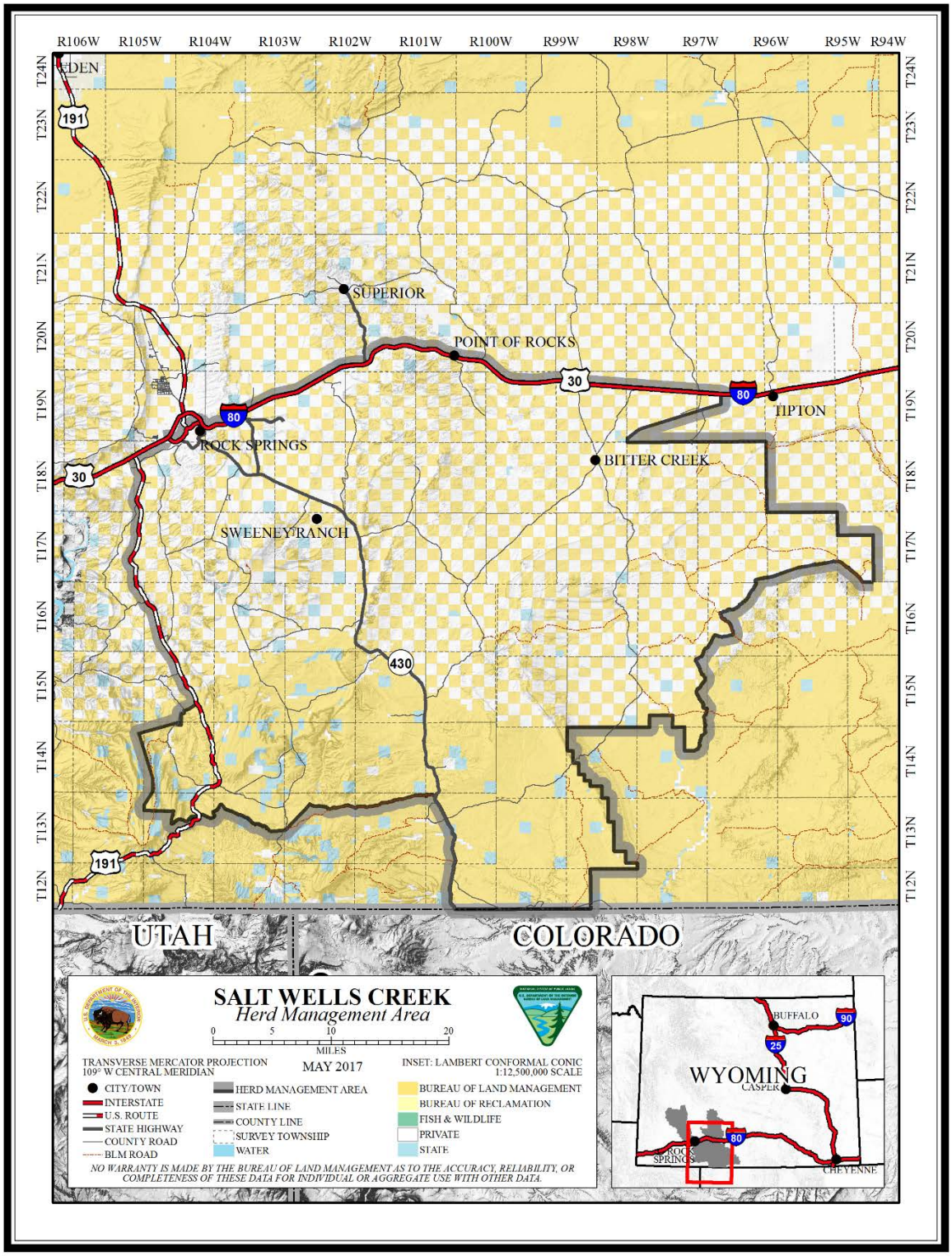
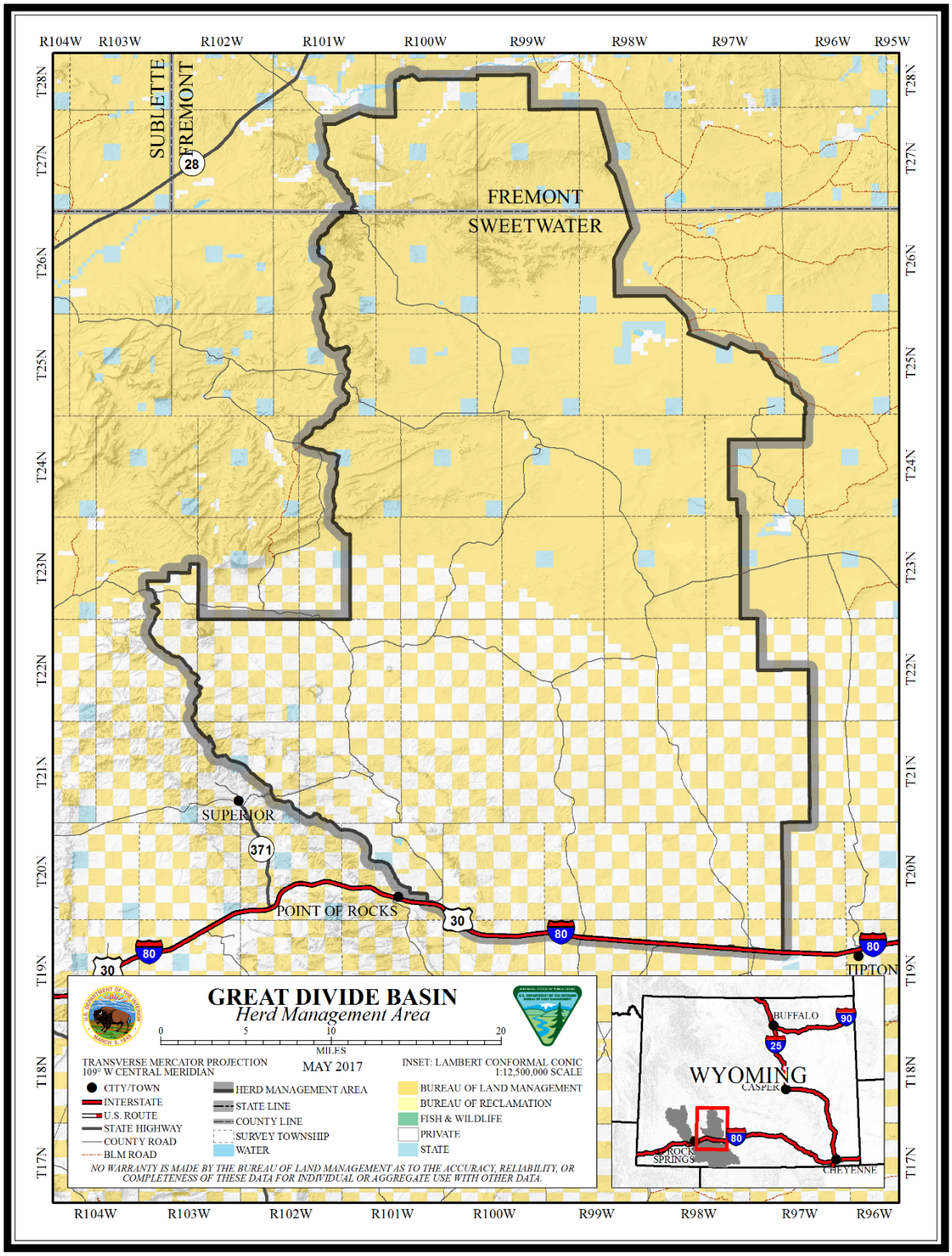


**Figure 3. Great Divide Basin HMA**



**Project Area Wild Horse Population Estimates/Projections**

Aerial survey and distribution flights were completed in April of 2017 in the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs. This census was conducted in accordance with the United States Geological Survey (USGS) simultaneous double count method. The wild horse numbers and locations were recorded with the use of a Global Positioning System and compiled on maps. The direct count numbers have been adjusted by the USGS using the simultaneous double count method as indicated in Table 2.

**Table 2. Projected Population 2017**

| 2017 Statistically Corrected Census Counts | | |
|---|---|---|
| **HMA** | **AML** | **April 2017 Census** |
| Adobe Town | 610-800 | 1,123 |
| Salt Wells Creek | 251-365 | 976 |
| Great Divide Basin | 415-600 | 737 |
| Total | 1,276-1,765 | 2,836 |

## *1.2 Purpose and Need*

**Purpose**
The purpose of the Proposed Action is: 1) to address an overpopulation of wild horses within the HMAs to achieve thriving natural ecological balance, 2) to alleviate deterioration of the rangeland, 3) to respond to requests to remove wild horses located 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.

**Need**
The need for the Proposed Action is to achieve and maintain wild horse populations within the established AMLs for each HMA, and to protect rangeland resources from deterioration from overpopulation. Currently the number of wild horses within these HMA are in excess of the AMLs established for these areas. Section 3 of the WFRHBA requires that the BLM manage wild horses in a way that promotes a thriving natural ecological balance. AMLs are established to ensure a thriving natural ecological balance can be reached when managing wild horse populations.

The need for this action is also brought about due to the presence of wild horses on private lands within these HMAs, and the request of the private landowner to remove these wild horses from their property. Section 4 of the WFRHBA requires that the BLM remove wild horses from private land upon the request of the landowner. The 2013 Consent Decree also requires the removal of wild horses from these HMAs.

The following laws drive the BLM need to respond to this issue: 43 CFR Section 1333(b) (2) of the Wild and Free Roaming Horse and Burro Act (WFRHBA, Public Law 92-195), as amended, section 302(b) of the Federal Land Policy and Management Act of 1976 (FLPMA, Public Law

94-579), and Section 2(b)(4) of the Public Rangelands Improvement Act of 1978 (PRIA, Public Law 95-514). The WFRHBA provides that the Department of the Interior "manage wild free-roaming horses and burros in a manner that is designed to achieve and maintain a thriving natural ecological balance on the public lands" (Section 1333(a), as amended). The WFRHBA also provides that "If wild free-roaming horses or burros stray from public lands onto privately owned land, the owners of such land may inform the nearest Federal marshal or agent of the Secretary, who shall arrange to have the animals removed" (Section 1334, as amended).

## *1.3 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 in excess of AML and to the presence of wild horses on private lands. The authorized officer may decide whether or not to gather, remove, treat, and release wild horses in the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs.

The decision to be made would not set or adjust AMLs, which were set through previous land use planning-level decisions. Future decisions regarding long-term management within the HMAs would continue to be accomplished through a land use planning process. Additionally, the decision would not adjust livestock use, which has been established through prior land use planning-level decisions which have complied with NEPA requirements and provided opportunity for public review and input.

## *1.4 Relationship to Statutes, Regulations, Plans, or Other Environmental Analyses*

### Conformance with Existing Land Use Plans

The gather and removal of excess wild horses from the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs are in conformance with both the Green River RMP Record of Decision approved on August 8, 1997 and the Rawlins RMP Record of Decision approved on December 24, 2008. Wild horse HMAs and AMLs were established and confirmed through the Green River and Rawlins RMP planning processes.

The Green River RMP and the Rawlins RMP were amended on September 22, 2015, by the "Approved Resource Management Plan Amendments for the Rocky Mountain Region, Including the Greater Sage-Grouse Sub-Regions of Lewistown, North Dakota, Northwest Colorado, and Wyoming/Record of Decision." This amendment is specific to management actions for the Greater Sage-Grouse in both the Rock Springs and Rawlins Field Offices.

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.

### Conformance with Rangeland Health Standards and Guidelines

The proposed action and other action alternatives are in conformance with the BLM Wyoming "Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management" (BLM 1997b). The proposed action will assist in maintaining the health of the public lands within each HMA and within the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs.

### Conformance with the October 14, 2016 Order and Judgement in *American Wild Horse Preservation Campaign v. Sally Jewell* (No. 15-8033 (10th Cir))

The BLM is statutorily authorized under Section 3 of the WFRHBA to remove wild horses from public lands after it determines "that an overpopulation exists on a given area of the public lands and that action is necessary to remove excess animals" in order "to achieve appropriate management levels." 16 U.S.C. § 1333(b)(2). By utilizing its authority to remove excess wild horses from public lands under Section 3 of the WFRHBA, and by maintaining AML within the HMAs, the action alternatives would be consistent the Court of Appeals' Order and Opinion.

### Conformance with the 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 approved in case 11-CV-263-NDF on April 3, 2013. The 2013 Consent Decree resolved litigation involving claims that the BLM had violated section 4 of the WFRHBA, 16 U.S.C. 1334, by failing to fulfill an October 2010 written request to remove strayed animals from RSGA lands. The removal of wild horses from these HMAs under the action alternatives is consistent with the Consent Decree.

### Relationship to Statutes, Regulations, or Other Plans

Public lands are managed under the FLPMA, which provides that the public lands are to be managed in accordance with land use plans and under principles of multiple use and sustained yield to protect the quality of scenic, ecological, environmental, and archeological values; to preserve and protect public lands in their natural condition; to provide feed and habitat for wildlife and livestock; and to provide for outdoor recreation (43 U.S.C. 1701(a)(8).1732(a)). FLPMA also stresses harmonious and coordinated management of the resources without permanent impairment of the environment (43 U.S.C. 1701(c)).

The proposed action and action alternatives are in conformance with the WFRHBA 16 U.S.C. 1333(b)(2) and 1334, and its implementing regulations found at Title 43 of the Code of Federal Regulations (CFR) 4700, including:

- 43 CFR 4700.0-6 (a): *Wild horses shall be managed as self-sustaining populations of healthy animals and in balance with other uses and the productive capacity of their habitat.*
- 43 CFR 4700.0-6 (c): *Management activities affecting wild horses and burros shall be undertaken with the goal of maintaining free-roaming behavior.*
- 43 CFR 4700.0-6 (e): *Healthy excess wild horses for which an adoption demand by qualified individuals exists shall be made available at adoption centers for private maintenance and care.*
- 43 CFR 4710.4: *Management of wild horses shall be at the minimum level necessary to attain the objectives identified in approved land use plans.*

- 43 CFR 4720.1: *Upon examination of current information and a determination by the authorized officer that an excess of wild horses or burros exist, the authorized officer shall remove the animals immediately.*
- 43 CFR 4720.2-1: *Upon written request from the private landowner to any representative of the Bureau of Land Management, the authorized officer shall remove stray wild horses and burros from private lands as soon as practicable. The private landowner may also submit the written request to a Federal marshal, who shall notify the authorized officer. The request shall indicate the numbers of wild horses or burros, the date(s) the animals were on the land, legal description of the private land, and any special conditions that should be considered in the gathering plan.*
- 43 CFR 4720.2-2: *If the authorized officer determines that proper management requires the removal of wild horses and burros from areas that include private lands, the authorized officer shall obtain the written consent of the private owner before entering such lands. Flying aircraft over lands does not constitute entry*.

No federal, state, or local law or requirement imposed for the protection of the environment will be threatened or violated under the proposed action or any action alternatives described in detail in this EA.

## *1.5 Scoping, Public Involvement, and Issues*

Internal scoping by an interdisciplinary team identified issues of concern to be analyzed. Public comments on the various components of wild horse management in the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs have been received throughout the last several years. On March 6, 2017, the BLM issued a scoping letter for this proposed wild horse gather. In excess of 3,500 comment letters/emails were received from individuals, organizations, and agencies following the issuance of the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs Wild Horse Gather Plan Scoping Letter addressing the action proposed. The majority of these, approximately 3,442 letters or emails, were submitted as a form letter. All comment letters were reviewed and considered which resulted in approximately 38 unique substantive comments (see Appendix I, Summary of Scoping Comments). All the substantive comments were considered in the development of the EA.

Through both public and internal scoping the following issues were identified for analysis and will be discussed in this document:

- WFRHBA issues to be analyzed
- Impacts to wild horses within the HMA
- Effects on wildlife and threatened and endangered species
- Impacts to vegetation, soils, and watersheds
- Effects on recreation and wilderness values
- Effects related to livestock grazing
- Cultural resource conflicts

# 2.0 Proposed Action and Alternatives

This section of the EA describes the action alternatives, including any that were considered but eliminated from detailed analysis. Based upon all information available at this time, the BLM has determined that approximately 1,560 excess (adult) wild horses need to be removed from the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs (see Table 3) to achieve AML

and maintain a thriving natural ecological balance on the range, and to remove horses from private lands.

**Table 3. Number of Wild Horses Over Low AML**

| 2017 Statistically Corrected Survey Counts | | | |
|---|---|---|---|
| **HMA** | **AML** | **April 2017 Survey** | **Number of Wild Horses Over Low AML** |
| Adobe Town | 610-800 | 1,123 | 513 |
| Salt Wells Creek | 251-365 | 976 | 725 |
| Great Divide Basin | 415-600 | 737 | 322 |
| Total | 1,276-1,765 | 2,836 | 1,560 |

Any decision of the authorized officer will be implemented effective on or after September 15, 2017 under authority provided in 43 CFR 4770.3(c). Alternatives analyzed in detail include the following:

- Alternative A: Remove Excess Animals to Lower Limit of AML range and utilize Fertility Control
- Alternative B: Proposed Action: Remove Excess Animals to Lower Limit of AML range
- Alternative C: No Action Alternative - No Gather or Removal

The action alternatives were developed to meet the BLM purpose and need. Alternative C (No Gather or Removal) does not comply with the WFRHBA and FLPMA, nor meet the purpose and need for action; it is included as a basis for comparison with the action alternatives.

## *Actions Common to Alternatives A and B*

The following actions are common to Alternatives A and B:

- All capture and handling activities would be conducted in accordance with the Standard Operating Procedures (SOPs) described in Appendix II (SOPs). Multiple capture sites (traps) would be used to capture wild horses within and outside of the Adobe Town, Salt Wells Creek, and Great Divide Basin 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 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 Washington Office Instruction Memorandum (WO IM) No. 2015-70 (https://www.blm.gov/policy/im-2015-070). 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 (WO IM) 2015-070. Conditions requiring humane euthanasia occur infrequently and are described in more detail in WO IM 2015-070.

- Selection of animals for removal and/or release would also be guided by Instruction Memorandum No. 2010-135, *Gather Policy, Selective Removal Criteria, and Management Considerations for Reducing Population Growth Rates* (BLM 2010a). (A copy of this IM can be reviewed upon request at the RSFO.)
- *Policy and procedures for safe and transparent visitation by the public and media at wild horse gather operations* would be in accordance with Instruction Memorandum No. 2013-058 *Wild Horse and Burro Gathers: Public and Media Management* (BLM 2013a).
- 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 Instruction Memorandum No. 2013-059, *Wild Horse and Burro Gathers: Comprehensive Animal Welfare Policy* (BLM 2013b).
- 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 Instruction Memorandum No. 2013-060, *Wild Horse and Burro Gathers: Management of Incident Command System* (BLM 2013c).
- All wild horses outside of the established boundaries of the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs in areas not designated for horse management would be removed.

## *Descriptions of Alternatives Considered In Detail*

### 2.1 Alternative A – Remove Excess Animals to Lower Limit of AML Range with Fertility Control

Alternative A is to gather approximately 85% of the estimated current population (or about 2,410 wild horses) in September 2017 or when funding permits in the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs.

The estimated 2017 adult wild horse population for Adobe Town HMA is 1,123. Approximately 954 wild horses (85% of the estimated current population) would be gathered in Adobe Town. Of those gathered, approximately 513 wild horses would be removed to achieve the low AML of 610. Approximately 175 mares would also be treated with Porcine Zona Pellucida (PZP) (a fertility control drug) and released back into the Adobe Town HMA along with all of the other wild horses gathered, except for the 513 proposed to be removed. Of the 441 wild horses returned, approximately 175 of them would be fertility-treated mares and the remaining 266 wild horses returned would consist of approximately 175 studs and 91 additional mares and/or colts.

The estimated 2017 wild horse population for the Salt Wells Creek HMA is 976. Approximately 829 wild horses (85% of the estimated current population) would be gathered and approximately 725 of these wild horses would be removed. Approximately 104 wild horses would be released back into the Salt Wells Creek HMA to maintain the low AML of 251. Approximately 40 of the mares released back would be treated with PZP and released as part of the 104 wild horses released back into the HMA. (Of the 104 returned approximately 40 would be treated mares, 56 would be studs, and 8 would be additional mares and/or colts.)

The estimated 2017 wild horse population for the Great Divide Basin HMA is 737. Approximately 626 wild horses (85% of the estimated current population) would be gathered and approximately 322 of these wild horses would be removed. Approximately 304 wild horses would be released back into the Great Divide Basin HMA to maintain the low AML of 415. Approximately 100 of the mares released back would be treated with PZP and released as part of the 304 wild horses released back into the HMA. (Of the 304 returned, approximately 100 would be treated mares, 140 would be studs, and 64 would be additional mares and/or colts.)

The estimated current wild horse population within the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs is based on the April 2017 flights. Of the animals gathered, approximately 1,560 excess wild horses (513 in Adobe Town, 725 in Salt Wells Creek, and 322 in Great Divide Basin) would be removed and shipped to BLM holding facilities in Rock Springs, Wyoming, Cañon City, Colorado and/or any other BLM holding facility, where they would be prepared for adoption and/or sale to qualified individuals and/or long-term holding. The projected wild horse population remaining on the range following the gather would be approximately 610 in the Adobe Town HMA, 251 in the Salt Wells Creek HMA and 415 in the Great Divide Basin HMA. Gather operations are anticipated to take between four to six weeks for completion. See Table 4 for summary of these numbers.

**Table 4. Action Summary Table for Fertility Control**

| HMA | 2017 *Population | Approximate Number to Gather (85%) | Approximate Number to be Removed | Approximate Number to be treated with Fertility Control and Released Back |
|---|---|---|---|---|
| Adobe Town | 1,123 | 954 | 513 | 175 |
| Salt Wells Creek | 976 | 829 | 725 | 40 |
| Great Divide Basin | 737 | 626 | 322 | 100 |
| Total | 2,836 | 2,409 | 1,560 | 315 |

* Numbers represent adult wild horses. BLM Manual 4700 defines an adult wild horse as: All WH&B one year of age and older are considered adults (a foal is considered one year of age on January 1 of the year following its birth).

The 1,276 wild horses remaining in the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs would include approximately 849 wild horses that would be returned to the HMAs. Approximately 371 would be studs and 315 would be fertility control treated mares and 163 additional, mares and/or colts. After selection and treatment, these horses would be released into the immediate gather area.

All the mares released would be subject to fertility control experimentation research protocol with a 22-month treatment of PZP. Fertility control would be conducted in accordance with Standard Operating Procedures as described in Appendix III (SOPs for Fertility Treatment).

Baseline DNA samples would be taken from 20 mares and 20 stallions returned to the each of the HMAs (BLM 2009). Instruction Memorandum 2009-062 (BLM 2009) 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 that DNA samples are collected from 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[1]. 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' here is meant to imply 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 VIII). New World Iberian phenotypes[2] may or may not be related to the presence of specific alleles. However, wild horses that appear to express 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 Appendix VII).

At the holding facilities the wild horses 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 long-term holding (Off-Range). The projected wild horse population remaining on the range following the gather would be about 1,276 wild horses in the HMAs.

## 2.2 Alternative B – Proposed Action: Remove Excess Animals to Lower Limit of AML Range without Fertility Control

Alternative B – Proposed Action is to gather approximately 1,560 wild horses or about 55% of the estimated current population (2,836 horses) in the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs. The estimated current wild horse population within the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs is based on the April 2017 flights. Of the animals gathered, approximately 1,560 excess wild horses would be removed from the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs. Approximately 513 excess wild horses would be removed from the Adobe Town HMA, 725 excess wild horses would be removed from the Salt Wells Creek HMA and 322 excess wild horses would be removed from the Great Divide Basin HMA.

Excess wild horses would be removed from the three HMAs while 20 mares and 20 stallions would be returned to the Adobe Town HMA. Baseline DNA samples would be taken from 20 mares and 20 stallions returned to the Adobe Town HMA as described in BLM 2009. Selective removal and retention criteria would be followed in the Adobe Town HMA as described in Instruction Memorandum 2010-135 (BLM 2010a) and the Rawlins RMP (BLM 2008b). 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 VIII). Phenotypes that are categorized as appearing to have New World Iberian breed type traits may or

[1] Genotype: The genetic makeup of an organism or group of organisms with reference to a single trait set of traits, or an entire complex of traits and/or the sum total of genes transmitted from parent to offspring.
[2] Phenotype: The composite of an organism's observable characteristics or traits, such as its morphology, development, biochemical or physiological properties, behavior, and products of behavior. A phenotype results from the expression of an organism's genetic code (its genotype,) as well as the influence of environmental factors and the interactions between the two.

may not be related to the presence of specific alleles in an individual's DNA  However, wild horses that appear to express the New World Iberian phenotypic traits would be preferentially returned to the Adobe Town HMA.  The Rawlins RMP more specifically seeks to increase the recognized occurrence of the New World Iberian genotype and associated phenotype.  Genetic diversity associated with breed type ancestry phenotypic traits Reference photographs would be taken of each wild horse that DNA samples are collected from 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 individuals that are more associated with New World Iberian breed type ancestry.  DNA sampling and analysis would be done so that genotypic changes and overall genetic health of the wild horses can be monitored and future management practices can be adapted based on the results of this genetic monitoring.

Excess wild horses would be shipped to BLM holding facilities in Rock Springs, Wyoming, Cañon City, Colorado, and/or any other BLM holding facility.  At the holding facilities the wild horses 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 long-term holding (Off-Range).  The projected wild horse population remaining on the range following the gather would be approximately 610 in Adobe Town HMA, 251 in Salt Wells Creek HMA and 415 in Great Divide Basin HMA, for a total of 1,276 wild horses.  Gather operations are anticipated to take between three to six weeks for completion.

## 2.3 Alternative C – No Action Alternative – No Gather or Removal

Under the No Action Alternative, a gather to remove excess wild horses within the project area would not take place in 2017 or when funding permits.  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 20-25% annually.  There would be no removal of wild horses from private lands within the HMAs.  However, existing management including monitoring would continue.

The WFRHBA requires the BLM to protect the range from deterioration associated with overpopulation of wild horses, and to preserve and maintain a thriving natural ecological balance.  Additionally, the FLPMA directs that management of public lands be on the basis of multiple use and sustained yield and that the BLM prevent unnecessary or undue degradation of public lands.  The No Action Alternative would not comply with:

- WFRHBA
- Applicable federal regulations and Bureau policy
- FLPMA
- 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.

## 2.4 Alternatives Considered but Eliminated from Detailed Analysis

### Change the Current Established AMLs

This alternative would involve changing the established AMLs to allow for a greater number of wild horses within the 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. This gather document and subsequent Decision Record is not the appropriate mechanism for adjusting the AML of an HMA. Adjustments to AML are completed through the land use planning process. The Rock Springs Field Office is currently revising its RMP, and AML is being assessed as part of this separate planning effort.

### 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 it ineffective in meeting the purpose and need to maintain the AMLs in accordance with all applicable regulations and orders identified in Section 1.3.

### 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. The information below will demonstrate that these methods are infeasible in meeting the purpose and need for this area.

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. 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 as an alternative.

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 method alternatives 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 to maintain the AML, as the existing population of wild horses within the HMAs is currently above the established AML and excess wild horses need to be removed in compliance with applicable regulations described in Section 1.3. This alternative would also fail to be in compliance with the 2013 Consent Decree.

## Incremental Approach for Wild Horse Removals

An alternative considered but not carried forward for detailed analysis was the incremental approach of removing excess wild horses from the HMAs over a longer period of time. This alternative does not meet the purpose and need to maintain the AML, as the existing population of wild horses within the HMAs is currently above the established AML and excess wild horses need to be removed immediately in compliance with applicable regulations described in Section 1.3. Also, due to the number of excess wild horses to be removed and the large geographic area of the HMAs, this technique would be infeasible. Furthermore, this alternative may not be in conformance with the 2013 Consent Decree.

## 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 (Spring 2018). 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 eco- logical balance and avoids a deterioration of the range (Animal Protection Institute of America v. Nevada BLM. 1989b)….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. For these reasons, this alternative

did not receive further consideration in this document. Furthermore, this alternative would not be consistent with the 2013 Consent Decree.

## Control of Wild Horse Numbers by Natural Means

This alternative would use natural means, such as natural predation 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.

The primary "Natural Means" would be population correction based on the population reaching carrying capacity. 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 document foal survival rates exceeding 95%. Overall, wild horses are not a self-regulating species.

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 in conformance with the 2013 Consent Decree.

## Remove or Reduce Livestock within the HMAs

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 to manage wild horses within AML and to remove wild horse 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 land use plans (43 CFR 4710.1).

Furthermore, this gather document and subsequent Decision Record 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. For modifications in long-term multiple use management, changes in forage allocations between livestock and wild horses would have to be re-evaluated and implemented through the land use planning process.

## Use of Surgical or Chemical Sterilization to Reduce Population Growth

The use of these methods to reduce population growth has yet to be implemented in wild horse populations. Research on the use of these techniques on wild horse behavior is still on going.

The effectiveness and impacts of these techniques are well understood in controlled settings, but they have not been extensively researched under field conditions. Furthermore, this alternative would not respond to the purpose and need to remove wild horses from private lands or to remove or reduce livestock within the HMAs.

# 3.0 Description of the Affected Environment and Environmental Consequences

## *3.1 Introduction*

This section of the environmental assessment briefly discusses the relevant components of the human and natural environment which would be either affected or potentially affected by the proposed action and alternatives. Direct impacts are those that result from management actions while indirect impacts are those that exist once the management action has occurred. By contrast, cumulative impacts result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such action. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Analysis related to maintaining the AMLs for the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs is tiered to the Final EISs for the Green River RMP (BLM 1996, pp. 345-346) and Rawlins RMP, (BLM 2008a, pp. 139-142), (Adobe Town HMA only), respectively.

The area covered by this analysis is within the jurisdiction of the BLM Rock Springs and Rawlins Field Offices, Wyoming. It is bordered on the south by the Colorado/Wyoming State Line, on the east by the Rock Springs and Rawlins field offices' boundary, on the north by the Continental Peak Allotment boundary, and on the west side by Highway 191 North (see Figures 1, 2 and 3). The majority of the private land holdings in the three HMAs are in a checkerboard land pattern with sections alternating from private to public lands. A description of the acreage associated with these HMAs is provided in Table 1.

The Salt Wells Creek, and Adobe Town HMAs are located southeast of Rock Springs, within Sweetwater and Carbon counties, Wyoming. Elevation ranges from 6,470 feet along Sand Creek Wash to over 8,000 feet on Kinney Rim.

The Divide Basin HMA is located approximately 30 miles northeast of Rock Springs, within Sweetwater and Fremont counties, Wyoming. Elevation ranges from 6,675 feet along Alkali Basin to 9,431 feet on Continental Peak.

Summers are hot, and winters can range from mild to bitterly cold in the three HMAs. Annual precipitation ranges from less than 7 inches to more than 12 inches per year. About half of the precipitation falls during the growing season from April through June, with the remainder coming in high intensity summer thunderstorms and winter snowfall. Appendix VI provides more information on climatic data for these areas.

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.

## Resource Issues Present or Potentially Affected

**Table 5. Resources Considered**

| Determination[1] | Resource | Rationale for Determination |
|---|---|---|
| NI | Air Quality/ Green House Gas Emissions | The Wyoming Department of Environmental Quality (WDEQ) is the authorized agency to administer the Clean Air Act. WDEQ monitoring data identifies that there are no Air Quality concerns within the project area. |
| NI | Areas of Critical Environmental Concern | While there are ACECs within the project area, no impacts are anticipated in association with any of the action alternatives, as no trapping locations or activities will occur within these areas. |
| PI | Cultural Resources | See Section 3.5 |
| NI | Environmental Justice | The action alternatives were reviewed in accordance with Executive Order 12898 and no impacts to minority or low-income populations are expected. |
| NP | Farmlands: Prime or Unique | No Prime or Unique Farmlands (as defined by 7 CFR 657.5) are present in the project area. |
| NP | Floodplains | No floodplains are present in the project area of the gather. |
| NI | Fuels/Fire Management | The removal of wild horses would not affect any planned fuels projects within the area. |
| PI | Invasive Species/ Noxious Weeds | See Section 3.4 |
| NI | Lands/Access | No rights-of-way or other land use authorizations are required to implement the proposed action or alternatives. |
| PI | Livestock Grazing | See Section 3.8 |
| PI | Native American Religious Concerns | See Section 3.5 |
| NP | Paleontology | An inventory of the proposed horse gathering locations did not indicate the presence of paleontological sites. |
| NI | Public Health & Safety | Public Health and Safety would not be impacted by any of the alternatives. |
| PI | Rangeland Health Standards | The wild horse gather would not impact rangeland health. The effect on rangeland health standards of fewer horses after the gather, or the effect of a greater number of |

| Determination[1] | Resource | Rationale for Determination |
|---|---|---|
| | | horses from not gathering, is addressed throughout the document. |
| PI | Recreation | See Section 3.6 |
| NI | Socio-Economics | The proposed action or alternatives would not affect the socioeconomic status of the county or nearby towns. |
| PI | Soils | See Section 3.4 |
| PI | Special Status Wildlife Species | See Section 3.3 |
| PI | Special Status Plant Species | See Section 3.4 |
| PI | Threatened, Endangered or Candidate Plant Species | See Section 3.4 |
| NI | Threatened, Endangered or Candidate Animal Species | Black-Footed Ferret have been block cleared in this area. Yellow Billed Cuckoo have the potential to occur along the Green River; however, no gather activities would impact this area. |
| NP | Wastes (hazardous or solid) | There are no known hazardous or solid wastes present in the project area. The proposed action or alternatives would not contribute to hazardous or solid wastes. |
| NI | Water Resources/Quality (drinking/surface/ground) | Currently, the WDEQ administers water quality and water quantity programs. Furthermore, WDEQ is the responsible agency for the administration of the Clean Water Act. The horse gather would not impact water resources. Therefore, since WDEQ is the responsible agency for administering water quality, and since the WDEQ has not provided any information in regards to water quality issues or implementing a water monitoring program within the area, this will not be discussed in detailed analysis. |
| NI | Wetlands/Riparian Zones | Removal of wild horses from these HMAs will not have an impact on wetlands and riparian zones. Wild horse gather operations would not impact wetlands and riparian areas. Trap sites are not located in wetlands or riparian areas, and the use of helicopters to |

| Determination[1] | Resource | Rationale for Determination |
|---|---|---|
| | | gather wild horses prevents potential impacts to these resources. |
| NP | Wild and Scenic Rivers | There are no WSR within the project area. |
| PI | Wilderness | See Section 3.7 |
| NI | Woodland/Forestry | There are no areas that meet the definition of forests within the project area. Juniper and aspen woodlands are present in the area but are not impacted by wild horses and will not be discussed further in the document. |
| PI | Vegetation | See Section 3.4 |
| NI | Visual Resources | Gather operations are temporary, and as such will not permanently affect visual resources within the project area. |
| PI | Wild Horses and Burros | See Section 3.2 |
| PI | Wildlife/Fisheries | See Section 3.3 |

[1]Determination:

PI: Potential Impact due to one or more action alternatives; therefore, analyzed in the NEPA document.

NP: Not Present in the area impacted by the action alternatives.

NI: No Impact expected from action alternatives.

## *3.2 Wild Horses*

### Affected Environment

The RSGA and wild horse advocacy groups entered into agreements in 1979 that provided for the management of specific numbers of wild horses on the privately controlled lands and the contiguous public lands within the Rock Springs District (now the Rock Springs Field Office). Current AMLs were established in part as a result of the decisions set forth in that agreement.

The current wild horse population for these three HMAs is estimated at 2,836 adult horses (see Table 2). This number is based upon the April 2017 wild horse census flights. Wild horses were last removed from the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs in 2014 when 1,261 wild horses were captured and removed from the checkerboard portions of these HMAs.

Recent utilization monitoring within these HMAs demonstrated that current utilization in these areas does not generally exceed moderate use levels. This could be due, in part, to the above average moisture received during the last 2 growing seasons. Generally speaking, southwest Wyoming is becoming drier and warmer. However, 2015 and 2016 have been unusually wet compared to 2012 which was one of the driest drought years on record since meteorological data was recorded. Despite these recent moisture patterns, data shows that since the 1950s, multi-year droughts have become more frequent in Wyoming (see Appendix VI).

More specific information on the populations, genetic viability and AML of each HMA are provided below:

**Adobe Town HMA**

The 2017 estimated population for the Adobe Town HMA is 1,123 wild horses. This number is based upon the April 2017 census flights conducted in accordance with Instruction Memorandum No. 2010-057, *Wild Horse & Burro Population Inventory and Estimation* (BLM 2010b).

The AML for the Adobe Town HMA was a specifically defined population range that would result in an average population of 700 adults over time. The AML was established in May of 1994 in the Great Divide Resource Area Wild Horse Herd Management Area Evaluation following intensive resource monitoring. The management range is 610 to 800 wild horses. The range condition and trend studies that were used in 1993 to determine the level of use (AML) of 700 horses were repeated in 2003-04 and revealed a consistent downward trend in range condition throughout the area from 1993 to 2003. Other factors (which may include AML not achieved, extended drought, other combined grazing uses) need to be analyzed to determine the cause of the downward trend in ecological condition in the Adobe Town HMA. Allocation of range use and the determination of the AML are land use management decisions not analyzed in this EA.

Genetic variability data was collected in 2010 for the Adobe Town HMA. The hair 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 is summarized here:

> "Genetic variability of this herd is quite high probably due to mixed ancestry and a large population size. There is a somewhat high percentage of variation that is at risk but this is unlikely to be a problem unless there is a drastic reduction in population size. Genetic variation levels have remained high in comparison to 2003. Genetic similarity results suggest a herd with mixed ancestry but a high probability of Spanish blood….Current variability levels are high enough that no action is needed as long as there is no serious reduction in population size" (Cothran 2011).

At the time Cothran made this assessment, this HMA had approximately 610 wild horses (low AML). Therefore, it is fair to assume that this wild horse herd continues to be a genetically diverse population, and would continue to have adequate genetically variability even at low AML. The relative similarity between horses of Adobe Town HMA and other major breed types did not change markedly from 2003 to 2010. Coefficients of genetic similarity between sampled

horses in the two years sampled did not consistently show a pattern of relatedness to New World or Old World Iberian breed ancestry that was statistically distinguishable from several other categories of horse ancestry. Table 3 in each of Cothran's (2003, 2010) analyses vary in the strength of association between Adobe Town horses and Iberian breeds, as measured by the value of Rogers' genetic similarity coefficient, S. In 2010, the confidence intervals for S overlapped for Light and Racing breeds, Oriental and Arabian breeds, Old World Iberian breeds, New World Iberian breeds, North American Gaited breeds, Heavy Draft breeds, and True Pony breeds. Results were similar in 2003. For more detailed information about the Adobe Town HMA, New World Iberian Genetics (see Appendix VII).

**Salt Wells Creek HMA**

The 2017 estimated population for the Salt Wells Creek HMA is 976 wild horses based on the April 2017 census flights conducted in accordance with Instruction Memorandum No. 2010-057, *Wild Horse & Burro Population Inventory and Estimation* (BLM 2010b). The Salt Wells Creek AML of 308 wild horses was established in the 1997 Green River Resource Management Plan with a management range of 251 to 365 adult horses.

Genetic variability data was collected in 2010 for the Salt Wells Creek HMA. The hair samples were analyzed by Dr. E. Gus Cothran, Department of Veterinary Integrative Bioscience, Texas A&M University, College Station, Texas. His conclusions and recommendations regarding genetic variability in the Salt Wells Creek herd is 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 2011).

**Great Divide Basin HMA**

The 2017 estimated population for the Great Divide Basin HMA is 737 wild horses based on the April 2017 census flights conducted in accordance with Instruction Memorandum No. 2010-057, *Wild Horse & Burro Population Inventory and Estimation* (BLM 2010b). The Great Divide Basin AML of 500 wild horses was established in the 1997 Green River Resource Management Plan with a management range of 415 to 600 adult horses.

Genetic variability data was collected in 2011 for the Great Divide Basin HMA. The hair samples were analyzed by Dr. E. Gus Cothran, Department of Veterinary Integrative Bioscience, Texas A&M University, College Station, Texas. His conclusions and recommendations regarding genetic variability in the Great Divide Basin herd is 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 2012).

### Environmental Consequences

The WinEquus program, developed by Dr. Steven Jenkins at the University of Nevada at Reno was designed to assist the BLM in evaluating various management plans and possible outcomes for the management of wild horses. More information about the model is available upon request from the RFO or RSFO.

Population modeling was completed for the three alternatives, by HMA, to analyze possible differences that could occur to the wild horse populations between alternatives. This modeling effort was completed using the WinEquus program developed by Dr. Steven Jenkins at the University of Nevada at Reno. This model was designed to assist the BLM in evaluating possible impacts on wild horse populations as a result of management actions. The modeling may not necessarily reflect actual on-the-ground results, but rather provides a means to demonstrate anticipated differences in populations based on different management actions. One objective of the modeling effort was to identify if any of the alternatives would "crash" the population or cause extremely low population numbers or growth rates.

Modeling demonstrated that minimum population levels and growth rates were found to be within reasonable levels and adverse impacts to the population are not anticipated. When comparing the differences between the three alternatives, the No Action alternative (Alternative C) would result in the greatest population number with an average population of 3,605 in the Adobe Town HMA, 3,062 in the Salt Wells Creek HMA and 2,261 in the Great Divide Basin HMA. According to the modeling, Alternative A results in the lowest average population of 896 in the Adobe Town HMA, 485 in the Salt Wells Creek HMA and 636 in the Great Divide Basin HMA while Alternative B (the Proposed Action) resulted in an average population of 1,125 in the Adobe Town HMA, 513 in the Salt Wells Creek HMA and 766 in the Great Divide Basin HMA. Graphic and tabular results are displayed in detail in Appendix IV (Wild Horse Population Modeling).

## Impacts Common to Alternatives A and B

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 II would be implemented to ensure a safe and humane gather occurs and would minimize potential stress and injury to wild horses.

In wild horse gathers that utilize helicopters and motorized vehicles, gather-related mortality averages only about two percent (2%), which is considered very low when handling wild animals. 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, unless an emergency situation exists.

Individual, direct effects to wild horses include the handling stress associated with the roundup, capture, sorting, handling, and transportation of the animals. The intensity of these effects varies by individual, and is indicated by behaviors ranging from nervous agitation to physical distress. When being herded to trap site corrals by the helicopter, injuries sustained by wild horses may include 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 based on prior gather statistics, serious injuries requiring humane euthanasia occur in less than 1 horse per every 100 captured. 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. Overall, direct gather-related mortality averages less than 2% (extrapolated from 2007 gather data).

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.

To assist with the collection of baseline genetic data, DNA samples would be taken from 20 mares and 20 stallions returned to the Adobe Town HMA (BLM 2009). Instruction Memorandum 2009-062 (BLM 2009) provides provides program guidance and policy for the collection of genetic baseline information for wild horse and burro populations. 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. Additionally reference photographs would be taken of each wild horse that DNA samples are collected from 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 breed types. If this process can identify physical characteristics that are reliably associated with New World Iberian breed types, then it is anticipated that future gathers could make use of that information to aid in the selective retention of wild horses thought to have more genetic influence from New World Iberian breed types. This could potentially lead to a marginal increase in the prevalence of individual horses that have a higher degree of genetic similarity to New World Iberian breed types within the Adobe Town HMA in the future.

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 Instruction Memorandum 2013-059 (BLM 2013b). Decisions to humanely euthanize animals in field situations would be made in conformance with BLM policy. The policy described in Instruction Memorandum 2015-070 (BLM 2015a) is used as a guide to determine if animals meet the criteria and should be euthanized (Appendix II, SOPs). 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. 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.

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.

***Transport, Short-Term Holding, and Adoption (or Sale) Preparation***

Approximately 1,560 excess horses would be removed. Animals would be transported from the capture/temporary holding corrals to the designated BLM short-term holding corral facility(s) in accordance with BLM Instruction Memorandum 2013-059 (BLM 2013b). From there, they would be made available for adoption or sale to qualified individuals or to long-term (grassland) pastures.

Wild horses selected for removal from the range are transported to the receiving short-term holding facility 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 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 8 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 short-term holding facility, 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 short-term holding facility, 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 American Veterinary Medical Association (AVMA).

Wild horses in very thin condition or animals with 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, 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 short-term corral facilities, a minimum of 700 square feet is provided per animal. Mortality at short-term holding facilities 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 Long-Term 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 Instruction Memorandum No. 2013-032, *Direction for the Sale of Wild Horse and Burros - Interim Guidance* (BLM 2013d).

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 long-term pastures (LTPs).

Potential effects to wild horses from transport to adoption, sale or LTPs are similar to those previously described. One difference is that when shipping wild horses for adoption, sale or LTP, 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.

Long-term 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. Approximately 49,959 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, Montana, Oklahoma, and South Dakota. Located in mid or tall grass prairie regions of the United States, these LTPs are highly productive grasslands as compared to more arid western rangelands. These pastures comprise about 256,000 acres (an average of about 8-10 acres per animal). The majority of these animals are older in age.

Mares and castrated stallions (geldings) are segregated into separate pastures except one facility where geldings and mares coexist. Although the animals are placed in LTPs, 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 LTPs, but foals born to pregnant mares are gathered and weaned when they reach about 8-10 months of age and are then shipped to short-term facilities 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 LTPs averages approximately 8% per year, but can be higher or lower depending on the average age of the horses pastured there (GAO-09-77, page 52). The savings to the American taxpayer which results from contracting for LTPs averages about $4.45 per horse per day as compared with maintaining the animals in short-term holding facilities.

***Euthanasia and Sale without Limitation***

While humane euthanasia and sale without limitation of healthy horses for which there is no adoption demand is authorized under the WFRHBA, Congress prohibited the use of appropriated funds between 1987 and 2004 and again starting in 2009 through the appropriations language each fiscal year through 2017 for this purpose. Sales of wild horses are conducted in accordance with Instruction Memorandum No. 2013-032, *Direction for the Sale of Wild Horse and Burros - Interim Guidance* (BLM 2013d).

## Impacts of Alternative A

Under this action, the post-gather population of wild horses for the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs would be approximately 1,276. The post-gather numbers represent the combined lower limit of the AML range.

Under this alternative, a selected number of mares (as described in Section 2.1) would be treated with PZP prior to their release. The treated mares would equal approximately 30% of the post-gather mare population. Each of these mares, if pregnant, would be expected to foal normally during the 2018 foaling season. The treated mares would not be expected to foal in the subsequent year following treatment. The PZP treatment would be expected to slow population

growth starting in 2019 and be effective for at least one year. Therefore, wild horse numbers would be expected to exceed the upper limit of the AML range in year 4 following the gather (by about 2021).

Mares receiving the fertility control inoculation would experience increased levels of stress from additional handling while they are being inoculated and freeze marked. There would be potential additional impacts to animals at the injection site following the administration of the fertility control vaccine, as noted below. For monitoring purposes, wild horses treated with the PZP vaccine would be identified by a freeze-mark on the left side of the neck as follows: "2" for Salt Wells Creek HMA, "3" for Adobe Town HMA or "9" for Great Divide Basin HMA.

PZP would have little effect on the occurrence of the New World Iberian Genotype because all captured mares would be treated regardless of phenotype or genotype, and because PZP is only temporarily effective.

***BLM Use of Contraception in Wild Horse Management***

Expanding the use of population growth suppression to slow population growth rates and reduce the number of animals removed from the range and sent to off-range pastures (ORPs) is a BLM priority. The WFRHBA of 1971 specifically provides for contraception and sterilization (section 3.b.1). No finding of excess animals is required for the BLM to pursue contraception in wild horses or wild burros. Contraception has been shown to be a cost-effective and 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). Contraception by itself does not remove excess horses from an HMA's population, so if a wild horse population is in excess of AML, then contraception alone would result in some continuing environmental effects of horse overpopulation. Successful contraception reduces future reproduction. Limiting future population increases of horses could limit increases in environmental damage from higher densities of horses than currently exist. Horses are long-lived, potentially reaching 20 years of age or more in the wild and, if the population is above AML, treated horses returned to the HMA may continue exerting negative environmental effects, as described in section 3.4, throughout their life span. In contrast, if horses above AML are removed when horses are gathered, that leads to an immediate decrease in the severity of ongoing detrimental environmental effects.

Successful contraception would be expected to reduce the frequency of horse gather activities on the environment, as well as wild horse management costs to taxpayers. Bartholow (2007) concluded that the application of 2- or 3-year contraceptives to wild mares could reduce operational costs in a project area by 12-20%, or up to 30% in carefully planned population management programs. He also concluded that contraceptive treatment would likely reduce the number of horses that must be removed in total, with associated cost reductions in the number of adoptions and total holding costs. If applying contraception to horses requires capturing and handling horses, the risks and costs associated with capture and handling of horses may be comparable to those of gathering for removal, but with expectedly lower adoption and long-term holding costs. Population suppression becomes less expensive if fertility control is long-lasting (Hobbs et al. 2000). Selectively applying contraception to older animals and returning them to

the HMA could reduce long-term holding costs for such horses, which are difficult to adopt, and could 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 a long-lived animal with high levels of genetic diversity – and could reduce growth rates further by delaying the age of first parturition (Gross 2000). Although contraceptive treatments may be associated with a number of potential physiological, behavioral, demographic, and genetic effects, detailed below, 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).

The literature review is intended to summarize what is known and what is not known about potential effects of treating mares with porcine zona pellucida (PZP) vaccine. As noted below, some negative consequences of vaccination are possible. PZP vaccines are administered only to females.

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

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

***PZP Vaccine***

The immune-contraceptive PZP vaccine is currently being used on over 75 areas managed for wild horses by the National Park Service, US Forest Service, and the Bureau of Land Management and its use is appropriate for free-ranging wild horse herds. Taking into consideration available literature on the subject, the National Research Council concluded in their 2013 report that PZP was one of the preferable available methods for contraception in wild horses and burros (NRC 2013). PZP use can reduce or eliminate the need for gathers and removals (Turner et al. 1997). PZP vaccines meet most of the criteria that the National Research Council (2013) used to identify promising fertility control methods, in terms of delivery method, availability, efficacy, and side effects. It has been used extensively in wild horses (NRC 2013), and in a population of feral burros in the United States (Turner et al. 1996). PZP is relatively inexpensive, meets BLM requirements for safety to mares and the environment, and is commercially produced as ZonaStat-H, an EPA-registered product (EPA 2012, SCC 2015), or as PZP-22, which is a formulation of PZP in polymer pellets that can lead to a longer immune response (Turner et al. 2002, Rutberg et al. 2017). It can easily be remotely administered in the field in cases where mares are relatively approachable.

Under the Proposed Action, the BLM would return to the HMA as needed to re-apply PZP-22 and/or ZonaStat-H and initiate new treatments in order to maintain contraceptive effectiveness in controlling population growth rates. Both forms of PZP can safely be reapplied as necessary to control the population growth rate. Even with repeated booster treatments of PZP, it is expected that most, if not all, mares would return to fertility. Once the population is at AML and population growth seems to be stabilized, the BLM could use population planning software

(WinEquus II, currently in development by USGS Fort Collins Science Center) to determine the required frequency of re-treating mares with PZP.

***PZP Direct Effects***

When injected as an antigen in vaccines, PZP causes the mare's immune system to produce antibodies that are specific to zona pellucida proteins on the surface of that mare's eggs. The antibodies bind to the mare's eggs surface proteins (Liu et al. 1989) and effectively block sperm binding and fertilization (Zoo Montana, 2000). Because treated mares do not become pregnant but other ovarian functions remain generally unchanged, PZP can cause a mare to continue having regular estrus cycles throughout the breeding season. Research has demonstrated that contraceptive efficacy of an injected PZP vaccine is approximately 90% for mares treated twice in the first year and boostered annually (Kirkpatrick et al., 1992). In addition, among mares, PZP contraception appears to be reversible, with most treated mares returning to fertility over time. PZP vaccine application at the capture site does not appear to affect normal development of the fetus or foal, hormone health of the mare or behavioral responses to stallions, should the mare already be pregnant when vaccinated (Kirkpatrick et al. 2002). The vaccine has no apparent effect on pregnancies in progress or the health of offspring (Kirkpatrick and Turner 2003).

The NRC (2013) criterion by which PZP is not a good choice for wild horse contraception was duration. The ZonaStat-H formulation of the vaccine tends to confer only one year of efficacy. Some studies have found that a PZP vaccine in long-lasting pellets (PZP-22) can confer multiple years of contraception (Turner et al. 2007), particularly when boostered with subsequent PZP vaccination (Rutberg et al. 2017). Other trial data, though, indicate that the pelleted vaccine may only be effective for one year (J. Turner, University of Toledo, Personal Communication).

Following a gather, application of PZP for fertility control would reduce fertility in a large percentage of mares for at least one year (Ransom et al. 2011). Recruitment of foals into the population may be reduced over a three-year period. Gather efficiency would likely not exceed 85% via helicopter, and may be less with bait and water trapping, so there would be a portion of the female population uncaptured that is not treated in any given year. Additionally, some mares may not respond to the fertility control vaccine, but instead will continue to foal normally.

In most cases, PZP contraception appears to be temporary and reversible (Kirkpatrick and Turner 2002, Joonè et al. 2017), does not appear to cause out-of-season births (Kirkpatrick and Turner 2003), and has no ill effects on ovarian function if contraception is not repeated for more than five consecutive years on a given mare. Although the rate of long-term or permanent sterility following repeated vaccinations with PZP has not been quantified, it must be acknowledged that this could be a result for some number of wild horses receiving multiple repeat PZP vaccinations. Even though it is not the intent of PZP treatment, the permanent sterility of a fraction of treated mares is a potential result that would be consistent with the contraceptive purpose of applying the vaccine to wild mares.

Although most treatments with PZP will be reversible, repeated treatment with PZP may lead to long-term infertility (Feh 2012) and, perhaps, direct effects on ovaries (Gray and Cameron 2010). Bechert et al. (2013) found that ovarian function was affected by the SpayVac PZP vaccination, but that there were no effects on other organ systems. Mask et al. (2015)

demonstrated that equine antibodies that resulted from SpayVac immunization could bind to oocytes, ZP proteins, follicular tissues, and ovarian tissues, but it is possible that result is specific to SpayVac, which may have lower PZP purity than ZonaStat or PZP-22 (Hall et al. 2016). Joonè et al. (2017) found effects on ovaries after SpayVac PZP vaccination in some treated mares, but normal estrus cycling had resumed 10 months after the last treatment. SpayVac is a patented formulation of PZP in liposomes that can lead to multiple years of infertility (Roelle et al. 2017) but which is not reliably available for the BLM to use at this time. Kirkpatrick et al. (1992) noted effects on ovaries after three years of treatment with PZP. Observations at Assateague Island National Seashore indicate that the more times a mare is consecutively treated, the longer the time lag before fertility returns, but that even mares treated 7 consecutive years did return to ovulation (Kirkpatrick and Turner 2002). Other studies have reported that continued applications of PZP may result in decreased estrogen levels (Kirkpatrick et al., 1992) but that decrease was not biologically significant, as ovulation remained similar between treated and untreated mares (Powell and Monfort 2001). Permanent sterility for mares treated consecutively 5-7 years was observed by Nunez et al. (2010, 2017). In a graduate thesis, Knight (2014) suggested that repeated treatment with as few as three to four years of PZP treatment may lead to longer-term sterility, and that sterility may result from PZP treatment before puberty.

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. In mice, Sacco et al. (1981) found that antibodies specific to PZP can pass from mother mouse to pup via the placenta or colostrum, but that did not apparently cause any innate immune response in the offspring: the level of those antibodies were undetectable by 116 days after birth. There was no indication in that study that the fertility or ovarian function of those pups was compromised, nor is the BLM aware of any such results in horses or burros.

On-range observations from 20 years of application to wild horses indicate that PZP application in wild mares does not generally cause mares to foal out of season or late in the year (Kirkpatrick and Turner 2003). Nunez's (2010) research showed that a small number of mares that had been previously been treated with PZP foaled later than untreated mares and expressed the concern that this late foaling "may" impact foal survivorship and decrease band stability, or that higher levels of attention from stallions on PZP-treated mares might harm those mares. However, that paper provided no evidence that such impacts on foal survival or mare well-being actually occurred. Rubenstein (1981) called attention to a number of unique ecological features of horse herds on Atlantic barrier islands, which calls into question whether inferences drawn from island herds can be applied to western wild horse herds. Ransom et al. (2013), though, identified a potential shift in reproductive timing as a possible drawback to prolonged treatment with PZP, stating that treated mares foaled on average 31 days later than non-treated mares. Those results, however, showed that over 81% of the documented births in this study were between March 1 and June 21, i.e., within the normal spring season. Ransom et al. (2013) advised that managers should consider carefully before using PZP in small refugia or rare species. Wild horses and burros in Nevada do not generally occur in isolated refugia, and they are not a rare species. Moreover, an effect of shifting birth phenology was not observed uniformly: in two of three PZP-treated wild horse populations studied by Ransom et al. (2013), foaling season of treated mares extended three weeks and 3.5 months, respectively, beyond that of untreated mares. In the other population, the treated mares foaled within the same time period as the untreated mares.

Moreover, Ransom et al. (2013) found no negative impacts on foal survival even with an extended birthing season.

Mares receiving the vaccine would experience slightly increased stress levels associated with handling while being vaccinated and freeze-marked. Newly captured mares that do not have markings associated with previous fertility control treatments would be marked with a new freeze-mark for the purpose of identifying that mare, and identifying her PZP vaccine treatment history. This information would also be used to determine the number of mares captured that were not previously treated, and could provide additional insight regarding gather efficiency.

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

***Indirect Effects***

One expected long-term, indirect effect on wild horses treated with fertility control would be an improvement in their overall health. Many treated mares would not experience the biological stress of reproduction, foaling and lactation as frequently as untreated mares, and their better health is expected to be reflected in higher body condition scores (Nunez et al. 2010). After a treated mare returns to fertility, her future foals would be expected to be healthier overall, and would benefit from improved nutritional quality in the mares' milk. This is particularly to be expected if there is an improvement in rangeland forage quality at the same time, due to reduced wild horse population size. Past application of fertility control has shown that mares' overall health and body condition remains improved even after fertility resumes. PZP treatment may increase mare survival rates, leading to longer potential lifespan (Ransom et al. 2014a). To the extent that this happens, changes in lifespan and decreased foaling rates could combine to cause changes in overall age structure in a treated herd (Roelle et al. 2010). 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. 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.' More research is needed to document and quantify these hypothesized effects; however, it is believed that repeated contraceptive treatment may minimize this rebound effect.

Because successful fertility control would reduce foaling rates and population growth rates, another indirect effect would be to reduce the number of wild horses that have to be removed over time to achieve and maintain the established AML. So long as the level of contraceptive treatment is adequate, the lower expected birth rates can compensate for any expected increase in the survival rate of treated mares. Also, reducing the numbers of wild horses that would have to be removed in future gathers could allow for removal of younger, more easily adoptable excess wild horses, and thereby could eliminate the need to send additional excess horses from this area to long-term pastures. A high level of physical health and future reproductive success of fertile mares within the herd would be sustained, as reduced population sizes would be expected to lead to more availability of water and forage resources per capita.

Reduced population growth rates and smaller population sizes would also allow for continued and increased environmental improvements to range conditions within the project area, which would have long-term benefits to wild horse habitat quality. As the population nears or is maintained at the level necessary to achieve a thriving natural ecological balance, vegetation resources would be expected to recover, improving the forage available to wild horses and wildlife throughout HMA. With a more optimal distribution of wild horses across the HMA, at levels closer to a thriving ecological balance, there would also be less trailing and concentrated use of water sources, which would have many benefits to the wild horses still on the range. There would be reduced competition among wild horses using the water sources, and less fighting would occur among studs and individual animals to access water sources. Water quality and quantity would continue to improve to the benefit of all rangeland users including wild horses. Wild horses would also have to travel less distance back and forth between water and desirable foraging areas. Should PZP booster treatment and repeated fertility control treatment continue into the future, the chronic cycle of overpopulation and large gathers and removals would no longer occur, but instead a consistent cycle of balance and stability would ensue, resulting in continued improvement of overall habitat conditions and animal health.

***Behavioral Effects***

The NRC report (2013) noted that all fertility suppression has effects on mare behavior, mostly as a result of the lack of pregnancy and foaling, and concluded that PZP was a good choice for use in the program. The result that PZP-treated mares may continue estrus cycles throughout the breeding season can lead to behavioral differences, when compared to mares that are fertile. Such behavioral differences should be considered as potential consequences of successful contraception.

Ransom and Cade (2009) delineate behaviors that can be used to test for quantitative differences due to treatments. Ransom et al. (2010) found no differences in how PZP-treated and untreated mares allocated their time between feeding, resting, travel, maintenance, and most social behaviors in three populations of wild horses, which is consistent with Powell's (1999) findings in another population. Likewise, body condition of PZP-treated and control mares did not differ between treatment groups in the Ransom study (Ransom et al. 2010) Nunez (2010) found that PZP-treated mares had higher body condition than control mares in another population, presumably because energy expenditure was reduced by the absence of pregnancy and lactation. Knight (2014) found that PZP-treated mares had better body condition, lived longer and switched harems more frequently, while mares that foaled spent more time concentrating on grazing and lactation and had lower overall body condition. Studies on Assateague Island (Kirkpatrick and

Turner 2002) showed that fillies (female foals) that were born to mares treated with PZP during pregnancy eventually breed and produce healthy, viable foals.

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

Ransom et al. (2010) found that control mares were herded by stallions more frequently than PZP-treated mares, and Nunez et al. (2009, 2014, 2017) found that PZP-treated mares exhibited higher infidelity to their band stallion during the non-breeding season than control mares. Madosky et al. (2010) and Knight (2014) found this infidelity was also evident during the breeding season in the same population that Nunez et al. (2009, 2010, 2014, 2017) studied; they concluded that PZP-treated mares changing bands more frequently than control mares could lead to band instability. Nunez et al. (2009), though, cautioned against generalizing from that island population to other herds. Nuñez et al. (2014) found elevated levels of fecal cortisol, a marker of physiological stress, in mares that changed bands. The research is inconclusive as to whether all the mares' movements between bands were related to the PZP treatments themselves or the fact that the mares were not nursing a foal, and did not demonstrate any long-term negative consequence of the transiently elevated cortisol levels. The authors (Nunez et al. 2014) concede that these effects "…may be of limited concern when population reduction is an urgent priority." In contrast to transient stresses, Creel et al (2013) highlight that variation in population density is one of the most well-established causal factors of chronic activation of the hypothalamic-pituitary-adrenal axis, which mediates stress hormones; high population densities and competition for resources can cause chronic stress. Creel also states that "…there is little consistent evidence for a negative association between elevated baseline glucocorticoids and fitness." Band fidelity is not an aspect of wild horse biology that is specifically protected by the WFRHBA of 1971. It is also notable that Ransom et al. (2014b) found higher group fidelity after a herd had been gathered and treated with a contraceptive vaccine; in that case, the researchers postulated that higher fidelity may have been facilitated by the decreased competition for forage after excess horses were removed. At the population level, available research does not provide evidence of the loss of harem structure among any herds treated with PZP. Long-term implications of these changes in social behavior are currently unknown, but no negative impacts on the overall animals or populations welfare or well-being have been noted in these studies.

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

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

> PZP in a variety of ecological settings, the likelihood of serious adverse effects seem low."

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

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

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

***Genetic Effects of PZP Vaccination***

In HMAs where large numbers of wild horses have recent and/or an ongoing influx of breeding animals from other areas with wild or feral horses, contraception is not expected to cause an unacceptable loss of genetic diversity or an unacceptable increase in the inbreeding coefficient. In any diploid population, the loss of genetic diversity through inbreeding or drift can be prevented by large effective breeding population sizes (Wright 1931) or by introducing new potential breeding animals (Mills and Allendorf 1996). The NRC report recommended that managed herds of wild horses would be better viewed as components of interacting metapopulations, with the potential for interchange of individuals and genes taking place as a result of both natural and human-facilitated movements. In the last 10 years, there has been a high realized growth rate of wild horses in most areas administered by the BLM, such that most alleles that are present in any given mare are likely to already be well represented in her siblings, cousins, and more distant relatives. With the exception of horses in a small number of well-known HMAs that contain a relatively high fraction of alleles associated with old Spanish horse breeds (NRC 2013), the genetic composition of wild horses in lands administered by the BLM is consistent with admixtures from domestic breeds. As a result, in most HMAs, applying fertility control to a subset of mares is not expected to cause irreparable loss of genetic diversity. Improved longevity and an aging population are expected results of contraceptive treatment that can provide for lengthening generation time; this result which would be expected to slow the rate of genetic diversity loss (Hailer et al., 2006). Based on a population model, Gross (2000) found that an effective way to retain genetic diversity in a population treated with fertility control is to preferentially treat young animals, such that the older animals (which contain all the existing genetic diversity available) continue to have offspring. Conversely, Gross (2000) found that

preferentially treating older animals (preferentially allowing young animals to breed) leads to a more rapid expected loss of genetic diversity over time.

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

Many factors influence the strength of a vaccinated individual's immune response, potentially including genetics, but also nutrition, body condition, and prior immune responses to pathogens or other antigens (Powers et al. 2013). One concern that has been raised with regards to genetic diversity is that treatment with immunocontraceptives could possibly lead to an evolutionary increase in the frequency of individuals whose genetic composition fosters weak immune responses (Cooper and Larson 2006, Ransom et al. 2014a). This premise is based on an assumption that lack of response to PZP is a heritable trait, and that the frequency of that trait will increase over time in a population of PZP-treated animals. Cooper and Herbert (2001) reviewed the topic, in the context of concerns about the long-term effectiveness of immunocontraceptives as a control agent for exotic species in Australia. They argue that imunocontraception could be a strong selective pressure, and that selecting for reproduction in individuals with poor immune response could lead to a general decline in immune function in populations where such evolution takes place. Other authors have also speculated that differences in antibody titer responses could be partially due to genetic differences between animals (Curtis et al. 2001, Herbert and Trigg 2005). Although this topic may merit further study, lack of clarity should not preclude the use of immunocontraceptives to help stabilize extremely rapidly growing herds.

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

Magiafolou et al. (2013) clarify that if the variation in immune response is due to environmental factors (i.e., body condition, social rank) and not due to genetic factors, then there will be no expected effect of the immune phenotype on future generations. It is possible that general health, as measured by body condition, can have a causal role in determining immune response, with animals in poor condition demonstrating poor immune reactions (NRC 2013).

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

PZP would have little effect on the occurrence of genes associated with New World Iberian breed types because captured mares would be selected for PZP treatment or left untreated (as noted in Section 2.1) without regard to phenotype. Previous gathers have not apparently caused any decrease in the relative similarity to New World Iberian breed types in Adobe Town HMA (Appendix VII). Furthermore, PZP is expected to be only temporarily effective, such that mares treated with PZP would still be expected to produce foals in the future.

## Impacts of Alternative B – Proposed Action

In addition to the impacts described in **Impacts Common to Alternatives A & B,** under the Proposed Action, the number of wild horses within the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs would be reduced by 1,560. Achieving the combined lower limit of AML for wild horses in the project area would allow for recovery of any vegetation that has been moderately to heavily utilized. Additional stress to the wild horses due to the fertility control implementation would not occur since fertility control would not be applied.

Under this alternative, all released mares would foal normally over the next 2 to 3-year period. Based on a normal projected population increase (20%), wild horse numbers are expected to exceed the upper limit of the AML range by 2020.

## Impacts of Alternative C – No Action – No Gather or Removal

Under this alternative, no wild horses would be removed at this time, nor would fertility control treatment be implemented. 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. In 2017, wild horse populations would be expected to grow to about 3,403 wild horses. Projected population increases would result in minimal potential for inbreeding over the long term, but 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. Competition for the 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 through the following summer 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.

## *3.3 Wildlife and Special Status Species*

## Affected Environment

### Wildlife

A variety of wildlife species occur or have the potential to occur in the project area including mule deer, pronghorn antelope (antelope), elk, moose, coyote, red fox, bobcat, cottontail and Jack rabbits, Wyoming ground-squirrel, migratory birds, including the horned lark, raven, magpie, and common nighthawk. Mule deer, elk and antelope utilize the project area year-round and approximately 20% of the project area is identified as crucial winter range for these species. For a complete description of species and habitats found within BLM jurisdiction in the HMAs, see Chapter 3 of the Final EIS for the Rawlins RMP (2008, pp. 143–150) and Chapter 3 of the Final EIS for the Green River RMP (1996, pp. 347-351).

### Special Status Species

A number of animal species potentially present in the project area have been accorded "sensitive species" status by the BLM (BLM 2010c). Sensitive mammal species that have the potential to occur in the project area include the Wyoming pocket gopher, pygmy rabbit, swift fox, spotted bat, long-eared myotis, fringed myotis, Townsend's big-eared bat, and white-tailed prairie dog.

Sensitive bird species that have the potential to occur in the area, or may have habitat located within the area include the ferruginous hawk, mountain plover, peregrine falcon, long-billed curlew, burrowing owl, sage thrasher, loggerhead shrike, Brewer's sparrow and sage sparrow.

Mountain plover have been recorded in the project area, and potential mountain plover breeding/nesting habitat exists throughout the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs.

Other sensitive species that have the potential to occur in the area, or may have habitat located within the area include the: Great Basin spadefoot toad, Northern leopard frog, midget-faded rattlesnake, roundtail chub, bluehead sucker, flannelmouth sucker, and Colorado River cutthroat trout.

Greater Sage-Grouse

In September 2015, the U.S. Fish and Wildlife Service completed a status review of the Greater Sage-Grouse, and determined that listing under the Endangered Species Act (ESA) was "Not Warranted." The Greater Sage-Grouse is now a BLM Sensitive species. BLM records indicate that there are approximately seven Greater Sage-Grouse leks and/or associated nesting habitat within or adjacent to the Adobe Town HMA, approximately 35 Greater Sage-Grouse leks and/or associated nesting habitat within or adjacent to the Salt Wells Creek HMA, and approximately 23 leks within the Great Divide Basin HMA. Approximately 256,000 acres of breeding and nesting habitat are associated with mapped Core Greater Sage-Grouse area. An additional 112,000 acres of nesting habitat are associated with leks outside of Core Greater Sage-Grouse areas. Areas of winter use have also been documented in the area.

# Environmental Consequences

## Impacts of Alternatives A and B

### *Wildlife*

Wildlife immediately adjacent to trap sites would be temporarily displaced during capture operations by the increased activity of trap setup, helicopters and vehicle traffic, but in most cases this displacement should only last 2-3 days in each trap area. Reduction of wild horse numbers would result in reduced competition for forage and water resources between wild horses and wildlife. The short-term stress and displacement during the gather operations should result in long-term benefits in improving habitat condition. Habitat disturbance associated with wild horses along stream bank riparian habitat and adjacent upland habitat would be reduced. The effect of lessening impacts to water and riparian resources benefits all aquatic species by reducing sedimentation and maintaining quality habitats.

### *Special Status Species*

No impacts from the proposed wild horse gather would occur to Sensitive mammal species: Wyoming pocket gopher, pygmy rabbit, swift fox, spotted bat, long-eared myotis, fringed myotis, Townsend's big-eared bat, and white-tailed prairie dog.

Sensitive wildlife species may be temporarily displaced during capture operations, due to the increased activities associated with the capture. However, it is expected that any impacts would be short-term and insignificant due to the placement of the traps in areas that avoid or minimize disturbance to habitat, and timing of the capture.

No impacts from the proposed wild horse gather would occur to Sensitive bird species: ferruginous hawk, mountain plover, peregrine falcon, long-billed curlew, burrowing owl, sage thrasher, loggerhead shrike, Brewer's sparrow and sage sparrow.

No impacts from the proposed wild horse gather would occur to any other sensitive species that have the potential to occur in the area, or may have habitat located within the area include the: Great Basin spadefoot toad, Northern leopard frog, midget-faded rattlesnake, roundtail chub, bluehead sucker, flannelmouth sucker, and Colorado River cutthroat trout.

Greater Sage-Grouse

No impacts from the proposed wild horse gather would occur to the Greater Sage-Grouse. No surface disturbing and/or disruptive activities or surface occupancy will occur within Greater Sage-Grouse nesting habitat from March 15 through June 30. Wild horse trapping activities are anticipated to occur during the fall and early winter months, so no impacts to Greater Sage-Grouse leks or nesting/brood-rearing habitat are expected. Greater Sage-Grouse would benefit from the removal of wild horses because the reduced grazing pressure would improve rangeland conditions and available forage.

## Impacts of Alternative C – No Action – No Gather or Removal

### *Wildlife*

Wildlife would not be temporarily displaced or disturbed under Alternative C, the No Action Alternative. However, there would be continued and increased competition between wild horses and wildlife for limited water and forage resources. This competition would increase as wild horse numbers continued to increase annually. Although diet overlap is highest between wild horses and elk, fecal analysis data shows higher wild horse use of shrubs during the winter, which would also overlap more with the diets of antelope and mule deer. Wild horses are aggressive around water sources and some wildlife species may not be able to compete successfully. The continued competition for limited resources would lead to increased stress or dislocation of native wildlife species. Although wildlife may move to locations outside the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs, these areas are likely already occupied, which may result in long-term reductions in wildlife populations. Additionally, increased competition between wild horses and wildlife species for the new plant growth is detrimental for plants to make and store carbohydrates for promoting long-term vegetation recovery. Extreme stress on native vegetative species could impact vegetation recovery and encourage non-native or invasive plants to become established, displacing the more desirable species used by wildlife. Residual nesting cover needed by Greater Sage-Grouse and nesting songbirds would not be adequate to hide and protect nests from predation. The long-term decline in vigor and cover or even the loss of native vegetation would reduce wildlife populations and diversity, and lower the likelihood of providing suitable habitat in order to support the Wyoming Game and Fish Department population objectives for big game species in this area. No direct impact to sensitive fish species would occur from gathering horses. The effect of increasing impacts to water and riparian resources due to expanding horse herds negatively affects all aquatic species by increasing sedimentation and reducing or eliminating aquatic or riparian habitats.

### *Special Status Species*

Because no gather operations would occur under this alternative, there would be no gather related impacts to Special Status Species. However, because excess wild horses would still be present within these HMAs and populations would continue to grow at approximately 20% per year, this alternative would lead to potential increasing negative impacts to Special Status Species habitat.

Greater Sage-Grouse

Because no gather operations would occur under this alternative, there would be no gather related impacts to sage-grouse. However, because excess wild horses would still be present within these HMAs and populations would continue to grow at approximately 20% per year, this alternative would lead to potential increasing negative impacts to sage-grouse habitat.

# Mitigation

## *Alternatives A and B – Proposed Action*

In accordance with BLM policies and guidance, the following timing stipulations and surface disturbance restrictions will be used to determine the location of the trap sites during the gather:

- No surface disturbing activities or surface occupancy within a 0.6-mile radius of the perimeter of occupied or undetermined Greater Sage-Grouse leks inside Priority Habitat Management Areas (PHMA) areas.
- No surface disturbing activities within 0.25-mile radius of the perimeter of occupied or undetermined Greater Sage-Grouse leks outside PHMA areas.
- Where credible data support different time frames for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the previous dates stated.
- Disruptive activities are prohibited from 6pm-9am from March 1-May 20 on and within 0.25 mile (0.6 mile in PHMA) of the perimeter of an occupied grouse lek.

Trap sites would be constructed and operated under the recommendations of a wildlife biologist to avoid adverse impacts to wildlife, including the avoidance of known Greater Sage-Grouse leks, raptor nests and big game crucial winter ranges. The Field Offices are following management protocol within crucial winter habitats in coordination with the Wyoming Game and Fish Department.

## *3.4 Vegetation, Special Status Plants, Invasive Species, Soils and Watershed*

## Affected Environment

### Vegetation

There are a variety of vegetation types in the RSFO and RFO areas where wild horses can be found, both within and outside of wild horse HMAs. Vegetation types include: sagebrush, sagebrush/grass, saltbush, greasewood, desert shrub, juniper, grass, meadow, broadleaf trees, conifer, mountain shrub, half shrub and perennial forbs, and badlands. The predominant vegetation type is sagebrush/grass.

Plant communities are very diverse in the RSFO and RFO, reflecting the diversity in soils, topography, and geology found there. The high-elevation, cold-desert vegetation of the project area is composed predominately of Wyoming big sagebrush/grass and Gardner saltbush vegetation communities. Other plant communities present are: desert shrub, grassland, mountain shrub, juniper woodlands, and very few aspen woodlands. Needle-and-thread, Indian ricegrass, bluebunch wheatgrass, western wheatgrass, junegrass, basin wild rye, sandhill muhly, Canby and little bluegrass, and threadleaf sedge are the predominant grasses and grass-like species. Wyoming big sagebrush, black sagebrush, bud sage, birdsfoot sage, Gardner's saltbush, spiny hopsage, four-wing salt bush, greasewood, bitterbrush, winterfat, horsebrush, Douglas and rubber rabbitbrush, and true mountain mahogany are important shrub species for wildlife. Forbs are common and variable depending on the range site and precipitation zone.

Wild horses generally prefer perennial grass species as forage when available. Shrubs are more important during the fall and winter, and in drought years. The species of grasses preferred depends on the season of the year. Needle-and-thread and Indian ricegrass are most important during the winter and spring and wheatgrasses during the summer and fall.

The mosaic of plant communities and topographic features that are found throughout the HMAs supports a wide variety of wildlife species that use the various habitats for resting, courtship, foraging, travel, food and water, thermal protection, escape cover and reproduction.

## Special Status Plants

Special Status Plants are those species that are federally listed as threatened or endangered, proposed for listing, or candidates for listing under the ESA. They also include species designated by each BLM State Director as sensitive and those listed or proposed for listing by a state in a category implying potential endangerment or extinction. The BLM is mandated to protect and manage threatened, endangered, candidate, proposed, and sensitive species and their habitats. The federally listed Ute ladies'-tresses has habitat in the area but surveys throughout the area have not found any populations. It occurs in riparian areas below 7,000 feet. The Colorado butterfly plant, Fremont rockcress, and blowout penstemon plant are not located within, or habitat is not found, in the project area. All existing sites for wild horse gather holding facilities have been surveyed for special status plant species and have been cleared. Any new gather holding facility sites would be surveyed and cleared before operations begin.

The Wyoming BLM Sensitive Plant Species that grow in or have potential habitat in the project area are listed in Table 6.

**Table 6. Wyoming Special Status Plant Species**

| Common Name | Scientific Name | Habitat |
|---|---|---|
| Wyoming tansymustard | *Descurainia torulosa* | Sparsely vegetated sandy slopes at base of cliffs of volcanic breccia or sandstone 8,300 – 10,000 ft. |
| Dune wildrye | *Elymus simplex* var. *luxuriens* | Drifting sand dunes at 6,700 - 7,200 ft. |
| Large-fruited Bladderpod | *Lesquerella macrocarpa* | Gypsum-clay hills & benches, clay flats, & barren hills 7,200-7,700 ft. |
| Meadow pussytoes | *Antennaria arcuata* | Moist, hummocky meadows, seeps or springs surrounded by sage/grasslands 4,950-7,900 ft. |
| Ownbey's thistle | *Cirsium ownbeyi* | Sparsely vegetated shaley slopes in sage and juniper communities, 6,440 -8,400 ft. |
| Gibbens' milkvetch | *Astragalus gibbensii* | Sparsely vegetated shale or sandy-clay slopes at 5,500-7,700 ft. |
| Cedar Rim Thistle | *Cirsium aridum* | Barren slopes, fans and draws on whitish-gray sandstone, chalk, tufaceous colluvium, or clay substrates. Mostly found in sparsely vegetated opening within Wyoming big sagebrush grasslands at 5800 to 7500 feet. |

| Common Name | Scientific Name | Habitat |
|---|---|---|
| Gibben's Beardtongue | *Penstemom gibbensii* | Found on barren shale or sandstone slopes of the Browns Park Formation or Laney member of the Green River shale, often located below caprock, on the steep, upper or middle slopes eroding out below the resistant layer. Elevation 6200-7700 feet. |
| Laramie Columbine | *Aquilegia laramiensis* | Granite rock outcrops including cliffs and boulders, particularly crevices, ledges and cliff bases often shaded by aspect, overhanging rock, or trees. Soils are poorly developed, derived mainly from Laramie granite but also from other Precambrian igneous and metamorphic rocks. The setting is usually in forest, sometimes in openings, grassland or burned forest. Elevation range: 5400-10,200 feet. |
| Persistent Sepal Yellowcress | *Rorippa calycina* | Found primarily along moist sandy to muddy banks of streams, stock ponds, and man-made reservoirs near the high-water line at 3660-6800 feet. |

## Invasive Species

Noxious weeds and other invasive species are found scattered throughout the HMAs mostly in disturbed areas and to lesser amounts among the native plant communities. Treatments of these invasive species occur mostly through Agreements with the County Weed & Pest Districts utilizing Integrated Pest Management Techniques. Noxious weeds and other invasive species that are known to be present in the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs are listed in Table 7.

**Table 7. Noxious Weeds and Other Invasive Species**

| Wyoming Designated Noxious Weeds Common Name | Scientific Name |
|---|---|
| Black Henbane | *Hyoscyamus niger* |
| Canada thistle | *Cirsium arvense* |
| Houndstongue | *Cynoglossum officianale* |
| Leafy Spurge | *Euphorbia esula* |
| Musk thistle | *Carduus nutans* |
| Perennial pepperweed | *Lepidium latifolium* |
| Russian Olive | *Elaeagnus angustifolia* |
| Tamarisk (Salt cedar) | *Tamarix spp.* |
| Whitetop (Hoary cress) | *Cardaria spp.* |
| | |

| Invasive Species Common Name | Scientific Name |
|---|---|
| Downy brome (Cheatgrass) | *Bromus tectorum* |
| Halogeton | *Halogeton glomeratus* |
| Swainson Pea | *Sphaerophysa salsula* |

## Soils and Watershed

The soils in the HMAs are highly variable in depth and texture as would be expected with the great variability in geology and topography that characterizes the area. Generally, the eastern third is a mix of sandy soils with high wind erosion potential and clayey soils with high water erosion potential and varying amounts of salts. The western third has more loamy inclusions in the form of undulating uplands and alluvial complexes, with moderate erosion potential, while the middle third is a mixture of both. Virtually any soil condition that may be encountered in the region can be found somewhere within the HMAs. More specific soils information can be found in the draft soil surveys located in the BLM files in the RSFO and RFO.

The Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs encompass portions of the Colorado River Basin (primarily Bitter Creek which is a tributary to Green River which contributes to the Colorado River). The eastern portion of the HMAs extend into the Continental Divide closed basin. Within the state, Colorado River Basin water quality is primarily regulated by the State of Wyoming but can be affected by the management of adjacent lands. Additional land management guidance is provided by various agencies, compacts and agreements that are focused primarily, but not exclusively upon the Colorado River Drainage. Sand Creek is the largest drainage in the Adobe Town area, which flows into the Little Snake River. The soils are highly erodible and can be easily transported down drainages and downstream through the Colorado River Basin. There is little riparian vegetation in the area; however, riparian areas are often considered the most productive sites in the region. There are numerous developed water sources such as stock tanks and reservoirs in the area.

Allotment use data, including the dates of the most recent Land Health Evaluation and identified standards (if any) that were not being met during that evaluation, is presented in Appendix V for all allotments within the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs. The majority of allotments have averaged less than 50% utilization for the last five years, with a low of 0% use and a high of 100% use in a few allotments. This overall decrease in utilization is due to a voluntary effort by permittees decreasing their actual use which increases forage and improves rangeland conditions.

Key monitoring areas for measuring forage utilization were established in the spring of 2010 in the upland areas near the Brady Plant in the Rock Springs Grazing Allotment within the Salt Wells Creek HMA. In 2012, the Rock Springs Field Office monitoring data indicate for the Brady Plant Key Area showed heavy utilization (72.7%) by wild horses. Heavy utilization (61-80% use) on the Key Species data form defines heavy use as "More than half of the available forage on key species appears to have been utilized. Less than 10 percent of the current seedstalks remain." In 2013 the water source near the Brady Plant went dry, therefore the wild horses have redispersed in the area around other water sources. Wild horses are uneven grazers, meaning that they do not always graze an area in its entirety before moving on to another. Areas

where they do graze have been noted to have a lower abundance of cover grasses, lower shrub cover, lower total vegetative cover, lower species richness, and less continuous shrub canopy (Beever and Herrick 2006).

Increasing wild horse utilization due to increasing numbers is occurring in the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs and is reducing vegetative cover and vigor, particularly, in those areas immediately adjacent to water sources. The reduction of vegetative cover and increased trampling resulting from higher wild horse numbers has led to increased soil compaction and surface disturbance leading to potential accelerated run off and subsequent soil erosion and weeds.

Generally, with some exceptions, grazing allotments in this area are currently meeting upland heath standards. However, some allotments in the area do not currently meet all of the riparian health standards. Failure to meet these standards are related to livestock and wild horse use, as well as impacts from development and irrigation. More information on the current determination of rangeland health standards are provided in Appendix V.

Recent drought years (2002, 2006, and 2012) have resulted in plant mortality throughout multiple areas within the watershed, even in observation areas that were receiving moderate to no forage use. High numbers of wild horses have for some years left little residual forage, and along with water shortages, have led to wild horses moving to other allotments, particularly to those allotments within the RSFO Salt Wells HMA.

In the spring of 2013, the Alkali Creek and Vermillion Creek allotments were closed to livestock grazing for a year due to extreme drought, low vegetation vigor and heavy (greater than at least 60 % utilization on key vegetation species) utilization levels on key grasses and salt bushes. It was noted that wild horses stayed in the saline uplands year-round which was affecting the vigor of the saline upland ecosystems, which should only be grazed during the dormant growing season to maintain vegetation vigor and composition.

A rangeland health assessment on the Vermillion Creek allotment indicated that year-round grazing by wild horses was one of the reasons for areas of poor saline upland vegetation vigor and halogeton invasion. Although the Alkali Creek allotment passed rangeland health standards, it was noted that season-long grazing in that ecosystem would hinder improvements in saline upland vegetation vigor. Over the last decade, livestock permittees in this area have voluntarily only used an average of 39% of their permitted AUM use and as low as 10% in some years.

## Environmental Consequences

### Impacts of Alternative A

#### *Vegetation, Soils, and Watershed*

Impacts from the gather operations would be temporary and include trampling of some vegetation and soil compaction, particularly at the trap sites and holding locations. Where the wild horses are returned there would be a temporary increase in the impacts to vegetation above the Proposed Action Alternative proportional to the number of horses placed in each area.

The removal of excess wild horses from inside the project area and associated non-HMA areas would prevent over-utilization of forage and further reduction of vegetative ground cover. The quantity of forage throughout the HMAs could be increased. Adverse impacts from wild horses could diminish and there could be beneficial impacts. Vegetation composition, cover, and vigor could improve or be maintained near water sources where wild horses tend to congregate. An improvement in forage condition could lead to improved livestock 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.

Fertility control would allow the habitat to recover for a longer period of time as the numbers of wild horses would not increase as fast as without this reproductive control. Alternative A would be a larger and longer beneficial impact compared to Alternative B – Proposed Action, which does not have the reproductive control. Alternative C would continue to have a negative impact due to continued high use of the native habitat and increasing population size through time. Adverse, short-term effects to vegetation and soils would occur at trap sites when gathers are being conducted. Vegetation would be disturbed by trap construction, and short-term trails and soil compaction may develop near and in the trap. Any vegetation removed would be minimal and localized.

### *Special Status Plants*

Special Status Plants would benefit from the reduction in numbers down to AML. The native plant communities would be improved which would improve the upland and riparian habitats for these Special Status Plant Species. This beneficial impact would be more long lasting than in Alternative B due to the use of PZP.

### *Invasive Species*

The over-utilization of range resources and subsequent reduction in vegetative ground cover promotes the establishment and spread of noxious weeds and other invasive species. The removal of excess wild horses could aid in the curtailment of the introduction and spread of these noxious weeds and other invasive species. This beneficial impact would be more long lasting than in Alternative B due to the use of PZP.

### *Soils and Watershed*

Sheet and rill erosion would not exceed natural levels for the sites because maintenance of the AML would help ensure that a natural ecological balance would be maintained in and adjacent to the HMA. Perennial vegetation would continue to experience season-long grazing pressure which is not conducive to optimum plant health and vigor, but may be at lower utilization levels and lower impacts. Soil erosion and plant health would continue to be compromised around water locations with season-long grazing, but elsewhere impacts should be minimal. Watershed health should improve throughout much of the area.

## Impacts of Alternative B – Proposed Action

Under Alternative B – Proposed Action, the impacts associated with capture and removal operations are expected to be similar to Alternative A. Vegetation utilization would be similar to Alternative A with the expectation that wild horse population would be slightly larger without fertility control. This would be a minor long-term beneficial impact compared to Alternative C but not as beneficial as Alternative A.

This alternative would result in a reduction in horse numbers but the rate of population increase would not be affected. As a result, it would have a potential short-term positive impact on both riparian health and water quality but would be less effective in the long term. It would be more beneficial than Alternative C but not as beneficial as Alternative A.

## Impacts of Alternative C – No Action – No Gather or Removal

Under the No Action Alternative no gather operations impacts would occur. This alternative would allow wild horse populations to continue to increase within the HMA and nearby areas as no population management would take place. Populations of wild horses might eventually stabilize at very high numbers at their food-limited ecological carrying capacity. At these levels, range conditions would deteriorate which would affect the native vegetation species as well as the habitat for special status species. In the absence of healthy rangelands, animal health would eventually be impacted, leading to increasing numbers of wild horses in poor body condition and at risk of starvation or death without human intervention.

Perennial vegetation would continue to experience seasonal-long grazing pressure by wild horses and in locations where seasonal grazing from livestock still occurs, which is not conducive to optimum plant health and vigor. 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 would 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. These impacts would be cumulative over time.

As native plant health deteriorates and plant cover, vigor, and litter are reduced, soil erosion increases and a long-term loss of productivity occurs. More desirable species, such as Indian ricegrass, needle-and-thread, basin wildrye, and bottlebrush squirreltail, would be reduced or lost from the native plant communities. Plant species that are less desirable or more grazing resistant, such as sand muhly, western wheatgrass, threadleaf sedge and weeds, would be increased in terms of their composition within the affected plant communities. Similar results would occur in the isolated riparian habitats with sedges, rushes and grasses being replaced with Baltic rush, mat muhly, and weedy species. Impacts would be cumulative over time and would affect other surrounding areas. However, in some cases there would just be a greater amount of bare ground. There would also be an increase in invasive species. Eventually, long-term rangeland health would be jeopardized.

Invasive non-native plant species could continue to increase and invade new areas following increased soil disturbance and reduced native plant vigor and abundance. The shallow desert top soils cannot tolerate much loss without an associated loss in productivity and thus the ability to

support a native plant community. Invasive non-native species could increase following increased soil disturbance and reduced native plant vigor and abundance. This would lead to both a shift in plant composition towards weed dominated species and a loss of productivity from loss of native species and the erosion of soils. There would also be increased impacts and a greater possibility of the spread of invasive species as horses move out in search of better forage. Impacts would be cumulative over time and would affect areas beyond the HMAs.

The federally listed Ute ladies'-tresses has habitat in the area but surveys throughout the area have not found any populations. Potential habitat for the listed Ute ladies'-tresses could be affected by increased disturbance to their habitats which are readily accessible in numerous areas. They could experience direct impact from trampling of their populations or be indirectly impacted by the increase of weeds to the area diminishing the quality of the available habitat for these species. Where the wild horses are returned, there would be an increased threat to the populations of Special Status Plants that occur in these adjacent areas.

Reclamation efforts would be less likely to succeed as wild horse populations increase. All pads would require fencing for initial recovery of vegetation, however, once fences are removed, grazing by wild horses would result in loss of vegetation and destabilization of soils similar to adjacent rangelands. Linear features would not likely be fenced due to both the cost and restrictions they would place on movement of wildlife, wild horses, and livestock, as well as the cost involved. These sites would likely receive grazing use that would reduce or eliminate desirable species and promote weeds, less palatable plant species and bare ground which would, in turn, lead to increased soil erosion and water runoff into drainages or adjacent rangelands.

## *3.5 Cultural Resources and Native American Concerns*

### Affected Environment

Prehistoric sites known to exist within the HMAs include open camps and lithic scatters. Historic sites known to exist include trash dumps, trails, roads, and structures associated with early settlement and commerce, or with the local ranching industry. Cultural Resource program support for the wild horse capture would consist of file search (Class I) and/or intensive field (Class III) inventories, and, if necessary, mitigation of impacts at the locations of the temporary horse holding sites. Support includes consultation with the Wyoming State Historic Preservation Office according to the Wyoming State Protocol agreement of the BLM National Cultural Resources Programmatic Agreement, which states inventory may not be required for "Animal traps and corrals in use for three days or less" (Appendix B20).

### Environmental Consequences

### Impacts of Alternatives A and B – Proposed Action

Direct or indirect impacts to cultural resources are not anticipated to occur from implementation of Alternative A or B. Surface disturbing activities at the trap locations would be minimal and no historic properties would be adversely affected. The RFO and RSFO archeologists would review all proposed temporary holding facility locations to determine if these have had a Class III cultural resources inventory, and/or if a new inventory is required. If cultural resources are encountered at proposed gather sites or temporary holding facilities, those locations would not be

utilized unless they could be modified to avoid adverse impacts to significant cultural resource site(s).

### Impacts of Alternative C – No Action – No Gather or Removal

At the present time and for the short-term future, taking no action to remove excess wild horses is not expected to adversely affect historic properties.

## *3.6 Recreation*

### Affected Environment

The public enjoys seeing wild horses roaming free in the Rock Springs Field Office area. Although demand is not high, some people (residents and nonresidents) make special trips to see wild and free-roaming horses in their natural environment. Two outfitters are permitted by the BLM to conduct tours of the HMAs.

Other recreation in the project area is quite dispersed with the greatest amount occurring during the hunting seasons for the various game animals and birds. Primary recreational activities other than hunting includes camping, hiking, rock hounding, photography, wildlife and wild horse viewing, off highway vehicle (OHV) use, and sightseeing.

### Environmental Consequences

### Impacts of Alternative A

During gather operations, the areas immediately surrounding the trap and holding sites may be temporarily closed if necessary. Any areas closed would be reopened upon completion of the gather operations.

Implementation of Alternative A would be expected to improve rangeland health which would potentially enhance the aesthetic quality of recreational opportunities, such as hiking, wildlife viewing, and hunting. Opportunities to view wild horses in the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs would continue, however, there would be fewer animals in better body condition available for viewing than at present. Fertility control treatment in Alternative A would be expected to slow population growth; opportunities to view mares with foals during the next 2-3 years would be reduced over the present situation. During the capture operation it may be necessary to temporarily close BLM roads to allow for the safe and humane capture of wild horses. This would be accomplished in a manner to impact the fewest recreational users as possible.

### Impacts of Alternative B – Proposed Action

Under Alternative B, the impacts associated with capture and removal operations are expected to be similar to Alternative A. Fewer wild horses would be available for viewing during the first year following the gather. In years 2-3 following the gather, more mares with foals would be available for viewing than with the proposed action since fertility control would not be applied.

### Impacts of Alternative C – No Action – No Gather or Removal

Where horse numbers increased, certain kinds of opportunities associated with the horse population would increase, although the condition of the horses could decline over time, rendering them less desirable for viewing. The quality of recreational opportunities associated with the quality of the habitat, such as viewing or hunting wildlife, would probably decline as the wild horse population increased beyond the carrying capacity of the habitat.

Some opportunities associated with the presence of wild horses might increase in the short term, but they may decline in the long term due to the increasing occurrence of obviously malnourished horses. Recreationists would likely encounter carcasses and their scavengers more frequently when the population of horses is in decline due to insufficient feed and/or water. Thus, although the increased population of wild horses might make them easier to find, the experience might not be as desirable due to the poor condition of the horses.

Other recreation opportunities would also be detrimentally affected in the long run due to the habitat degradation caused by wild horse overpopulation. Game species might be pressured out of the area in search of essential resources. Viewers might not need to go to the HMAs to view wild herds because the wild horses would be forced to expand their territories outside the current HMA boundaries in order to find the feed and water they need to survive. Once they establish themselves beyond the HMA boundaries, they would upset the balance among other species in the new habitat as they used resources required for the other species. Opportunities for viewing and hunting other wildlife could be severely reduced in the long run, both within the HMA and beyond it.

## *3.7 Wilderness*

### Affected Environment

Management of wilderness and Wilderness Study Areas (WSAs) is directed by BLM Manual 6340-Management of BLM Wilderness and FLPMA section 603. Wild horses are considered an important attribute of the Seven Wilderness Study Areas (WSA) are present within the HMAs: Adobe Town, Honeycomb Buttes, Alkali Draw, South Pinnacles, East Sand Dunes, Red Lake, and part of Oregon Buttes WSAs. Wilderness Study Areas are managed to preserve their wilderness character (naturalness, solitude, and opportunities for primitive recreation) and suitability for designation as wilderness.

Fundamental to this preservation is prohibition of new surface disturbance or permanent structures so that the WSA retains the character of an area untrammeled by man. If designated wilderness, the WSA would be managed in accordance with the Wilderness Act of 1964.

### Environmental Consequences

### Impacts of Alternative A

The suitability of the WSAs for wilderness designation would be unimpaired (not affected).

### Impacts of Alternative B – Proposed Action

The suitability of the WSAs for wilderness designation would be unimpaired (not affected).

### Impacts of Alternative C – No Action – No Gather or Removal

Impacts of an increased wild horse herd size may decrease the naturalness of the WSAs due to vegetation and soils degradation, and therefore may impair its suitability for designation as wilderness. Impacts on the naturalness of the WSAs could come in many forms, primarily in the form of excessive erosion due to increased horse traffic and reduced soil stabilizing vegetative cover, and a change in the number of members of other species displaced by the increased competition for resources. If no gathers occurred, the horses might well expand their territories far beyond the boundaries of the Adobe Town and Great Divide Basin HMAs to obtain the resources they need, proportionately reducing their impacts on the WSAs, but the herd would likely continue to occupy traditional territories until absolutely necessary, thus having a detrimental effect on the WSAs in the short term as well as long term.

## *3.8 Livestock Grazing*

### Affected Environment

The Taylor Grazing Act of 1934, as amended, provides for the regulation of grazing on the public lands to improve rangeland conditions and regulate their use. Livestock belonging to specific livestock operators are authorized to use specific areas of rangeland (grazing allotments) for specified periods of time in specified numbers.

Thirteen of the 600 grazing allotments in the RFO jurisdiction occur within the Adobe Town HMA. Ten of the 80 grazing allotments in the RSFO (Hiawatha Tri-district and Canyon-Horseshoe administered out of the BLM Little Snake Field Office) occur within the Salt Wells Creek HMA. Corson Springs Allotment is located in RFO, but is administered out of the RSFO which is located within the Adobe Town HMA. A portion of the Rock Springs Allotment and Hiawatha Tri-district is also located within the Adobe Town HMA. In all cases, the grazing allotment and the authorization of livestock use (Taylor Grazing Act of 1934) pre-date passage of the WFRHBA.

Between 2008 and 2016 actual use averaged 39% of permitted livestock levels in the three HMAs. All nonuse was voluntarily made by permittees due to both drought conditions and high horse numbers (until after the 2010 gather), and to provide time for vegetation recovery. Livestock operations with greater flexibility have made little to no use in this area, while those with limited flexibility to go elsewhere have reduced their livestock numbers but still make up the majority of actual use being made.

The rangelands in the HMAs provide seasonal grazing for livestock (cattle and sheep). Wherever domestic livestock are authorized to graze the public lands, range improvements (e.g., stock ponds, water wells, fences, etc.) have been authorized. Most of these range improvements are operated and maintained by the livestock operators. Fencing is primarily used to keep livestock in specific allotments during specified seasons of use thereby improving range management. There is a limited amount of fencing found within the Salt Wells Creek HMA. Livestock water is provided by springs, wells, intermittent and ephemeral streams, pipelines, and reservoirs. Many of these range improvements are water sources for wild horses. Sheep grazing occurs mostly within the winter period while cattle grazing occurs throughout the year in some areas.

## Environmental Consequences

### Impacts of Alternative A

The proposed gather and removal would not directly impact livestock operations within or adjacent to the HMAs. 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.

An expected improvement in the quality and quantity of forage availability is expected where excess or strayed wild horses are removed. This would provide greater opportunity for improved range conditions within the related areas. With reduced grazing use by wild horses, plant vigor and production would be improved. Grazing in this area is also addressed in the Approved Record of Decision of the Green River RMP (p. 321-322).

### Impacts of Alternative B – Proposed Action

Under Alternative B – Proposed Action, the impacts associated with capture and removal operations are expected to be similar to Alternative A. There would be a faster rate of increase in wild horses resulting in more competition for the same resources between livestock and wild horses.

### Impacts of Alternative C – No Action – No Gather or Removal

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. Livestock operations with greater flexibility may apply for voluntary nonuse and immediately reduce or eliminate livestock grazing within their allotments. However, operators with no other grazing options may be forced to reduce their grazing use as forage conditions deteriorated.

Winter sheep operations would likely be the least impacted, but as wild horse diets become more dominated by shrubs and grass availability is low, the use by sheep would also be displaced by wild horses as demand for space, forage, and water increased. Displacement of livestock would be slow and indirect. Frequency of needed maintenance on all range improvements would increase due to increased numbers of wild horses and their potential damage to range improvements. Operation and maintenance of existing water sources (including truck hauling of water to tanks) by livestock operators may not occur if there is no livestock use. Range conditions throughout the area would deteriorate, and even if wild horses are rounded up in the future or a population crash occurs during a bad winter, long-term vegetation recovery may require continued nonuse by livestock operators. These impacts would be cumulative over time.

## *3.9 Cumulative Impacts*

NEPA regulations define cumulative impacts as impacts on the environment that result from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of which agency or person undertakes such actions (40 CFR 1508.7). Reasonably foreseeable future actions are those for which there are existing decisions, funding, formal proposals, or which are highly probable, based on known

opportunities or trends. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

## Past, Present and Reasonably Foreseeable Actions

The Past, Present, and Reasonably Foreseeable Future Actions applicable to the assessment area are identified in Table 8. Assessment areas are determined by WFRHBA is practical and reasonable for each resource.

**Table 8. Past, Present, and Reasonably Foreseeable Future Actions**

| Project – Name or Description | Status (x) | | |
|---|---|---|---|
| | Past | Present | Future |
| Livestock grazing | x | x | x |
| Wild Horse Management Actions | x | x | x |
| Mineral exploration/Oil and gas exploration/Abandoned mine land reclamation | x | x | x |
| Recreation | x | x | x |
| Water and spring development (wells, development of springs, & fencing water sources) | x | x | x |
| Invasive weed inventory/treatments | x | x | x |
| Wildlife/Big game habitat improvement projects | | x | x |
| Wind energy exploration and development | | x | x |

Any future proposed projects within the HMAs would be analyzed in an appropriate environmental document following site specific planning. Future project planning would also include public involvement.

## Effect of Past Present and Reasonably Foreseeable Future Actions

All resource values described for the Affected Environment have been evaluated for cumulative impacts. If there are no direct or indirect impacts to said resources, there are likewise no expected cumulative impacts. The resources evaluated in this section for cumulative effects include: Wild Horses, Wildlife, Vegetation, Soils, Watershed, Recreation, Livestock Grazing, and Heritage Resources (Cultural Resources and Native American Concerns).

## Wild Horses

Numerous gathers of wild horses have occurred throughout the HMAs in the past. The most recent gathers of wild horses was in September of 2014; this gather was necessary to bring the existing wild horse population in line with the 2013 Consent Decree. Fertility control has been implemented in the past. Genetic testing has been completed in the HMAs; the results indicate that the existing wild horse population has variability levels high enough that no action to increase diversity is needed at this point. Depending upon the population size the herd may need some monitoring but there should be few or no problems for at least ten years.

Past activities which may continue to affect wild horses within the HMAs include recreational uses, livestock grazing, and energy development. These activities can impact wild horses by reducing the quantity and quality of vegetation resources, as well as water quality and quantity. Past repeated gathers in the same areas or conducted too close together can affect wild horse

behavior making them harder to capture. Past and current mineral, oil and gas activities and other similar projects could have impacts to wild horses due to increased disturbance and removal of vegetation. Although wind monitoring and development was proposed within the project area, there are currently no proposals for wind projects. Wind monitoring continues. Wind monitoring does not impact wild horses. Impacts to wild horses from wind development projects would be similar to those associated with mineral development.

All other foreseeable activities would likely result in negligible impacts to wild horses in the long term; this is because the areas of disturbance would be small compared to the overall size of the HMAs. An overall lower population and density of wild horses across the landscape would allow for more rapid recovery of native vegetation that is currently degraded; it would also reduce or eliminate the potential for further degradation. Moreover, by managing wild horse populations within the AML range, the expected improvement in rangeland health would be expected to lead to improved body condition, healthier foals, and ensure herd sustainability through drought years.

Other ungulates would benefit from these improved resources without competition with wild horses for forage, water, cover and space. Continued monitoring and data collection would be needed to assess whether healthy and self-sustaining wild horse herds are being maintained on the HMAs over the long term. Monitoring of the project area would continue for wild horses as well as vegetation and water resources, to assess compliance with the standards for rangeland health.

Implementation of Alternative A; Mares treated with PZP-22 in 2017 may have prolonged contraceptive effects if they are treated in the future with a booster dose of PZP. Rutberg et al. (2017) found that there was a three-year contraceptive effect when mares initially treated with PZP-22 were subsequently given a booster dose of PZP. Future booster doses are not part of the decision analysis in this document. Implementation of Alternative C; Under the No Action Alternative, there would be no long-term cumulative benefits to wild horses. Future generations of wild horses would experience continued range deterioration. At the current rate of annual population growth, the projected wild horse population would exceed 5,900 animals within 4 years. Left unchecked, irreparable damage to the habitat could result in the need to permanently remove all wild horses from the HMAs.

## Wildlife and Special Status Species

Historic and continuing use by livestock, wild horse grazing, recreation, mineral exploration, mining and vegetation harvesting have likely impacted wildlife, special status species, and migratory bird habitat within the associated HMAs, especially near water locations. These activities result in loss of habitat, disruption of movement patterns, and activities imperative to survival of the wildlife. The current overpopulation of wild horses is adding to these impacts by increasing competition for forage, water and thermal protection. Alternative A or B would not contribute to the cumulative impacts to wildlife populations and movement. Cumulative impacts associated with range management, such as construction of water projects and weed treatments, can be beneficial to wildlife and wildlife habitat. However, depending on the location, some water developments can negatively impact wildlife if placed in key habitats such as: crucial winter range, parturition and nesting habitats. These range improvement projects are

implemented to enhance rangeland condition which generally benefits wildlife and their associated habitat.

Under Alternative C, wild horse populations would not be managed within the AML range over the next 3-4 year period. As a result, more wild horses would be present and the quality and quantity of these resources would be expected to degrade. When combined with past, present, and reasonably foreseeable future actions, and the identified mitigation measures, implementation of Alternative A or B would not result in adverse cumulative impacts to wildlife habitat.

No long-term cumulative benefits to wildlife and their habitats would be expected with implementation of the No Action Alternative C. The No Action Alternative C would be expected to result in continued range deterioration, and lead to long-term adverse impacts to upland and riparian health. Once long-term range and riparian health is impacted, any reasonably foreseeable projects or other management actions are unlikely to improve habitat for wildlife, sensitive species, or other values.

## Livestock Grazing, Vegetation, Special Status Plants, Invasive Species and Soils

The vegetation within the HMAs has been utilized by wild horses since the project area was first settled. Domestic livestock has grazed all portions of the HMAs in the past and is expected to continue in the future. Water is a limiting resource in some areas within the HMAs. As a result, existing water sources tend to be heavily utilized in some areas by livestock, wildlife, and wild horses which cause soil compaction around the immediate vicinity of water and competition with other animals (animals chasing off other animals from water).

Implementation of Alternative A or B would contribute to isolated areas of vegetation disturbance through the gather activities. In the long term, however, the achievement of AML in conjunction with proper grazing management and other foreseeable actions such as recreation, mineral exploration and reclamation, vegetation harvesting and weed treatments, would contribute to improved vegetative resources. Special Status Plants would benefit from the reduction in numbers down to AML. The native plant communities would be improved which would improve the upland and riparian habitats for these Special Status Plant Species. Invasive species spread would be reduced with the reduction in this vector for distribution.

Implementation of Alternative C would not promote improvements to ecological condition. Excessive use by wild horses would occur at water sources inside or outside the HMAs, and utilization and competition between animals would be increased. Key forage and browse species would not be expected to improve in health, abundance and robustness, and would not likely set seed and reproduce, which in turn would contribute to degradation in rangeland health. The proposed population control and other foreseeable actions would begin to offset past negative trends in habitat modification by allowing for attainment of rangeland health standards and site-specific management objectives. BLM Wyoming Sensitive Plants could be affected by increased disturbance to their habitats which are readily accessible in numerous areas. Invasive species would continue to spread with all the activity present in the area and without the reduction in numbers of wild horses the spread would continue and increase as the population increases over time.

With no large natural predators, the natural mechanisms for direct declines in horse populations tend to be starvation and disease. Starvation and dehydration induced infertility may also reduce long term population growth. These mechanisms can create environmental degradation and the prolonged suffering of individual animals. The proposed gather and removal of wild horses creates the benefits of reduced population pressures on the environment while reducing the level of environmental impact, and time and extent of individual suffering required to achieve the reductions through natural mechanisms. Selection of the No Action Alternative C would result in continued increases in natural population control mechanisms.

Implementation of the No Action Alternative C would result in continued expansion in area and severity of degradation of vegetation by wild horses due to increasing population pressures. In the long term, this would cause more palatable native vegetation to be replaced by more opportunistic native and/or nonnative species. These species, such as cheatgrass (*Bromus tectorum)*, and/or noxious weeds, such as black henbane (*Hyoscyamus niger),* tend to both expand in disturbed soil areas and be less palatable (see table 6). Past impacts would not be offset and downward trends would continue to occur. When combined with past, present, and reasonably foreseeable future actions the potential for significant cumulative impacts to livestock grazing, vegetation, and soils is expected to be higher in Alternative C due to increased wild horse populations.

## Recreation

Recreational uses have occurred throughout HMAs since the surrounding areas were first settled. Recreational uses are increasing and expanding throughout the area. As a result, the need for recreation planning has increased. Recreation planning allows land management agencies to work to balance the resource needs with the demand for a variety of recreation uses which the public can enjoy within the public lands both inside and outside of the HMAs.

Implementation of Alternative A or B would allow for continued viewing of wild horses in the HMAs. The aesthetic values provided in association with a variety of recreational opportunities such as, hunting, camping, hiking, rock hounding, photography, wildlife and wild horse viewing, off highway vehicle (OHV) use, and sightseeing would also be enhanced as the quantity and quality of vegetation within the area improves.

Implementation of the No Action Alternative C would allow for recreational opportunities as they currently exist. Viewing opportunities of wild horses would be greater under this alternative; however, heavy utilization of vegetation would continue to occur, impacting the aesthetic values associated with recreational opportunities. As wild horse health declines or wild horses leave the HMAs in search of food and water, some recreational opportunities would be less enjoyable. When combined with past, present, and reasonably foreseeable future actions the potential for significant cumulative impacts to recreation is expected to be higher than Alternative A or B due to less aesthetic values.

## Cultural Resources and Native American Concerns

No cumulative impacts are anticipated for heritage resources. Trap site locations would avoid any identified archeological sites that may be eligible for nomination to the National Register of Historic Places or whose eligibility has not yet been determined.

## Mitigation Measures and Suggested Monitoring

The HMAs would continue to be monitored post-gather. Data would be collected which would assist the BLM in determining whether existing AMLs are appropriate or need future adjustment (either increase or decrease ). Data collected would include observations of animal health and condition, climate (precipitation), utilization, distribution, population census, range condition and trend, among other items.

Mitigation and monitoring are incorporated into the proposed action through standard operating procedures and policies, which have been developed over time. These SOPs (Appendix II), along with BLM Instruction Memoranda 2010-135 (BLM 2010a), 2013-059 (BLM 2013b), 2015-070 (BLM 2015a), and 2015-151 (BLM 2015b), represent the "best methods" for reducing impacts associated with gathering, handling, transporting, collecting herd data and applying fertility control.

Based on the analysis of impacts above and consideration of all design features, wild horse gather best management practices, standard operating procedures presented as part of the proposed action and alternatives, no additional mitigation measures are proposed or required.

## Residual Impacts

No residual impacts are anticipated as a result of any action alternative.

# 4.0 Tribes, Individuals, Organizations, or Agencies Consulted

Tribes, individuals, organizations, and agencies were included in the scoping process. The letter soliciting scoping comments for the proposed gather in the Adobe Town, Salt Wells Creek, and Great Divide Basin was mailed March 6, 2017.

**Tribes**
Eastern Shoshone Business Council
Eastern Shoshone Tribe
Northern Arapaho Business Council
Northern Arapaho Tribal Historic Preservation
Shoshone-Bannock Cultural Resources
Shoshone-Bannock Tribal Council
Ute Tribal Council
Ute Tribe Cultural Resources

**Agencies**
Bureau of Indian Affairs
Bureau of Land Management
Carbon County Commissioners
Fremont County Commissioners
Mayor of Baggs
Mayor of Wamsutter
Mayor of Superior
NRCS
Office of the Governor of Wyoming
Popo Agie Conservation District
State of Wyoming agencies
State Representatives
State Senators
Sublette County Commissioners
Sweetwater County Commissioners
Sweetwater County Conservation District
Sweetwater County Planning Dept.
U.S. Fish and Wildlife Service
U.S. Representative Cynthia Lummis
U.S. Senator John Barrasso
U.S. Senator Michael B. Enzi
Wyoming Game and Fish Department

**Organizations**
Agri Kids USA
American Horse Protection Association
American Mustang Association
Dream Catcher Wild Horse & Burro Sanctuary
Friends of Animals
Hooved Animal Humane Society
National Mustang Association
National Wild Horse Association
North American Mustang Assoc. & Registry
Pryor Mountain Wild Mustang Center
The Cloud Foundation
University of Wyoming
Western Watersheds Project
Western Wyoming Mule Deer Foundation
Whole Horse Institute
Wild Horse Organized Assistance
Wild Horse Spirit
Wind River Backcountry Horsemen's Assoc.
Wyoming Advocates for Animals
Wyoming Business Council
Wyoming Chapter of the Sierra Club
Wyoming Livestock Board
Wyoming Wilderness Association
Wyoming Wildlife Federation
Wyoming State Grazing Board

**Operators, Media, Libraries**
4-Mile Sheep
AL Land & Cattle Company
Aimone, Bruce & Martin
Alkali Creek Grazing Association LLC
Anadarko Petroleum Corporation
Arapaho Grazing Association LLC
Bar X Sheep Company
Battle Mountain Co.
Big Sandy & Green River Livestock Co.
Blake Sheep Company & F.B. Espy
Bonomo, Jensen, Kourbelas
Carricaburu-Jauregui
CE Brooks & Associates PC
Central Bank & Trust

Conservancy of the Phoenix
Chilton Land and Livestock
Crosson Ranches LLC
Desert Cattle Co.
Dr. Jason Howard PC
Eaton, Dustin & James
Estate of Curtis Rochelle
Evans Wells & Livestock
Eversole, JohnJohn
Fill-More Beef LLC/P.H. Livestock
First Interstate Bank
G Bar B Veterinary Service
Hamel, Doug & Carolyne
Hill Land and Livestock
Hofeldt, John
Hog-Eye Ranch LLC
ISPM&B
Janet's Inc.
Utah State University Library
KBR
Mad Dog & the Pilgrim Booksellers
Maneotis Sheep Company
Marty and Ragsdale
Midland-Dunton Sheep Co.
Mike Sheehan Ranch LLC
Moon Living Trust
Mud Springs Livestock Company
N Bar K Ranch LLC
Olson Sisters Corporation
Pasin, Beverly & Anthony
Philp Sheep Company
Pinedale Roundup
Poor Farm LLC
Quarter Circle A Ranch LLC
Quarter Circle Block LLC
Quarter Circle Three Bar Ranch LLC
Quealy Properties, LLC
Raftopoulos Brothers Livestock
Ramsay, Norma
Rock Springs Grazing Association
Rock Springs Library
Rocket Miner
Salisbury Livestock Co.
Salisbury Livestock Co./Banjo Sheep Co.
Slagowski & Asay
Smith Rancho Inc.
Split Rock Holdings
Stewart Creek LLC
Stratton Sheep Co.
Sublette Examiner
Sun Land and Cattle Co.
Tall Grass, LLC
Taurus Productions, Inc.
Three Mill-Iron Ranch
Triple A Cattle Company
Tripp Family Trust
Vermillion Ranch Limited Partnership
Vercimak, Don & Peggy
W & M Thoman Ranches LLC
Weber Ranch Inc.
Western Wyoming Community College
Wilde, Jon
Wyoming Livestock Roundup
Wyoming Outdoor Council
Wyoming State Library

# 5.0 List of Preparers

This section contains the list of preparers and reviewers for this Environmental Assessment.

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# Appendix I
# Summary of Scoping and Public Comments

| No. | Scoping Comment | BLM Response |
|---|---|---|
| 1 | Utilize BLM's discretion under 43 CFR 4710.5(a) to close or limit livestock grazing in the HMAs, and/or designate this area to be managed principally for wild horse herds under 43 C.F.R. 4710. 3-2. | The issue of authorized livestock grazing use was previously decided in the Green River RMP (BLM 1997a) and in the Rawlins RMP (BLM 2008b). Please refer to Section 2.4 of the EA that discusses the alternative 'Remove or Reduce Livestock in the HMAs' for further information. |
| 2 | Re-evaluate and increase the AML for wild horses for these HMAs. | The AMLs were established through prior separate decision-making processes. Refer to Section 2.4 of the EA for a discussion of this alternative. |
| 3 | Offer any ranchers grazing livestock in the HMAs the option to retire cattle grazing allotments to promote ecotourism activities. | This is outside the scope of this analysis. The BLM has a multiple-use mandate to manage for all uses of the public land. Achieving and maintaining wild horse populations within established AMLs and controlling their population growth rates will enhance the public lands for the benefit of all users and resources. This in turn will increase the recreational experience in the area. Please refer to Section 3.6 of the EA. |
| 4 | Implement and expand the current proposal of fertility control treatments to allow more horses to remain on the range. | Fertility control has been incorporated into Alternative A, which is detailed in Sections 2.1 of the EA. |
| 5 | Implement range improvements and water enhancements that will benefit all animals, including wildlife and horses, living in the HMAs. | Water range improvement projects do enhance and benefit all wildlife and wild horses. Some water wells and pipelines are shut down to manage livestock rotation or for winter maintenance. No range improvements are proposed at this time. Please refer to Section 2 of the EA for a description of all alternatives, including those considered but not analyzed in detail. |
| 6 | The management approach detailed in the EA as the proposed alternative continues the unsustainable cycle of roundups, removals, and stockpiling of horses in long-term holding facilities. …this failed strategy is the inequitable distribution of resources within these HMAs. …no threat to the 'thriving natural balance' is greater than the extensive livestock grazing. | The BLM has a multiple-use management mandate for meeting its mission of sustaining the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations. Current management actions for the wild horses include maintaining AMLs for an ecological balance among wild horses and land and resource uses. Please refer to Section 2 of the EA for a description of all alternatives, including those considered but not analyzed in detail. |
| 7 | An Environmental Impact Statement is appropriate for the necessary deep analysis of the history and issues surrounding the proposed project. | The environmental analysis adequately addresses resource issues from the proposal and alternatives. If a finding of no significant impact cannot be reached, then an EIS would be warranted. |

| No. | Scoping Comment | BLM Response |
|---|---|---|
| 8 | In the alternative, the BLM can end the tax subsidies that ranchers enjoy by charging market rate for public land grazing fees. | The analysis of adequate grazing fees does not respond to the purpose and need of the proposed action and therefore is outside the scope of this wild horse gather analysis. |
| 9 | Why [is] the use of helicopters the standard for use by the BLM for wild horse roundups. The BLM must analyze and update its animal capture technique and protocol. Capture myopathy happens when animals are run under extreme stress (as wild horses are when being chased by a helicopter). | Wild mammals typically will experience some level of stress during capture regardless of the capture technique employed. The potential for capture myopathy can be minimized by limiting pursuit times, restricting captures to periods when environmental conditions minimize the chance that an animal will overheat and ensuring the expertise of the capture team. W.O IM 2015-151, Comprehensive Animal Welfare Program for Wild Horse and Burro Gathers was issued September 25, 2015 updates BLM policy. This IM defines standards, training and monitoring for conducting safe, efficient and successful WH&B gather operations while ensuring humane care and handling of animals gathered. Please refer to Section 3.2 and Appendices II and III of the EA for further information. |
| 10 | The scoping notice ignores the fact that the BLM is running out of long-term holding space for wild horses who have been removed from the range. | Decisions regarding the long-term stability of the BLM Wild Horse and Burro Program are outside of the scope of this analysis. |
| 11 | It is my understanding this gather is replacing a 2016 "gather" that was prevented by a Tenth District Court of Appeals ruling on the "2014 checkerboard removal activities" – meaning it was illegal. So, again, how can another roundup be conducted? | The 2017 proposed gather action would only remove excess wild horses above the AMLs from the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs. AMLs would be maintained in all three HMAs. The proposed gather is consistent with the Court of Appeals decision.<br><br>The cancelled 2016 gather proposed to remove all wild horses on the checkerboard lands regardless of wild horse numbers. AML may or may not have been maintained. |
| 12 | An alternative to maintain all horses on the range through fertility control and adjustments to livestock grazing must not only be considered, but also designated as the Proposed Action in the Environmental Assessment. | Management decisions regarding livestock grazing and wild horses are determined through the Resource Management Planning process. Current direction for the RSFO is discussed in the Green River RMP (1997); for the RFO, the Rawlins RMP (2008). Please refer to Section 2 of the EA for a description of all alternatives, including those considered but not analyzed in detail. |

| No. | Scoping Comment | BLM Response |
|---|---|---|
| 13 | An alternative that proposes negotiations with local ranchers to persuade them to tolerate a thriving wild horse population in the area in exchange for the privilege of grazing private livestock on our public lands. | Please refer to Sections 1.1 and 1.2 of the EA, which address a request from private landowners to remove excess wild horses. Additionally, please refer to Section 2 of the EA for a description of all alternatives, including those considered but not analyzed in detail. |
| 14 | Bait and/or water trapping should be considered as an alternative to helicopter roundup. | Please see Section 2.4 of the EA, which addresses this alternative. |
| 15 | Managing the wild horse population with natural sex ratios, since there is no evidence that sex ratio skewing to favor males impacts population growth rates. In addition, such skewing may have significant negative impacts on wild horse natural behaviors and social organization. | No sex ratio adjustments are being proposed in any of the alternatives. |
| 16 | Please seek alternatives that do not require a removal of wild horses. Utilize the one-year fertility drug, PZP, on mares one year and older. Manage wild horses on their legal ranges! | Use of fertility control vaccine PZP22 is being analyzed, which is a 22 month vaccine. |
| 17 | BLM must analyze how new oil and gas development would affect the horses, both inside and outside the checkerboard lands. | Land use allocations regarding oil and gas development and HMAs are analyzed in the Resource Management Plans. For current decisions regarding lands that are open to oil and gas leasing and/or HMAs, please see the Green River RMP (BLM 1997a) and the Rawlins RMP (BLM 2008b). Additionally, specific oil and gas development proposals will be subject to NEPA analysis, including analysis of potential effects to wild horses. |
| 18 | The high cost of gathers and maintaining removed horses makes the fertility control vaccine and sex ratio adjustments more than essential to successful management of feral horses going forward. | Fertility control is a key component of Alternative A and is analyzed under this EA. |
| 19 | While not specifically mentioned as a potential option, sterilization of a substantial portion of females would be highly desirable as a tool for maintaining numbers within the AML's. | Though proposed by the Wild Horse Advisory Board, this method is still undergoing research analysis and will not be analyzed as an option in this EA. Please refer to Section 2.4, Alternatives Considered but Eliminated from Detailed Analysis. |
| 20 | Private landowners are well within their rights to desire that feral horses be removed from these lands. Apparently the cost of managing these feral horse numbers has limited the ability of BLM to keep horse numbers within the amount that has been tolerated on private land over the last several decades. The potential | Please refer to Section 2.0 'Actions Common to Alternatives A and B' for information about removal of wild horses on private lands. |

| No. | Scoping Comment | BLM Response |
|---|---|---|
| | consequences of not keeping feral horse numbers to reasonable levels as related to private land would adversely impact a number of ecosystem services currently provided the public by these private lands. | |
| 21 | We comment that each of the alternatives in the EA should specifically evaluate if the geographic area to be used by proposed horse numbers in these alternatives would have adequate year-long forage, water, cover, and space on BLM lands as stated in the BLM's Wild Horse and Burro Handbook, H-4700-1. Each Alternative should also evaluate the potential impact of proposed horse numbers on current existing multiple use values such as wildlife, including sage grouse, and adjudicated livestock AUM's. | The request to reevaluate HMA boundaries is outside the scope of this analysis. HMA boundaries were established through the Land Use Planning process. Impacts to and from HMAs were analyzed during the Resource Management Plan EIS process for the Green River RMP, 1997 and Rawlins RMP, 2008. It is noted that the Green River RMP is currently undergoing a land use plan revision, which will consider a range of management options for the HMAs associated with that plan. However, until a new plan is approved, the management identified in the existing Green River RMP applies. |
| 22 | In principal, we support the use of effective fertility control measures and comment that BLM should use the most long term and long lasting methods available to the BLM. We support the use of a spay program as recommended by the National Wild Horse and Burro Advisory Board to the Secretary of Interior over the use of PZP because a spay program is a much more effective population control measure. We do not support the return of any fertile mares to the range once they are captured in the roundup process. | Thank you for your comment. |
| 23 | A helicopter roundup in Adobe Town will disrupt the accuracy of the collaring study--if the real purpose is to study natural movements (I believe better results would have been achieved had the horses been released near the spot where they were rounded up). | This proposed gather would not influence the ongoing collaring study in the Adobe Town HMA. If a collared wild horse is captured during the gather operations it would be released back into the Adobe Town HMA. The University of Wyoming collaring study would show where the 16 individual collared wild horses are currently located and additional information would be collected during and after the gather, enriching the study with their movements. |
| 24 | We comment that a cooperative monitoring program using science based protocols be developed and implemented in cooperation with the BLM and with the participation of rangeland and wildlife specialist from outside the BLM, and with participation by the grazing permittees. This monitoring program would study and evaluate the effects of "wild" horses on resource | Thank you for your comment. The development of this type of program is outside the scope of this EA, which is proposing to gather horses to maintain the established AMLs within the existing HMAs. |

| No. | Scoping Comment | BLM Response |
|---|---|---|
| | conditions and effects on multiple uses within these HMA's. | |
| 25 | We comment that all gathers and control measures should be designed to bring horse numbers down to at least the low AML number. | Low AML would be achieved through both of the action alternatives. |
| 26 | Maintain wild horse populations within AML by utilizing Catch Treat and Release methods for the vaccination of all mares over 1 year of age with PZP-22 or native PZP fertility control. | This alternative does not meet the purpose and need to maintain the AML, as the existing population of wild horses within the HMAs is currently above the established AML and excess wild horses need to be removed immediately in compliance with applicable regulations described in Section 1.3. Also, due to the number of excess wild horses to be removed and the large geographic area of the HMAs, this technique would be infeasible. Furthermore, this alternative would not be in conformance with the 2013 Consent Decree. |
| 27 | Humane standards for capture operations. Recommendations by the Humane Society of the United States and the ASPCA (American Society for the Prevention of Cruelty to Animals) should be incorporated into these standards. | Animal health and welfare are monitored by the contractor, government employees and APHIS veterinarians. Please refer to Section 3.2 and Appendices II and III of the EA for further information. |
| 28 | Full transparency for capture operations, including making real time video available from trap sites so the public can monitor this government operation. | BLM strives to allow the public access to gather operations. Safety for the horses, contractors and government employees is of highest priority, so full access is often limited. Please refer to Section 2.0 'Actions Common to Alternatives A and B' for further information about the BLM policies for public access. |
| 29 | All genetic analyses of the horses and potential impact of the proposed removal. All genetic reports should be included in the EA's appendix. | A synopsis of the latest genetic report information is included in Section 3.2 of the EA. All genetic reports are available upon request. |
| 30 | All forage allocations, usage (Animal Unit Months/AUMs) and listing of livestock grazing allotments within the HMA, both current and annual numbers for each of the past three years to enable valid comparison and analysis. | Livestock Grazing Status is available as Appendix V of the EA. |
| 31 | A full accounting of all water sources on the range, including an explanation of water allocations for all uses in the HMA, as well as how fencing and engineering of wells and springs for livestock grazing has affected water availability for wild horses and other wildlife species. | Please refer to Section 3.4 for information pertaining to vegetation, soils, and watershed conditions. There are no new proposals analyzed in this EA for changes to available water sources in the HMAs. |
| 32 | All monitoring data for each area, which includes data that clearly delineates the | The EA includes the most recent wild horse census (2017). All range monitoring data is available at the |

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| | separate impacts of livestock and wild horse use should be presented. | RSFO and RFO. The impact of livestock versus wild horse use is outside of the scope of this analysis. The removal actions are within the scope of the established AMLs and the 2013 Consent Decree. |
| 33 | Information on predator-killing activities within and around the HMA for each of the past three years and analysis of how these activities impact the Thriving Natural Ecological Balance in the HMA. | Wild horses are not common prey of any known predators. Predator management is not accomplished by BLM and is outside the scope of this EA. There are very few documented cases where wild horses are predated by mountain lions. The scale of the necessary wild horse removals to be within the AMLs compared to the potential predation by mountain lions would be insignificant to consider as a reasonable alternative to comply with the WFRHBA and established policies. Also, please refer to Section 2.4 of the EA for information about the alternative 'Control of Wild Horse Numbers by Natural Means' which was considered but not analyzed in detail. |
| 34 | We should increase the number of cattle and horses in these HMA's and maintain the land through holistic management. | Changes in livestock grazing and adjustments to the AMLs within the HMAs are outside the scope of this EA. There are not enough pastures within the HMAs to rotate all stock to manage for a holistic management system to work. Wild horses would not be accommodating in pasture moves due to their free-roaming natures. |
| 35 | Stray horses should not be removed but returned to the HMA and the reason for their leaving identified and resolved. | Areas outside of the designated HMAs are not managed for wild horses in accordance with the Green River RMP (BLM 1997a) or the Rawlins RMP (BLM 2008b). Removal of horses outside the HMAs is in compliance with the WFRHBA, FLPMA, and 43 CFR 4700. Additionally, all HMAs will be managed to AML in accordance with the existing RMPs. |
| 36 | Rain and snow catchment devices, commonly referred to as "guzzlers," should be strategically installed throughout the HMAs. | Please see comment response #5. |
| 37 | Remove wild horses due to drought conditions as livestock are asked to stock the range for drought. | The established AMLs for each HMA account for normal, wet, and dry years on average. Please also see comment response #2. |
| 38 | It is infeasible to build and maintain fences around the private lands; therefore BLM should remove all wild horses from the checkerboard. | Thank you for your comment. Please see comment response #20. |
| 39 | The combined impacts of excess wild horses and drought will continue to adversely affect sage grouse habitat. | Thank you for your comment. Impacts to wildlife, including the Greater Sage-Grouse, can be found in Sections 3.3 and 4.3 of the EA. |

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| 40 | The BLM must implement surgical sterilization, gelding and spaying as the primary fertility control for wild horses. | Thank you for your comment. |
| 41 | The Adobe Town and Salt Wells herds are within AMLs. Do not count foals toward AML. | AML applies to the number of adult wild horses or burros to be managed within the population and does not include the current year's foals. However, in accordance with BLM H 4700-1 Wild Horse and Burros Management Handbook, all wild horses one year of age and older are considered adults (a foal is considered one year of age on January 1 of the year following its birth). The 2017 Census data shows that the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs are currently over AML. |
| 42 | We recommend formulation of an emergency action alternative for inclusion in the Environmental Assessment that would analyze a reduction of wild horse numbers by at least 25-30% below the lower range of the BLM's AML for each HMA. We recommend this alternative based on the current year-long drought and concurrent adverse effects on the forage and water availability for wildlife. | Please see comment responses #2 and #37. |
| 43 | The designation of the Greater Sage Grouse core habitat within the HMAs further supports the need to consider reducing wild horse numbers below the existing AML. | Decisions regarding the Greater Sage-Grouse core habitat management were analyzed as part of the Greater Sage Grouse Nine Plan Resource Management Planning Amendment (September 2015), which included both the Green River and Rawlins RMPs. Additionally, it is noted that the Green River RMP is currently undergoing a land use plan revision, which will consider a range of management options for wild horses. However, until a new plan is approved, the management identified in the existing Green River RMP applies. |
| 44 | Recruit and train technical assistants from universities and community colleges to inventory and maintain current logs on the herds and to carry out a sustained PZP fertility control darting program for mares that have already contributed foals to the gene pool. | This technique has been successful in HMAs small in size and with small population numbers. The large size of the HMAs and large population numbers of the wild horses make the darting technique impractical. The majority of the wild horses would be regularly inaccessible from the main roads. Due to the wild nature of the wild horses, the ability to get close enough to successfully dart selected mares would be low. In order for a PZP darting program to be successful, a majority of the wild horse population would need to be regularly accessible by roads and be accustomed to constant human interaction in order to get close enough to administer the PZP dart. |

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| 45 | To avoid repeating errors that occurred in past gathers, where BLM consistently finds that there are more horses than previously counted, the following steps are recommended: (1) adopt the upper end of the U.S. Geological Survey statistical adjustment for undercounting; (2) count foals because this is not a purely an AML gather due to BLM's obligation to remove wild horses from private lands and the plain language of paragraph 4 of the 2013 Consent Decree; and (3) BLM must commit to gather all of the wild horses found outside the HMA boundaries. | (1) The point estimate for population size is the most appropriate value to use for management decisions. As is true with most statistical estimates, the 'point estimate' value for population size is the single most likely value for the true number of animals in the surveyed area at the time of the survey. It is not appropriate to make management decisions based on either the upper limit of the 90% confidence interval for the estimate of abundance, or based on the lower limit of the 90% confidence interval. The upper limit of the 90% confidence interval is far less likely to equal the true population size than the point estimate is. Alternatives A and B both would remove horses down to the lower limit of AML, based on the estimated number of adult horses present in the 2017 aerial survey. If the number of horses to remove were based on the upper limit of the 90% confidence interval for population size, then it is more likely than not that the resulting number of horses on the HMA would be lower than the low end of AML. That outcome would not be consistent with the RMP or with the purpose and need outlined in section 1.2. Average sighting probability for the 2017 wild horse survey was very high (98.2%), an increase over the 2016 survey (94.4%), and substantially higher than the 2015 survey (79.1%). The high sighting probability led to excellent confidence intervals and coefficients of variation in all HMAs surveyed.<br><br>(2) The AMLs in each HMA will be maintained at the end of the gather by the number of adult wild horses remaining on the respective HMA. The colts born in 2017 do not count as part of the population until after January1, 2018 when they would be counted as an adult wild horse. The colts that are gathered therefore would not count towards the target removal number of adult wild horses. The colts would likely not be weanable from their mothers and would be removed with the excess adult wild horses. The number of colts is not estimated in this analysis, but colts would be removed with their mothers.<br><br>(3) BLM is committed to gather and remove wild horses from outside of the HMA boundaries. See section 2.0 Actions Common to Alternatives A and B. |

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| 46 | The EA should contain a detailed analysis of the effects of the proposed action on the genetic composition of the herds with a special emphasis on the Spanish Colonial genetics. The cumulative analysis section should contain a detailed treatment of the effects of years of removal with only lip service given to the preservation of Spanish Colonial genetics. Detailed genetic data has been gathered since before 1994 and it will show that the Spanish Colonial nature of these herds has been steadily diluted as a result of the failure to consider it in the development of positive, meaningful removal/retention criteria. | See Sections 2.1, 2.2, and Appendix VIII in the EA which considers the development of positive, meaningful removal/retention criteria.<br><br>See Appendix VII for Adobe Town HMA Genetic Information. |
| **<u>Comments Received During EA review period.</u><br>(note: comments that were already addressed during scoping are not repeated in this section)** | | |
| 47. | Impacts to captured wild horses – a detailed analysis including the impacts of the BLM's budget request to Congress to lift the ban on destroying healthy horses and burros and selling them for slaughter. NEPA requires that BLM analyze all foreseeable activities that will affect horses so this lethal strategy that would have devastating effects on horses removed must be fully detailed and analyzed in the EIS | Thank you for your comment. Speculation about possible future budget and policy changes does not constitute a reasonably foreseeable future action. As such, all analysis within the EA represents current policy. At this time it is the BLM's policy to place all gathered wild horses up for adoption, and then relocate any that are not successfully adopted to long term holding pastures. See Section 3.2 for more information. |
| 48. | Implementing a program of land swaps to create contiguous public lands habitat for federally protected wild horses in the Wyoming Checkerboard. | Exchanging public lands does not meet the purpose and need. This activity would not address the overpopulation of wild horses that exists in this area, nor would it address the request of private landowners to remove wild horses from their private lands. Overall, this proposal is beyond the scope of this document. |
| 49. | Once this gather has been completed, WSGA urges BLM to immediately initiate scoping toward completion of NEPA analysis that would trigger authorization for a gather each time that horse numbers reach upper AML without the need for the delays and costly new analysis for each gather. | Thank you for your comment. This suggestion is beyond the scope of this document, as it has to do with future gathers not yet proposed. The BLM RSFO has not yet utilized multiple year gather EA's but may consider doing so in the future. |
| 50. | We recommend the removal of wild horses be timed to avoid impacting big game while they are on crucial winter range from November 15-April 30. If an exception to this timing stipulation is | BLM will request an exception and coordinate with Wyoming Game and Fish if the gather goes beyond November 15th. |

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| | requested, it should be considered in coordination with local WGFD biologists using the established exception request process. | |
| 51. | Timing should also be coordinated with local WGFD biologists to avoid rounding up horses during big game hunting seasons, particularly on weekends and season openers. | BLM may not be able to avoid gathering wild horses during the big game hunting seasons. However, gather operations would only impact a relatively small area at any given time, for a relatively short duration. This will still allow hunters to access and participate in hunting activities within any of the associated hunting units. See Section 3.6 for a detailed description of potential impacts to recreational users in association with the various alternatives. |
| 52. | BLM is asking Congress right now to approve a 2018 budget that will authorize the killing of thousands of wild horses in holding to save money, yet this plan will add over 1500 wild horses with all the attendant expenses to round them up and house them – this is not saving money. And these horses are being rounded up to be slaughtered. | See Comment # 47. |
| 53. | During scoping, the Coalition commented that wild horses have gone beyond the boundaries of the HMAs and have been reproducing in the Pine Mountain, Dry Creek, Hiawatha Tri-District, Canyon/Horseshoe, Galloway, Shell Creek, Cow Creek, Red Creek, and parts of Sage Creek allotments. The BLM is required to remove these horses and the problem only grows (by at least 20% ) each year that the BLM fails to act. | Removal of wild horses that have strayed beyond the HMA boundaries is included in the Purpose and Need and is a component of all action alternatives. See Section 1.2. See also Comments # 35 and 45. |
| 54. | BLM Ignored CLG's Comment That BLM Must Implement Post-Gather Census Counts | Future census counts are beyond the scope of this document. However, BLM is looking into the feasibility of conducting a fall census following the gather. |
| 55. | The Coalition commented during the scoping stage that the BLM uses IM 2010-057 to justify bottom-line requirements when determining how many horses it may remove. Specifically, the Coalition commented that BLM appears to use the low end of the 90% confidence interval ("LCL") to estimate the number of horses on the range even though IM 2010-057 | See Comment and Response #45. |

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| | does not require the BLM to adopt the LCL and the upper confidence level ("UCL") would better match BLM's responsibilities under Section 3 of Wild Horse and Burro Act ("WHA"). BLM responded in the EA that the "Point Estimate" is the most accurate estimate of wild horses on the range. However, the overwhelming body of knowledge regarding wild horses in Rock Springs BLM August 10, 2017 Page 4 Wyoming demonstrates that the "point estimate" has never accurately captured the number of horses on the range. Recent gather history in 2013 and 2014 prove that the reliance on the point estimate is doomed to failure. As the April 2015 count proved, BLM was wrong by more horses than if it would have adopted the UCL. The BLM has again failed to analyze and disclose the benefits of the "point estimate" over the UCL. Despite the Coalition's directed comment, the BLM did not provide a good faith effort to disclose precisely why the point estimate is better than the UCL given the fact that the point estimate has failed to date. Warm Springs Dam Task Force v. Gribble, 565 F.2d 549, 552 (9th Cir. 1977) (good faith consideration is mandatory under NEPA). | |
| 56. | Appendix V Livestock Use does not include the allotments in the Great Divide Basin HMA. Please update. | Thank you for your comment. Appendix V has been updated to include the allotments within the Great Divide Basin HMA. |
| 57 | The EA states that "one recommendation emerging from the analysis is that a fall survey after the entire annual foal crop has been born would provide a better understanding of the growth of horse abundance in these areas." Although RSGA appreciates BLM's acknowledgement, it is not a novel concept and should be implemented during this 2017 removal. | See Comment and Response #54 |
| 58 | RSGA urged the BLM to use the upper limit of the 90% confidence interval ("UCL") in order to establish a Thriving Ecological Balance ("TEB") to the | See Comment and Response #45. |

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| | HMAs in question. RSGA has exhaustively evaluated BLM's census counts and the number of horses gathered from 2013 forward. RSGA also demonstrated how the UCL conforms to the undercounting parameters to account for the difficulty of accurately counting wild horses discussed in Instruction Memorandum (IM) 2010-057 | |
| 59 | The Checkerboard in Adobe Town, Salt Wells, and Great Divide Basin can no longer be counted as part of the functional boundaries of those HMAs because the RSGA has withdrawn its consent to tolerate any horses on those lands. And, therefore, the AMLs for those HMAs need to be adjusted during the RSFO RMP amendment currently underway. This is basis of the 2013 Consent Decree. | Thank you for your comment. Changing the boundary or Appropriate Management Level is outside the scope of this EA. Changes in HMA boundaries and AML must occur through the Land Use Planning process. The BLM RSFO is currently in the process of updating their Land Use Plan and is considering changes in wild horse management in association with that plan. |
| 60 | The EA acknowledges the existence of the 2015 Sage-Grouse Land Use Plan Amendment ("SG9 Plan") but fails entirely to address how the wild horse gather affects the habitat objectives adopted in the SG9 Plan. Specifically, the EA does not state how removal of the "point estimate" number of horses will achieve and maintain the habitat objectives (i.e. stubble height in inches, canopy cover by percentage, etc.), identified in the SG9 Plan. In fact, the EA presumes that if the BLM manages the HMAs for established AMLs, that sage-grouse habitat objectives will be met. | The presence of Sage-grouse and potential impacts to Sage-grouse are discussed in Section 3.3 of the EA. All action alternatives are in compliance with the Green River RMP, including the Sage-grouse amendments that went into effect on September 22, 2015. |
| 61. | Wild horses, and the Adobe Town HMA and Jack Morrow Hills planning area in particular, are an important feature for visitors to the Red Desert. … Due to the strong importance of wild horse viewing to public recreational use of Red Desert public lands, and the likelihood that the proposed reductions would reduce such viewing opportunities to near zero in many areas, the project will necessarily result in significant impacts to the human environment. These impacts have not been fully disclosed or analyzed in the EA (a hard look deficiency). | Potential impacts to recreation opportunities associated with the action alternatives are addressed in Section 3.6. |

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| 62. | Wild horses in the Adobe Town herd have already been radically reduced from their former numbers through BLM-sponsored wild horse gathers. | Wild horse management numbers have been the same in these areas since 1979. Period gathers have occurred from that time to the present. Despite these gathers, the public have had adequate opportunity to view wild horses within these HMAs over the years. Section 3.6 of the EA describes the potential impacts to Recreational values associated with the various action alternatives. |
| 63. | There was a Thriving Natural Ecological Balance prior to these gathers, and there is a Thriving Natural Ecological Balance present in this Herd Management Unit today. It is therefore arbitrary and capricious and an abuse of discretion for BLM to premise the Purpose and Need for this project on a fictional "overpopulation" of wild horses and need to return the area to a Thriving Natural Ecological Balance. See EA at 7. Further reductions of this herd cannot be justified on the basis of reducing ecological damage, as BLM has provided no evidence that such damage is occurring | Providing for the achievement of thriving natural ecological balance is one aspect of the purpose and need. The purpose and need also describes the need to gather based on the 2013 Consent Decree and the request to remove wild horses from private lands within these HMAs. The combination of all these factors is what drives the need for BLM action at this time. Gathering wild horses that are over AML will allow for the achievement (or maintenance) of a thriving natural ecological balance while addressing the other points described in the Purpose and Need. |
| 64. | The BLM needs to analyze all of these costs to the U.S. taxpayer for wild horses to be gathered under this NEPA decision, and compare these costs to the alternative cost to the taxpayer of removing a corresponding number of AUMs of cattle and/or sheep, to make the case that gathering and removing wild horses is an economically viable and responsible proposition for the taxpayers, who will foot the bill for this action of such dubious value to the public. The BLM must fully disclose the cost of the wild horse gather operation itself, including costs related to aircraft time, contractor wages and charges, materials for temporary corrals, BLM staff time, and vehicle related costs. In addition, please present the cost of wild horses once captured to temporary holding facilities, and costs in maintenance and personnel to care for the horses while in temporary holding. Then please calculate and present the costs related to auctioning the animals... | The BLM determined that there would not be a socio-economic impact associated with the action alternatives (see Table 5). Section 3.2 discusses impacts associated with the gather and removal of wild horses. A detailed financial analysis of the overall BLM wild horse program is beyond the scope of this document. Nor does NEPA require a cost-benefit analysis. 40 CFR 1502.23. Making any financial comparisons to the removal of livestock AUMs is beyond the scope of this document as well as the removal of AUMs was eliminated as a reasonable alternative (see Section 2.4). |

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| 65. | It is also incumbent on BLM to analyze an action Alternative D where private livestock, instead of wild horses, are removed from the public lands to achieve a corresponding reduction in grazing. | Please refer to Section 2.4 of the EA that discusses the alternative 'Remove or Reduce Livestock in the HMAs' for further information. See Comment #1 |
| 66. | The BLM should also analyze an alternative that reduces wild horse numbers through PZP fertility control only, to the upper limit of AML range, and supplements this with a reduction in domestic livestock corresponding to the difference between lower and upper AML level. | Please refer to Section 2.4, Alternatives Considered but Eliminated from Detailed Analysis. |

# Appendix II
# Standard Operating Procedures
# for
# Wild Horse Gathers

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

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

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

The primary gather methods used in the performance of gather operations include:

1. Helicopter Drive Gathering. This gather method involves utilizing a helicopter to herd wild horses into a temporary gather site.

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

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

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

**A. Gather Methods used in the Performance of Gather Contract Operations**

The primary concern of the contractor is the safe and humane handling of all animals gathered. All gather attempts shall incorporate the following:

1. All gather sites and holding facilities locations must be approved by the Contracting Officer's Representative (COR) and/or the Project Inspector (PI) prior to construction. The Contractor may also be required to change or move gather locations as determined by the COR/PI. All gather

sites and holding facilities not located on public land must have prior written approval of the landowner.

2. The rate of movement and distance the animals travel shall not exceed limitations set by the COR who would consider terrain, physical barriers, access limitations, weather, extreme temperature ( high and low), condition of the animals, urgency of the operation (animals facing drought, starvation, fire rehabilitation, etc.) and other factors. In consultation with the contractor the distance the animals travel would account for the different factors listed above and concerns with each HMA.

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

    a. Gather sites and holding facilities shall be constructed of portable panels, the top of which shall not be less than 72 inches high for horses and 60 inches high for burros, and the bottom rail of which shall not be more than 12 inches from ground level. All gather sites and holding facilities shall be oval or round in design.

    b. All loading chute sides shall be a minimum of 6 feet high and shall be fully covered with plywood or metal without holes.

    c. All runways shall be a minimum of 30 feet long and a minimum of 6 feet high for horses, and 5 feet high for burros, and shall be covered with plywood, burlap, plastic snow fence or like material a minimum of 1 foot to 5 feet above ground level for burros and 1 foot to 6 feet for horses. The location of the government furnished portable fly chute to restrain, age, or provide additional care for the animals shall be placed in the runway in a manner as instructed by or in concurrence with the COR/PI.

    d. All crowding pens including the gates leading to the runways shall be covered with a material which prevents the animals from seeing out (plywood, burlap, plastic snow fence, etc.) and shall be covered a minimum of 1 foot to 5 feet above ground level for burros and 2 feet to 6 feet for horses.

    e. All pens and runways used for the movement and handling of animals shall be connected with hinged self-locking gates.

4. No modification of existing fences would be made without authorization from the COR/PI. The Contractor shall be responsible for restoration of any fence modification which he has made.

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

6. Alternate pens, within the holding facility shall be furnished by the Contractor to separate mares or jennies with small foals, sick and injured animals, estrays, or other animals the COR determines need to be housed in a separate pen from the other animals. Animals shall be sorted as to age, number, size, temperament, sex, and condition when in the holding facility so as to minimize, to the extent possible, injury due to fighting and trampling. Under normal conditions, the government would require that animals be restrained for the purpose of determining an animal's age, sex, or other necessary procedures. In these instances, a portable restraining chute may be necessary and would be provided by the government. Alternate pens shall be furnished by the Contractor to hold animals if the specific gathering requires that animals be released back

into the gather area(s). In areas requiring one or more satellite gather site, and where a centralized holding facility is utilized, the contractor may be required to provide additional holding pens to segregate animals transported from remote locations so they may be returned to their traditional ranges. Either segregation or temporary marking and later segregation would be at the discretion of the COR.

7. The Contractor shall provide animals held in the gather sites and/or holding facilities with a continuous supply of fresh clean water at a minimum rate of 10 gallons per animal per day. Animals held for 10 hours or more in the gather site or holding facilities shall be provided good quality hay at the rate of not less than two pounds of hay per 100 pounds of estimated body weight per day. The contractor would supply certified weed free hay if required by State, County, and Federal regulation.

8. An animal that is held at a temporary holding facility through the night is defined as a horse/burro feed day. An animal that is held for only a portion of a day and is shipped or released does not constitute a feed day.

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

10. The Contractor shall restrain sick or injured animals if treatment is necessary. The COR/PI would determine if animals must be euthanized and provide for the destruction of such animals. The Contractor may be required to humanely euthanize animals in the field and to dispose of the carcasses as directed by the COR/PI.

11. Animals shall be transported to their final destination from temporary holding facilities as quickly as possible after gather unless prior approval is granted by the COR for unusual circumstances. Animals to be released back into the HMA following gather operations may be held up to 21 days or as directed by the COR. Animals shall not be held in gather sites and/or temporary holding facilities on days when there is no work being conducted except as specified by the COR. The Contractor shall schedule shipments of animals to arrive at final destination between 7:00 a.m. and 4:00 p.m. No shipments shall be scheduled to arrive at final destination on Sunday and Federal holidays; unless prior approval has been obtained by the COR. Animals shall not be allowed to remain standing on trucks while not in transport for a combined period of greater than three (3) hours in any 24 hour period. Animals that are to be released back into the gather area may need to be transported back to the original gather site. This determination would be at the discretion of the COR or Field Office Wild Horse & Burro Specialist.

**B. Gather Methods That May Be Used in the Performance of a Gather**

1. Gather attempts may be accomplished by utilizing bait (feed, water, mineral licks) to lure animals into a temporary gather site. If this gather method is selected, the following applies:

    a. Finger gates shall not be constructed of materials such as "T" posts, sharpened willows, etc., that may be injurious to animals.

    b. All trigger and/or trip gate devices must be approved by the COR/PI prior to gather of animals.

    c. Gather sites shall be checked a minimum of once every 10 hours.

2. Gather attempts may be accomplished by utilizing a helicopter to drive animals into a temporary gather site. If the contractor selects this method the following applies:

    a. A minimum of two saddle-horses shall be immediately available at the gather site to accomplish roping if necessary. Roping shall be done as determined by the COR/PI. Under no circumstances shall animals be tied down for more than one-half hour.

    b. The contractor shall assure that foals shall not be left behind, and orphaned.

3. Gather attempts may be accomplished by utilizing a helicopter to drive animals to ropers. If the contractor, with the approval of the COR/PI, selects this method the following applies:

    a. Under no circumstances shall animals be tied down for more than one hour.

    b. The contractor shall assure that foals shall not be left behind, or orphaned.

    c. The rate of movement and distance the animals travel shall not exceed limitations set by the COR/PI who would consider terrain, physical barriers, weather, condition of the animals and other factors.

**C. Use of Motorized Equipment**

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

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

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

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

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

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

    - 11 square feet per adult horse (1.4 linear foot in an 8 foot wide trailer);
    - ☐ 8 square feet per adult burro (1.0 linear foot in an 8 foot wide trailer);
    - ☐ 6 square feet per horse foal (0.75 linear feet in an 8-foot-wide trailer);
    - ☐ 4 square feet per burro foal (0.5 linear feet in an 8-foot-wide trailer).

7. The COR/PI shall consider the condition and size of the animals, weather conditions, distance to be transported, or other factors when planning for the movement of gathered animals. The COR/PI shall provide for any brand and/or inspection services required for the gathered animals.

8. If the COR/PI determines that dust conditions are such that the animals could be endangered during transportation, the Contractor would be instructed to adjust speed.

**D. Safety and Communications**

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

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

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

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

5. Should the contractor choose to utilize a helicopter the following would apply:

    a. The Contractor must operate in compliance with Federal Aviation Regulations, Part 91. Pilots provided by the Contractor shall comply with the Contractor's Federal Aviation Certificates, applicable regulations of the State in which the gather is located.

    b. Fueling operations shall not take place within 1,000 feet of animals.

**E. Site Clearances**

1. No Personnel working at gather sites may excavate, remove, damage, or otherwise alter or deface or attempt to excavate, remove, damage or otherwise alter or deface any archaeological resource located on public lands or Indian lands.

2. Prior to setting up a gather site or temporary holding facility, the BLM would conduct all necessary clearances (archaeological, T&E, etc.). All proposed site(s) must be inspected by a government archaeologist and wildlife biologist. Once clearance has been obtained, the gather site or temporary holding facility may be set up. Said clearance shall be arranged for by the COR, PI, or other BLM employees.

3. Gather sites and temporary holding facilities would not be constructed on wetlands or riparian zones.

**F. Animal Characteristics and Behavior**

Releases of wild horses would be near available water when possible. If the area is new to them, a short-term adjustment period may be required while the wild horses become familiar with the new area.

**G. Public Participation**

Opportunities for public viewing (i.e. media, interested public) of gather operations would be made available to the extent possible; however, the primary considerations would be to protect the health, safety and welfare of the animals being gathered and the personnel involved. The public must adhere to guidance from the on-site BLM representative. It is BLM policy that the public would not be allowed to come into direct contact with wild horses being held in BLM facilities. Only authorized BLM personnel or contractors may enter the corrals or directly handle the animals. The general public may not enter the corrals or directly handle the animals at any time or for any reason during BLM operations.

**H. Responsibility and Lines of Communication**

- Rock Springs Field Office – Contracting Officer's Representative/Project Inspector: Jay D'Ewart

- Alternate – Contracting Officer's Representative/Project Inspector:
  Ed Vandenburg
  Clay Stot
  Benjamin Smith
  Scott Fluer

  Wyoming State Office – Contracting Officer's Representative/Project Inspector: N/A

The Contracting Officer's Representatives (CORs) and the project inspectors (PIs) have the direct responsibility to ensure the Contractor's compliance with the contract stipulations. The Rawlins and Rock Springs Assistant Field Managers for Renewable Resources and the Rawlins and Rock Springs Field Managers will take an active role to ensure the appropriate lines of communication are established between the field, Field Office, District Office, State Office, National Program Office, and BLM Holding Facility offices. All employees involved in the gathering operations would keep the best interests of the animals at the forefront at all times.

All publicity, formal public contact and inquiries would be handled through the Assistant Field Manager for Renewable Resources and District Public Affairs Officer. These individuals would be the primary contact and would coordinate with the COR/PI on any inquiries.

The COR would coordinate with the contractor and the BLM Corrals to ensure animals are being transported from the gather site in a safe and humane manner and are arriving in good condition.

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

Should the Contractor show negligence and/or not perform according to contract stipulations, he would be issued written instructions, stop work orders, or defaulted.

# Appendix III
# Standard Operating Procedures
# for
# Fertility Control Treatment

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

- The 22-month pelleted PZP vaccine would be administered by trained BLM personnel.

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

- Delivery of the vaccine would be as an intramuscular injection while the mares are restrained in a working chute. 0.5 cubic centimeters (cc) of the PZP vaccine would be emulsified with 0.5 cc of adjuvant (a compound that stimulates antibody production) and loaded into the delivery system. The pellets would be loaded into the jabstick for the second injection. With each injection, the liquid and pellets would be propelled into the left hind quarters of the mare, just below the imaginary line that connects the point of the hip and the point of the buttocks.

- All treated mares will be freeze-marked with two 3.5-inch letters on the left hip for treatment tracking purposes. The only exception to this requirement is that each treated mare can be clearly and specifically identified through photographs or markings. This step is to enable researchers to positively identify the animals during the research project as part of the data collection phase.

- At a minimum, estimation of population growth rates using helicopter or fixed wing surveys will be conducted the year preceding any subsequent gather. During these surveys it is not necessary to identify which foals were born to which mares, only an estimate of population growth is needed (i.e. # of foals to # of mares).

- Population growth rates of herds selected for intensive monitoring will be estimated every year post-treatment using helicopter or fixed wing surveys. During these surveys it is not necessary to identify which foals were born to which mares, only an estimate of population growth is needed (i.e. # of foals to # of mares). If during routine HMA field monitoring (on-the-ground), if data on mare to foal ratios can be collected, these data should also be shared with the NPO for possible analysis by the USGS.

- A PZP Application Data sheet will be used by the field applicators to record all the pertinent data relating to identification of the mare (including a photograph if the mares are not freeze-marked) and date of treatment. Each applicator will submit a PZP Application Report and accompanying narrative and data sheets will be forwarded to the NPO (Reno, Nevada). A copy of the form and data sheets and any photos taken will be maintained at the field office.

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

# Appendix IV
# Wild Horse Population Modeling

## Population Model Overview

WinEquus is a program used to simulate the population dynamics and management of wild horses created by Stephen H. Jenkins of the Department of Biology, University of Nevada at Reno. For further information about this model, you may contact Stephen H. Jenkins at the Department of Biology/314, University of Nevada, Reno, NV 89557.

Detailed information is provided within the WinEquus program available at http://unr.edu/homepage/jenkins, and will provide background about the use of the model, the management options that may be used, and the types of output that may be generated.

The population model for wild horses was designed to help the BLM evaluate various management strategies that might be considered for a particular area. The model uses data on average survival probabilities and foaling rates of horses to project population growth for up to 20 years. The model accounts for year-to-year variation in these demographic parameters by using a randomization process to select survival probabilities and foaling rates for each age class from a distribution of values based on these averages. This aspect of population dynamics is called environmental stochasticity, and reflects the fact that future environmental conditions that may affect wild horse population's demographics can't be established in advance. Therefore each trial with the model will give a different pattern of population growth. Some trials may include mostly "good" years, when the population grows rapidly; other trials may include a series of several "bad" years in succession. The stochastic approach to population modeling uses repeated trials to project a range of possible population trajectories over a period of years, which is more realistic than predicting a single specific trajectory.

The model incorporates both selective removal and fertility treatment as management strategies. A simulation may include no management, selective removal, fertility treatment, or both removal and fertility treatment. Wild horse and burro specialists can specify many different options for these management strategies such as the schedule of gathers for removal or fertility treatment, the threshold population size which triggers a gather, the target population size following a removal, the ages and sexes of horses to be removed, and the effectiveness of fertility treatment.

To run the program, one must supply an initial age distribution (or have the program calculate one), annual survival probabilities for each age-sex class of horses, foaling rates for each age class of females, and the sex ratio at birth. Sample data are available for all of these parameters. Basic management options must also be specified.

## Population Modeling – Adobe Town Salt Wells Creek, and Great Divide Basin HMAs

To complete the population modeling for the Adobe Town Salt Wells Creek, and Great Divide Basin HMAs, version 1.40 of the WinEquus program, created April 2, 2002, was utilized.

## Objectives of Population Modeling

Review of the data output for each of the simulations provided many useful comparisons of the possible outcomes for each alternative. Some of the questions that need to be answered through the modeling include:

- Do any of the Alternatives "crash" the population?
- WFRHBA effect does fertility control have on population growth rate?
- WFRHBA effects do the different alternatives have on the average population size?
- WFRHBA effects do the different alternatives have on the genetic health of the herd?

## Population Data, Criteria, and Parameters utilized for Population Modeling

Initial age structure for the 2017 herd was developed from age structure data collected during the 2005 Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs gathers. The following table shows the proposed age structure that was utilized in the population model for the Proposed Action and Alternatives:

**Initial Age Structure**

| Age Class | Females | Males |
|---|---|---|
| Foal | 106 | 115 |
| 1 | 32 | 28 |
| 2 | 92 | 66 |
| 3 | 26 | 30 |
| 4 | 16 | 27 |
| 5 | 16 | 6 |
| 6 | 8 | 24 |
| 7 | 23 | 22 |
| 8 | 20 | 26 |
| 9 | 15 | 15 |
| 10-14 | 16 | 26 |
| 15-19 | 5 | 25 |
| 20+ | 0 | 15 |
| **Total** | **375** | **425** |

All simulations used the survival probabilities, foaling rates, and sex ratio at birth that was supplied with the WinEquus population model for the Garfield HMA:

**Sex ratio at Birth:** 47% Females; 53% Males

The following percent effectiveness of fertility control was utilized in the population modeling for Alternative A:

**Year 1: 94%, Year 2: 82%, Year 3: 68%**

The following table displays the removal parameters utilized in the population model for Alternative A:

**Removal Criteria**

| ***Age*** | ***Percentages for Removals*** | |
|---|---|---|
| | **Females** | **Males** |
| Foal | 100% | 100% |
| 1 | 100% | 100% |
| 2 | 100% | 100% |
| 3 | 100% | 100% |
| 4 | 100% | 100% |
| 5 | 0% | 0% |
| 6 | 0% | 0% |
| 7 | 0% | 0% |
| 8 | 0% | 0% |
| 9 | 0% | 0% |
| 10-14 | 0% | 0% |
| 15-19 | 0% | 0% |
| 20+ | 0% | 0% |

The following table displays the contraception parameters utilized in the population model for Alternative B:

**Contraception Criteria (Alternative 1)**

| **Age** | **Percentages for Fertility Treatment** |
|---|---|
| Foal | 0% |
| 1 | 100% |
| 2 | 100% |
| 3 | 100% |
| 4 | 100% |
| 5 | 100% |
| 6 | 100% |
| 7 | 100% |
| 8 | 100% |
| 9 | 100% |
| 10-14 | 100% |
| 15-19 | 100% |
| 20+ | 100% |

## Population Modeling Criteria

The following summarizes the population modeling criteria that are common to all alternatives:

- Starting Year: 2017
- Initial gather year: 2017
- Gather interval: regular interval of three years
- Gather for fertility treatment regardless of population size: No
- Continue to gather after reduction to treat females: Yes
- Sex ratio at birth: 53% males
- Percent of the population that can be gathered: 85% Alternative A and 55% Alternative B
- Minimum age for long-term holding facility horses: Not Applicable
- Foals are not included in the AML
- Simulations were run for 10 years with 100 trials each

The following table displays the population modeling parameters utilized in the model:

**Population Modeling Parameters**

| Modeling Parameter | Alternative 1 (Remove to Low Limit of Management Range & Fertility Control) | Alternative 2 (Remove to Lower Limit of Management Range) | Alternative 3 No Action (No Removal & No Fertility Control) |
|---|---|---|---|
| Management by removal and fertility control | Yes | No | N/A |
| Management by removal only | No | Yes | N/A |
| Threshold Population Size for Gathers | 365 Salt Wells Creek HMA<br>800 Adobe Town HMA<br>415 Great Divide Basin HMA | 365 Salt Wells Creek HMA<br>800 Adobe Town HMA<br>600 Great Divide Basin HMA | N/A |
| Target Population Size Following Gathers | 251 Salt Wells Creek HMA<br>610 Adobe Town HMA<br>415 Great Divide Basin HMA | 251 Salt Wells Creek HMA<br>610 Adobe Town HMA<br>600 Great Divide Basin HMA | N/A |
| Gather for fertility control regardless of population size | No | No | N/A |
| Gathers continue after removals to treat additional females | Yes | No | N/A |
| Effectiveness of Fertility Control: year 1 | 94% | N/A | N/A |
| Effectiveness of Fertility Control: year 2 | 82% | N/A | N/A |
| Effectiveness of Fertility Control: year 3 | 68% | N/A | N/A |

## Results of WinEquus Population Modeling

Population modeling was completed for the proposed action and the alternatives. One hundred trials were run, simulating population growth and herd demographics to determine the projected herd structure for the next four years, or prior to the next gather. The computer program used simulates the population dynamics of wild horses. It was written by Dr. Stephen H. Jenkins, Department of Biology, University of Nevada, Reno, under a contract from the National Wild Horse and Burro Program of the Bureau of Land Management and is designed for use in comparing various management strategies for wild horses.

Interpretation of the Model

The estimated population of 1,123 wild horses in the Adobe Town HMA, 976 wild horses in the Salt Wells Creek HMA, and 737 wild horses in the Great Divide Basin HMA was based on a April 2017 census, and was used in the population modeling. Year one is the baseline starting point for the model, and reflects wild horse numbers immediately prior to the gather action and also reflects a slightly skewed sex ratio which favors males. A sex ratio of 53:47 was entered into the model for the post gather action population. In this population modeling, year one would be 2017. Year two would be exactly one year in time from the original action, and so forth for years three, four, and five, etc. Consequently, at year eleven in the model, exactly ten years in time would have passed. In this model, year eleven is 2027. This is reflected in the Population Size Modeling Table by "Population sizes in ten years" and in the Growth Rate Modeling Table by "Average growth rate in 10 years." Growth rate is averaged over ten years in time, while the population is predicted out the same ten years to the end point of year eleven. The Full Modeling Summaries contain tables and graphs directly from the modeling program.

The initial herd size, sex ratio and age distribution for 2017 was structured by the WinEquus Population Model using data from the horses gathered and removed during the 2005 gather. This initial population data was then entered into the model and the model was used to predict various outcomes of the different alternatives, including the No Action Alternative for comparison purposes.

The parameters for the population modeling were:

1. Gather when population exceeds 810 wild horses in the Adobe Town HMA, 365 wild horses in the Salt Wells Creek HMA and 415 wild horses in the Great Divide Basin HMA.
2. Foals are not included in AML.
3. Percent to gather 85% in Alternative 1 and 56% in Alternative 2
4. Three years between gathers
5. Number of trials 100
6. Number of years 10
7. Initial calendar year 2017
8. Initial population size: 1,123 wild horses in the Adobe Town HMA, 976 wild horses in the Salt Wells Creek HMA and 737 wild horses in the Great Divide Basin HMA.
9. Population size after gather would be 610 wild horses in the Adobe Town HMA, 251 wild horses in the Salt Wells Creek HMA and 415 wild horses in the Great Divide Basin HMA.
10. Implement selective removal criteria.
11. Fertility control Yes for Alternative A and No for Alternative B.

**Results:**

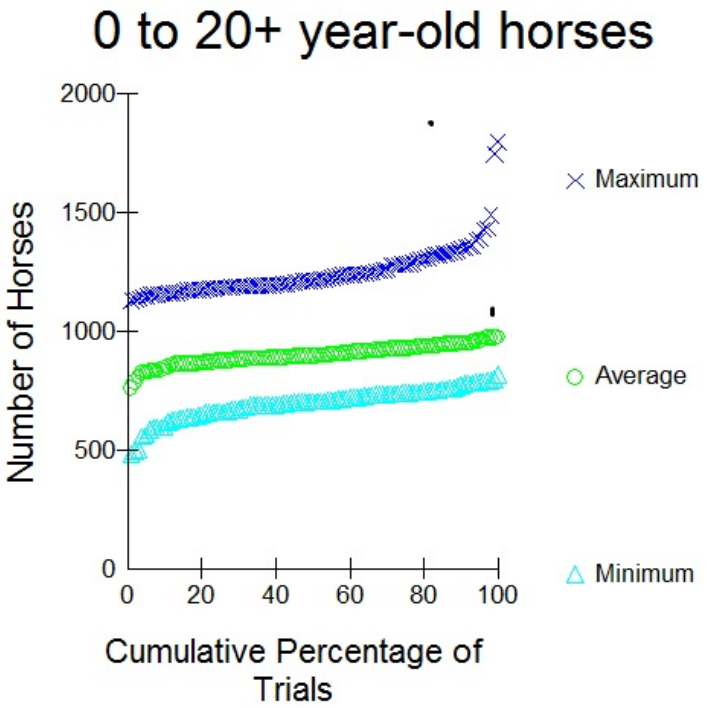
**<u>Alternative A:</u> – Removal of Excess Animals to the Lower Limit of AML range (610) with Fertility Control in Adobe Town HMA.**

The parameters for the population modeling were:

1-10. The same as parameters listed above.

12. Yes, treat all mares released with fertility control.

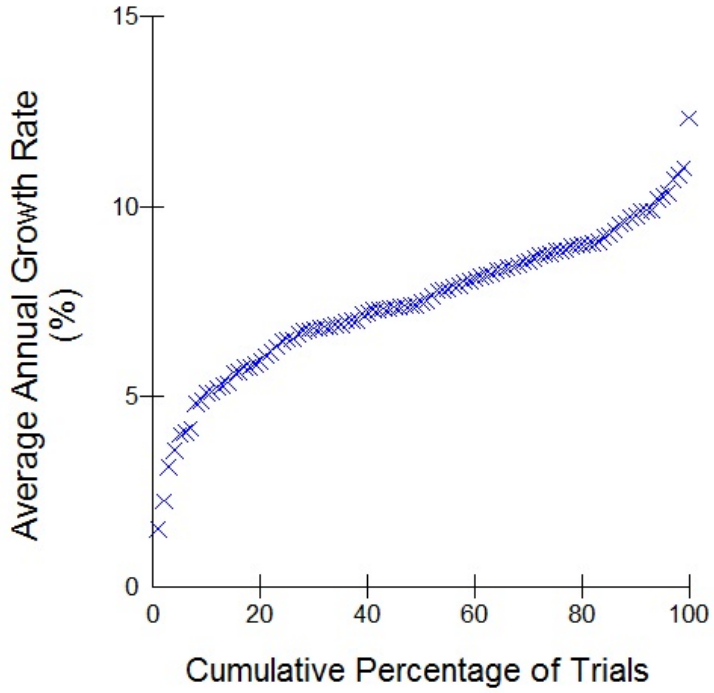
***Population Size and Modeling Graph and Table (Gather and Fertility Control)***




| POPULATION SIZES IN 11 YEARS* | | | |
|---|---|---|---|
| | MINIMUM | AVERAGE | MAXIMUM |
| Lowest Trial | 483 | 762 | 1130 |
| 10th Percentile | 610 | 847 | 1160 |
| 25th Percentile | 662 | 874 | 1184 |
| Median Trial | 704 | 896 | 1217 |
| 75th Percentile | 740 | 927 | 1283 |
| 90th Percentile | 775 | 947 | 1354 |
| Highest Trial | 818 | 974 | 1796 |

* 0 to 20+ year-old horses

***Growth Rate Modeling Graph and Table (Gather and Fertility Control)***




| **AVERAGE GROWTH RATE IN 10 YEARS** | |
|---|---|
| Lowest Trial | 1.5% |
| 10th Percentile | 5.1% |
| 25th Percentile | 6.5% |
| Median Trial | 7.5% |
| 75th Percentile | 8.9% |
| 90th Percentile | 9.8% |
| Highest Trial | 12.3% |

**Results:**

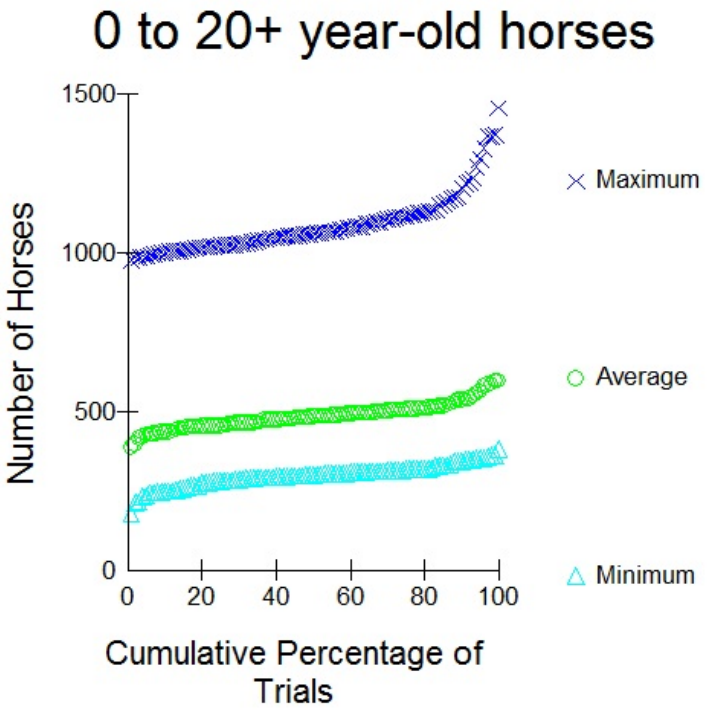
**<u>Alternative A:</u>– Removal of Excess Animals to the Lower Limit of AML range (251) with Fertility Control in Salt Wells Creek HMA.**

The parameters for the population modeling were:

1-11. The same as parameters listed above.

13. Yes, treat all mares released with fertility control.

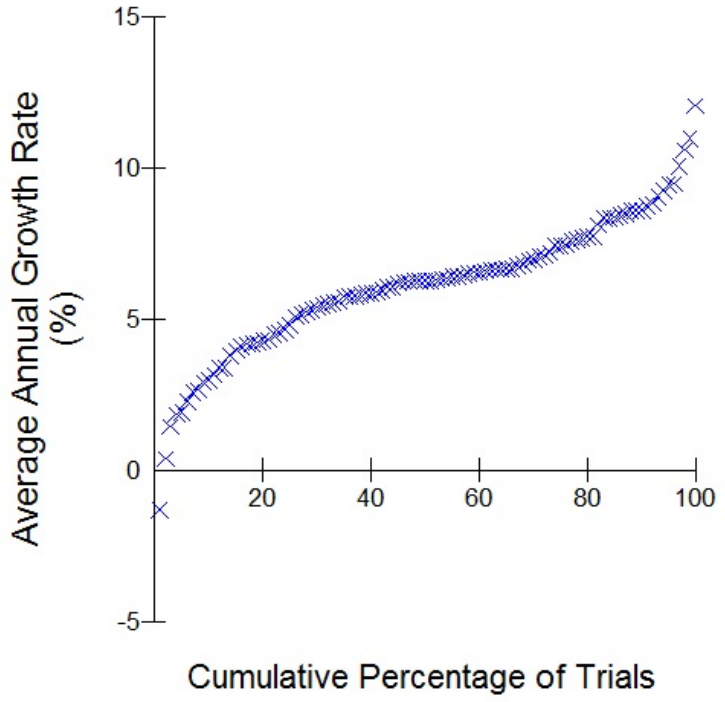
***Population Size and Modeling Graph and Table (Gather and Fertility Control)***




| POPULATION SIZES IN 11 YEARS* | | | |
|---|---|---|---|
| | MINIMUM | AVERAGE | MAXIMUM |
| Lowest Trial | 179 | 389 | 978 |
| 10th Percentile | 251 | 435 | 1004 |
| 25th Percentile | 284 | 456 | 1024 |
| Median Trial | 302 | 485 | 1062 |
| 75th Percentile | 319 | 507 | 1117 |
| 90th Percentile | 346 | 538 | 1210 |
| Highest Trial | 382 | 596 | 1456 |

* 0 to 20+ year-old horses

***Growth Rate Modeling Graph and Table (Gather and Fertility Control)***




| AVERAGE GROWTH RATE IN 10 YEARS | |
|---|---|
| Lowest Trial | -1.3% |
| 10th Percentile | 3.1% |
| 25th Percentile | 5.0% |
| Median Trial | 6.3% |
| 75th Percentile | 7.5% |
| 90th Percentile | 8.7% |
| Highest Trial | 12.1% |

**Results:**

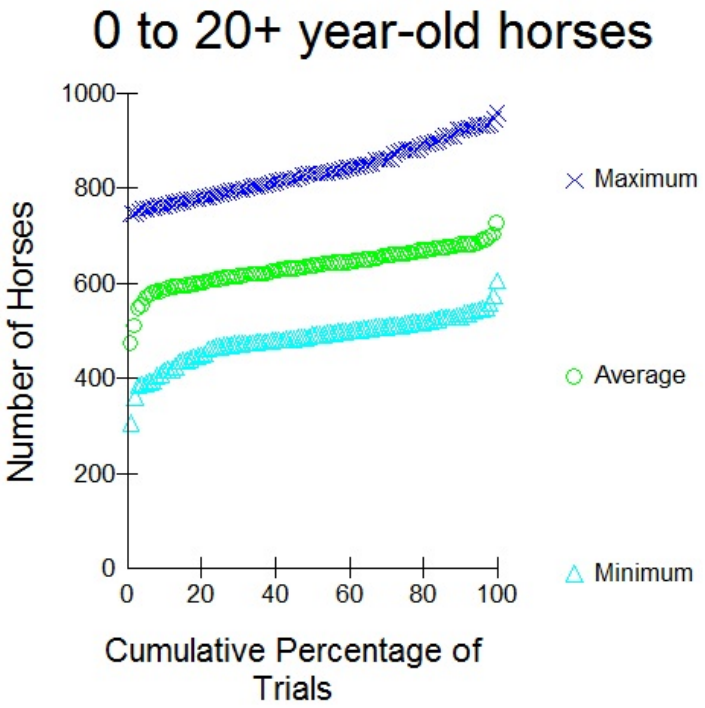
**<u>Alternative A:</u>– Removal of Excess Animals to the Lower Limit of AML range (415) with Fertility Control in Great Divide Basin HMA.**

The parameters for the population modeling were:

1-12. The same as parameters listed above.

14. Yes, treat all mares released with fertility control.

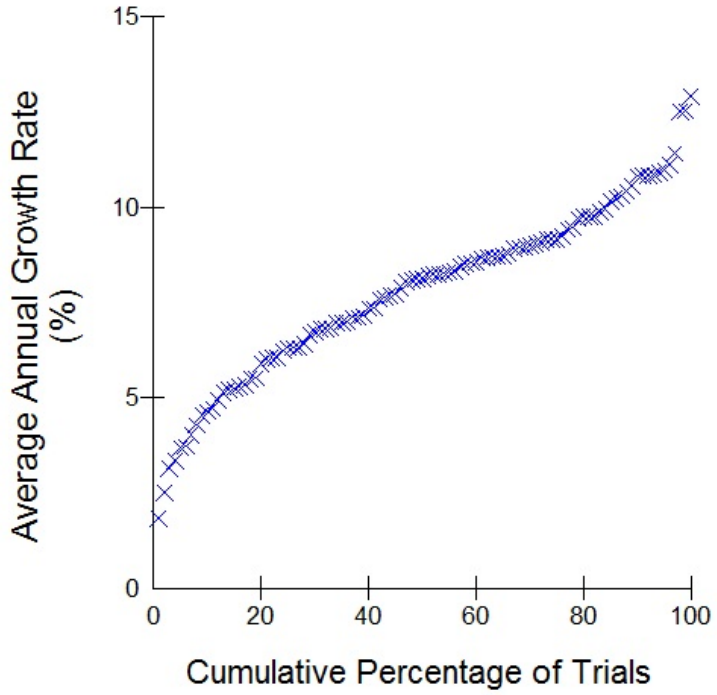
***Population Size and Modeling Graph and Table (Gather and Fertility Control)***




| POPULATION SIZES IN 11 YEARS* | | | |
|---|---|---|---|
| | MINIMUM | AVERAGE | MAXIMUM |
| Lowest Trial | 307 | 472 | 747 |
| 10th Percentile | 416 | 586 | 765 |
| 25th Percentile | 468 | 609 | 790 |
| Median Trial | 491 | 636 | 832 |
| 75th Percentile | 514 | 661 | 882 |
| 90th Percentile | 533 | 680 | 924 |
| Highest Trial | 605 | 726 | 958 |

* 0 to 20+ year-old horses

***Growth Rate Modeling Graph and Table (Gather and Fertility Control)***



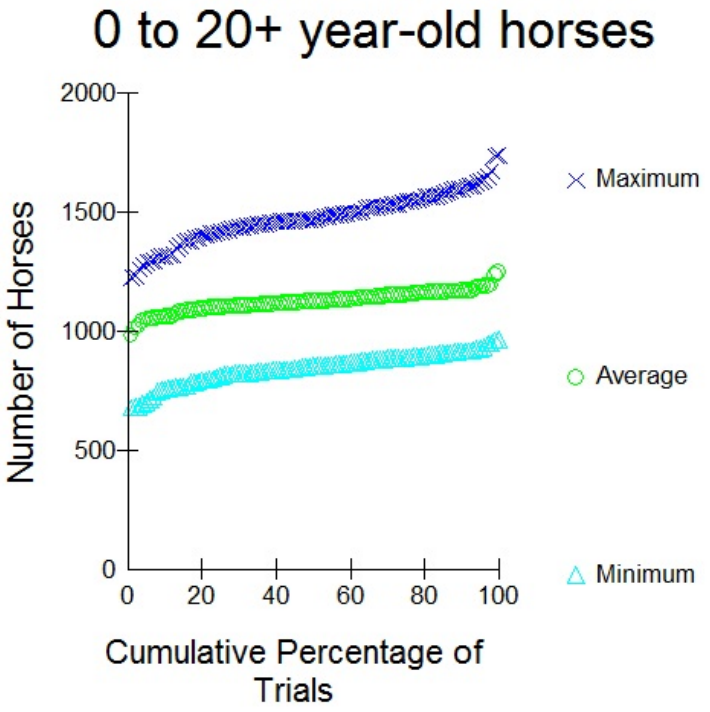

| AVERAGE GROWTH RATE IN 10 YEARS | |
|---|---|
| Lowest Trial | 1.8% |
| 10th Percentile | 4.7% |
| 25th Percentile | 6.3% |
| Median Trial | 8.2% |
| 75th Percentile | 9.2% |
| 90th Percentile | 10.8% |
| Highest Trial | 12.9% |

**Results:**

**<u>Alternative B</u> – Removal of Excess Animals to the Lower Limit of AML range (610) with No Fertility Control in the Adobe Town HMA.**

The parameters for the population modeling were:
1-10. same as parameters listed above.
11. No, do not treat mares released with fertility control.

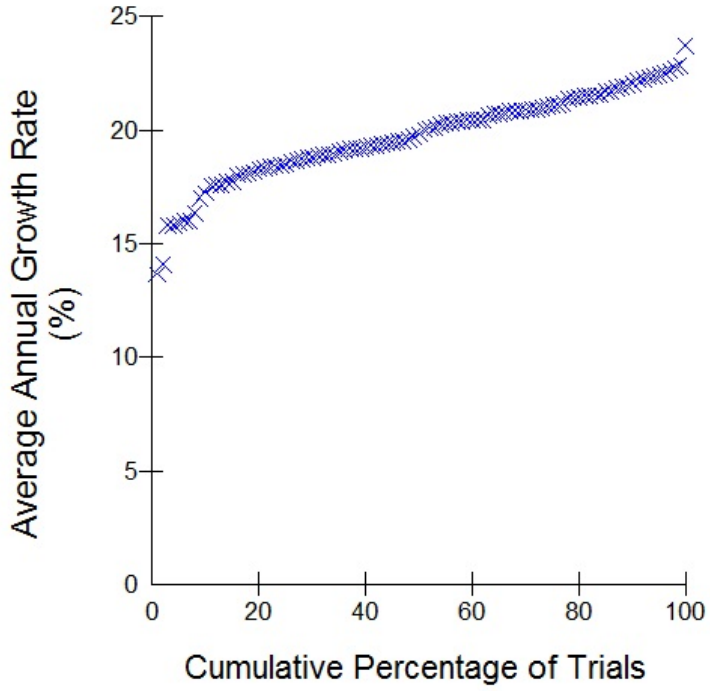
***Population Size and Modeling Graph and Table (Gather Only)***




| POPULATION SIZES IN 11 YEARS* | | | |
|---|---|---|---|
| | MINIMUM | AVERAGE | MAXIMUM |
| Lowest Trial | 679 | 980 | 1225 |
| 10th Percentile | 758 | 1062 | 1318 |
| 25th Percentile | 814 | 1099 | 1420 |
| Median Trial | 854 | 1125 | 1472 |
| 75th Percentile | 890 | 1153 | 1548 |
| 90th Percentile | 916 | 1169 | 1602 |
| Highest Trial | 965 | 1244 | 1740 |

* 0 to 20+ year-old horses

***Growth Rate Modeling Graph and Table (Gather Only)***



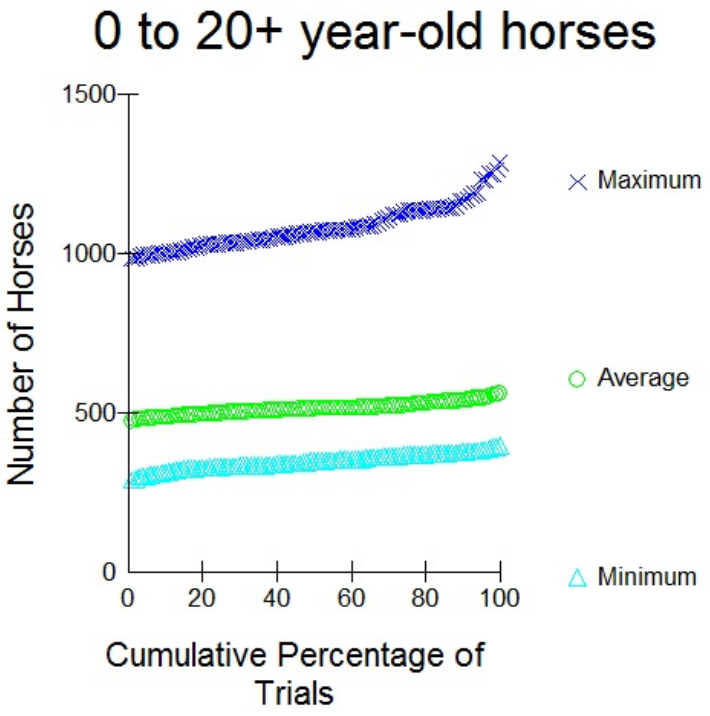

| AVERAGE GROWTH RATE IN 10 YEARS | |
|---|---|
| Lowest Trial | 13.7% |
| 10th Percentile | 17.4% |
| 25th Percentile | 18.6% |
| Median Trial | 19.9% |
| 75th Percentile | 21.1% |
| 90th Percentile | 22.1% |
| Highest Trial | 23.7% |

**Results:**

**<u>Alternative B</u> – Removal of Excess Animals to the Lower Limit of AML range (251) with No Fertility Control in the Salt Wells Creek HMA.**

The parameters for the population modeling were:
1-10. same as parameters listed above.
11. No, do not treat mares released with fertility control.

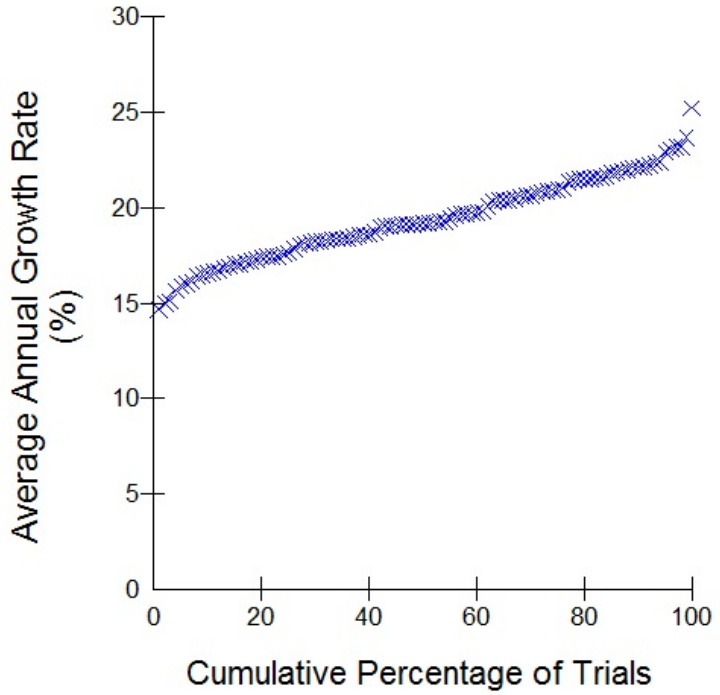
***Population Size and Modeling Graph and Table (Gather Only)***




| POPULATION SIZES IN 11 YEARS* | | | |
|---|---|---|---|
| | **MINIMUM** | **AVERAGE** | **MAXIMUM** |
| Lowest Trial | 289 | 473 | 984 |
| 10th Percentile | 314 | 486 | 1004 |
| 25th Percentile | 330 | 500 | 1034 |
| Median Trial | 348 | 513 | 1069 |
| 75th Percentile | 367 | 524 | 1135 |
| 90th Percentile | 378 | 539 | 1170 |
| Highest Trial | 398 | 560 | 1284 |

* 0 to 20+ year-old horses

**Growth Rate Modeling Graph and Table (Gather Only)**



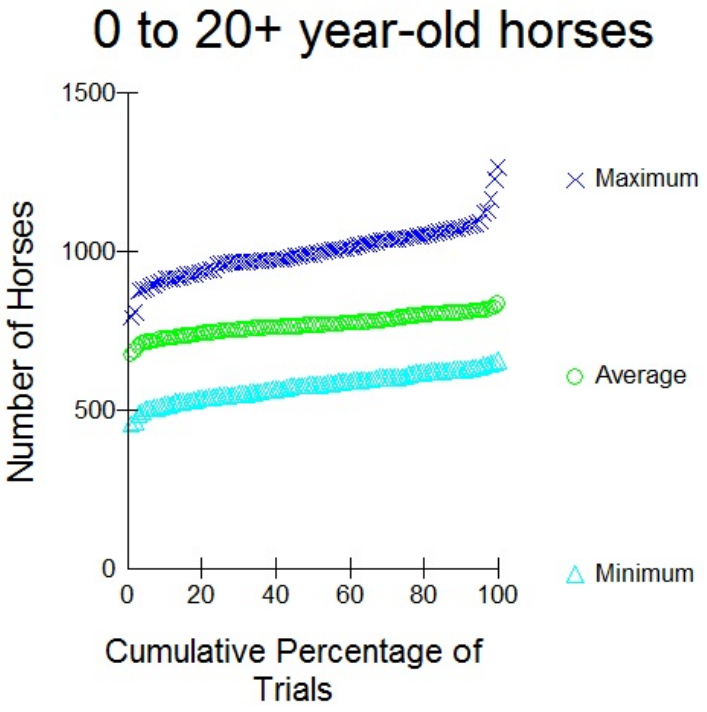

| AVERAGE GROWTH RATE IN 10 YEARS | |
|---|---|
| Lowest Trial | 14.7 |
| 10th Percentile | 16.7 |
| 25th Percentile | 17.8 |
| Median Trial | 19.2 |
| 75th Percentile | 21.0 |
| 90th Percentile | 22.1 |
| Highest Trial | 25.2 |

**Results:**

**<u>Alternative B</u> – Removal of Excess Animals to the Lower Limit of AML range (415) with No Fertility Control in the Great Divide Basin HMA.**

The parameters for the population modeling were:
1-10. same as parameters listed above.
11. No, do not treat mares released with fertility control.

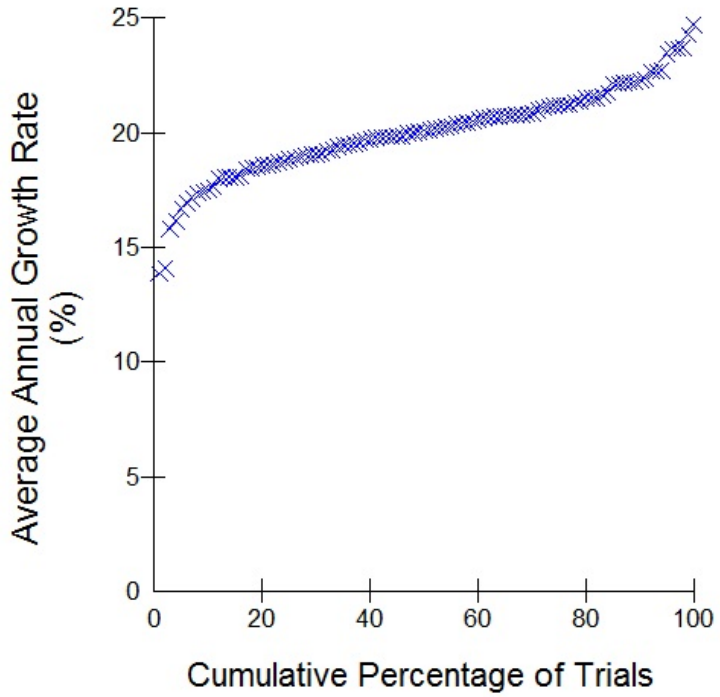
***Population Size and Modeling Graph and Table (Gather Only)***




| POPULATION SIZES IN 11 YEARS* | | | |
|---|---|---|---|
| | MINIMUM | AVERAGE | MAXIMUM |
| Lowest Trial | 457 | 673 | 793 |
| 10th Percentile | 518 | 724 | 914 |
| 25th Percentile | 546 | 748 | 962 |
| Median Trial | 580 | 766 | 996 |
| 75th Percentile | 610 | 792 | 1046 |
| 90th Percentile | 627 | 806 | 1078 |
| Highest Trial | 655 | 833 | 1265 |

* 0 to 20+ year-old horses

**Growth Rate Modeling Graph and Table (Gather Only)**



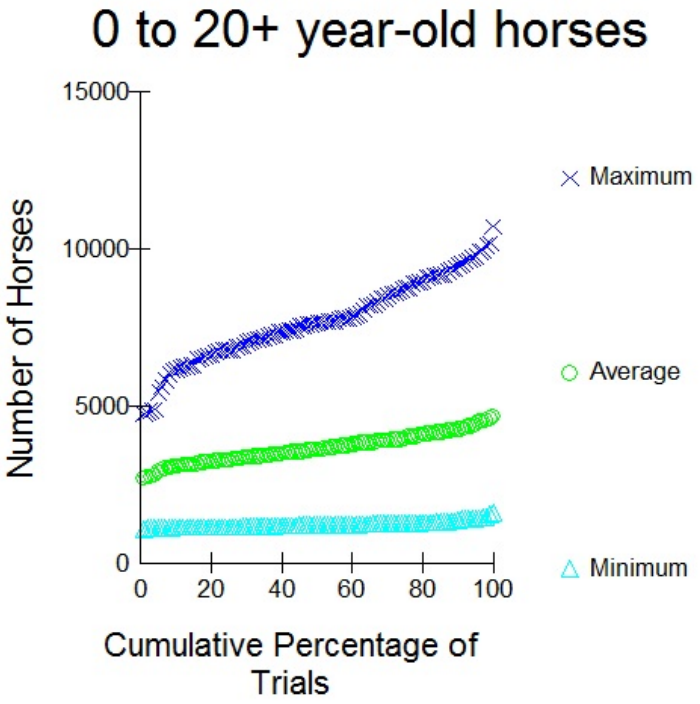

| AVERAGE GROWTH RATE IN 10 YEARS | |
|---|---|
| Lowest Trial | 13.9 |
| 10th Percentile | 17.6 |
| 25th Percentile | 18.9 |
| Median Trial | 20.1 |
| 75th Percentile | 21.2 |
| 90th Percentile | 22.3 |
| Highest Trial | 24.7 |

**Results:**

**<u>Alternative C</u> – No Action Alternative – No Gather or Removal in the Adobe Town HMA.**

The parameters for the population modeling were:
Do not gather in 2017
Foals are not included in AML
Percent to gather 0

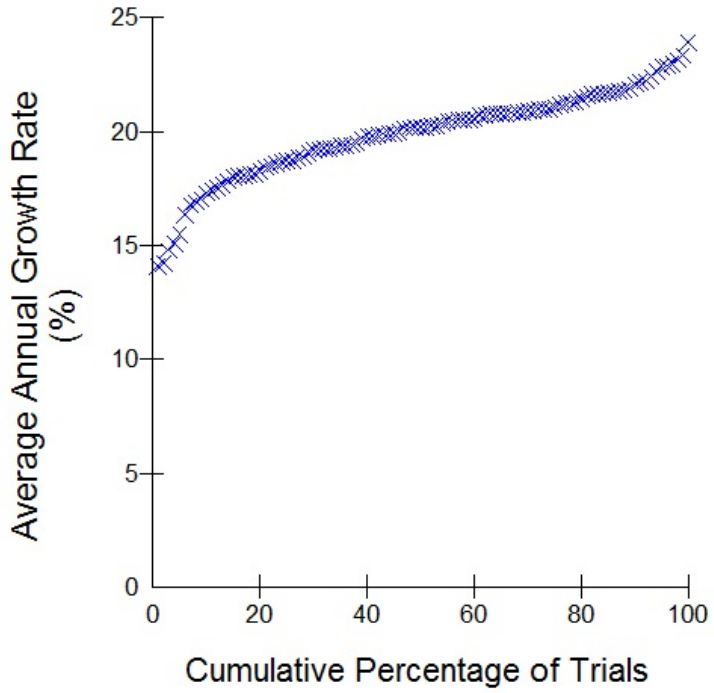
***Population Size Modeling Graph and Table (No Action)***




| POPULATION SIZES IN 11 YEARS* | | | |
|---|---|---|---|
| | **MINIMUM** | **AVERAGE** | **MAXIMUM** |
| Lowest Trial | 1077 | 2705 | 4762 |
| 10th Percentile | 1152 | 3077 | 6215 |
| 25th Percentile | 1168 | 3289 | 6805 |
| Median Trial | 1232 | 3605 | 7670 |
| 75th Percentile | 1284 | 3974 | 8776 |
| 90th Percentile | 1392 | 4260 | 9514 |
| Highest Trial | 1610 | 4665 | 10707 |

* 0 to 20+ year-old horses

***Growth Rate Modeling Graph and Table (No Action)***



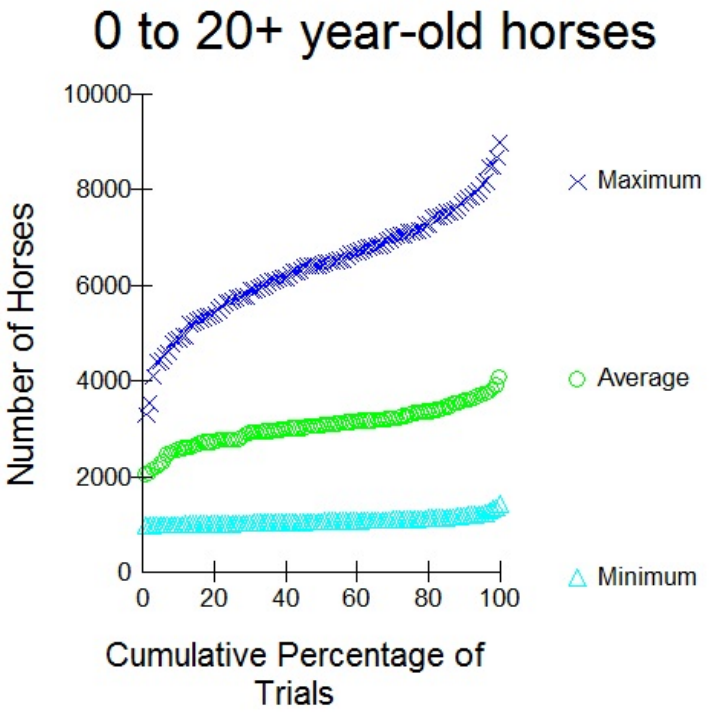

| AVERAGE GROWTH RATE IN 10 YEARS | |
|---|---|
| Lowest Trial | 14.4 |
| 10th Percentile | 17.4 |
| 25th Percentile | 18.8 |
| Median Trial | 20.2 |
| 75th Percentile | 21.2 |
| 90th Percentile | 22.2 |
| Highest Trial | 23.9 |

**Results:**

**<u>Alternative C</u> – No Action Alternative – No Gather or Removal in the Salt Wells Creek HMA.**

The parameters for the population modeling were:
Do not gather in 2017
Foals are not included in AML
Percent to gather 0

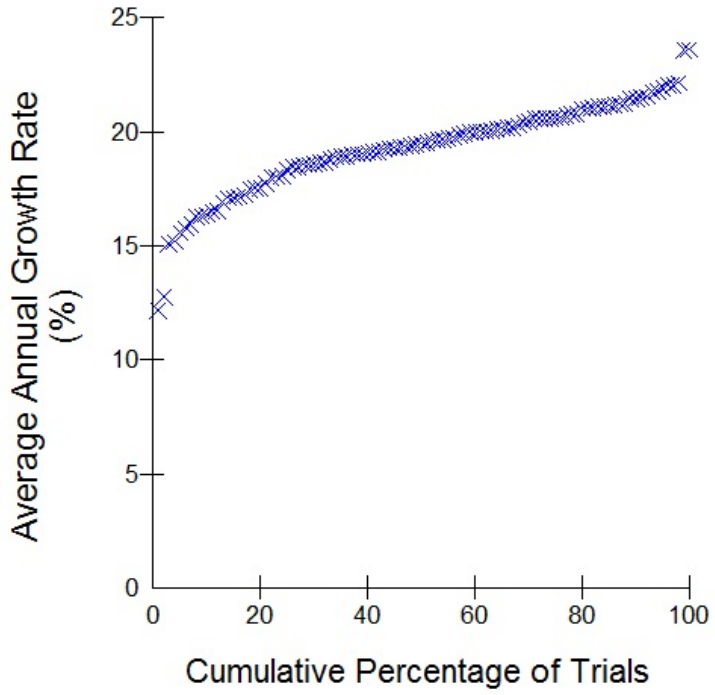
***Population Size Modeling Graph and Table (No Action)***




| POPULATION SIZES IN 11 YEARS* | | | |
|---|---|---|---|
| | MINIMUM | AVERAGE | MAXIMUM |
| Lowest Trial | 979 | 2040 | 3303 |
| 10th Percentile | 999 | 2566 | 4916 |
| 25th Percentile | 1028 | 2762 | 5724 |
| Median Trial | 1068 | 3062 | 6468 |
| 75th Percentile | 1119 | 3305 | 7130 |
| 90th Percentile | 1191 | 3592 | 7814 |
| Highest Trial | 1429 | 4069 | 8982 |

* 0 to 20+ year-old horses

***Growth Rate Modeling Graph and Table (No Action)***




| AVERAGE GROWTH RATE IN 10 YEARS | |
|---|---|
| Lowest Trial | 12.2 |
| 10th Percentile | 16.5 |
| 25th Percentile | 18.4 |
| Median Trial | 19.5 |
| 75th Percentile | 20.6 |
| 90th Percentile | 21.5 |
| Highest Trial | 23.6 |

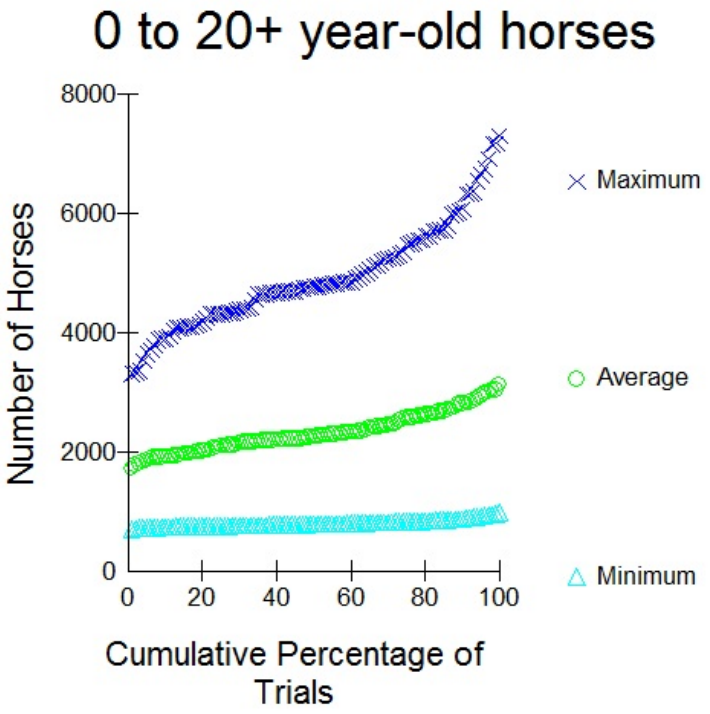
**Results:**

**<u>Alternative C</u> – No Action Alternative – No Gather or Removal in the Great Divide Basin HMA.**

The parameters for the population modeling were:
Do not gather in 2017
Foals are not included in AML [Grab your reader's attention with a great quote from the document or use this space to emphasize a key point. To place this text box anywhere on the page, just drag it.]

Percent to gather 0

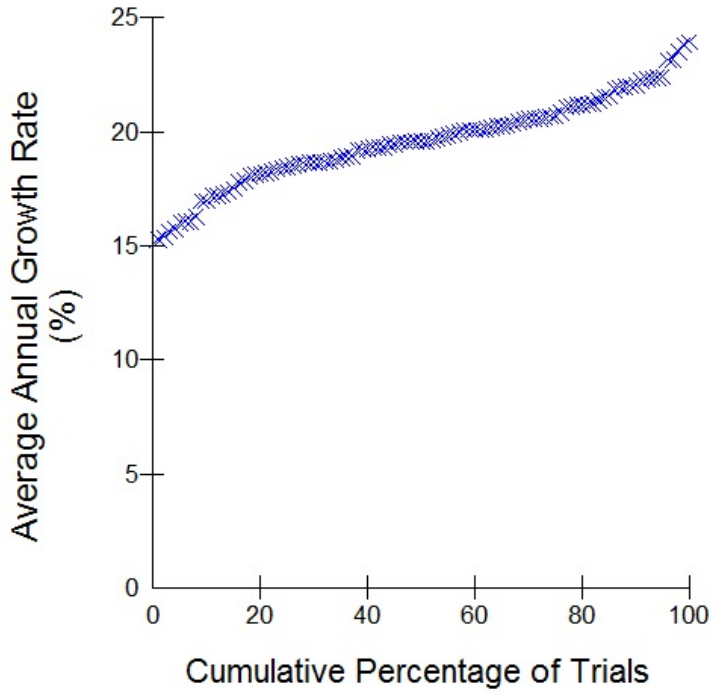
***Population Size Modeling Graph and Table (No Action)***




| POPULATION SIZES IN 11 YEARS* | | | |
|---|---|---|---|
| | MINIMUM | AVERAGE | MAXIMUM |
| Lowest Trial | 715 | 1718 | 3324 |
| 10th Percentile | 747 | 1924 | 3926 |
| 25th Percentile | 764 | 2100 | 4323 |
| Median Trial | 794 | 2261 | 4780 |
| 75th Percentile | 837 | 2573 | 5489 |
| 90th Percentile | 890 | 2815 | 6196 |
| Highest Trial | 986 | 3132 | 7298 |

* 0 to 20+ year-old horses

***Growth Rate Modeling Graph and Table (No Action)***




| AVERAGE GROWTH RATE IN 10 YEARS | |
|---|---|
| Lowest Trial | 15.3 |
| 10th Percentile | 17.1 |
| 25th Percentile | 18.5 |
| Median Trial | 19.6 |
| 75th Percentile | 20.8 |
| 90th Percentile | 22.2 |
| Highest Trial | 24.0 |

# Appendix V
# Livestock Grazing Allotments and Status within the Adobe Town, Salt Wells Creek, and Great Divide Basin HMAs

| Allotment Name | Allotment Number | Number of Operators | Active AUMs | Year | Billed AUMs | % Used | Livestock Type | Season of Use | Land Health Determination Date | Land Health Standard(s) Not Achieved in the Allotment and Significant Causal Factor(s) Identified | FO & HMA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Circle Springs | 04001 | 1 | 946 | 2016 | 333 | 35% | Cattle/ Sheep | Year-long | 11/5/2012 | All standards are met | RSFO |
| | | | | 2015 | 413 | 44% | | | | | |
| | | | | 2014 | 66 | 7% | | | | | |
| | | | | 2013 | 280 | 30% | | | | | |
| | | | | 2012 | 364 | 38% | | | | | |
| | | | | 2011 | 431 | 46% | | | | | SW |
| | | | | 2010 | 445 | 47% | | | | | |
| | | | | 2009 | 412 | 44% | | | | | |
| | | | | 2008 | 487 | 51% | | | | | |
| | | | | | | | | | | | |
| Rife | 04002 | 1 | 508 | 2016 | 508 | 100% | Cattle | Summer | 07/12/2002 | All standards are met | RSFO |
| | | | | 2015 | 508 | 100% | | | | | SW |
| | | | | 2014 | 508 | 100% | | | | | |
| | | | | 2013 | 415 | 82% | | | | | |
| | | | | 2012 | 508 | 100% | | | | | |
| | | | | 2011 | 508 | 100% | | | | | |
| | | | | 2010 | 508 | 100% | | | | | |
| | | | | 2009 | 508 | 100% | | | | | |
| | | | | 2008 | 426 | 84% | | | | | |
| | | | | | | | | | | | |

| Allotment Name | Allotment Number | Number of Operators | Active AUMs | Year | Billed AUMs | % Used | Livestock Type | Season of Use | Land Health Determination Date | Land Health Standard(s) Not Achieved in the Allotment and Significant Causal Factor(s) Identified | FO & HMA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Vermillion Creek | 04003 | 4 | 12,140 | 2016 | 4,896 | 40% | Cattle/ Sheep | Fall/Winter/ Spring | 02/19/2004 | Riparian/Wetland Standard - Irrigation return flows from deeded hay meadows is identified as source of excess sediment and 1° risk factor to lower Vermillion Creek. | RSFO |
| | | | | 2015 | 5,622 | 46% | | | | | SW |
| | | | | 2014 | 4,567 | 38% | | | | | |
| | | | | 2013 | 2,380 | 20% | | | | | |
| | | | | 2012 | 5,919 | 49% | | | | | |
| | | | | 2011 | 6,100 | 50% | | | | | |
| | | | | 2010 | 5,181 | 43% | | | | | |
| | | | | 2009 | 5,222 | 43% | | | | | |
| | | | | 2008 | 4,544 | 37% | | | | | |
| | | | | | | | | | | | |
| Alkali Creek | 04004 | 2 | 2,283 | 2016 | 1,342 | 59% | Cattle/ Sheep | Fall/Winter/ Spring | 11/17/2014 | All standards are met | RSFO |
| | | | | 2015 | 1,822 | 80% | | | | | SW |
| | | | | 2014 | 759 | 33% | | | | | |
| | | | | 2013 | 1,042 | 46% | | | | | |
| | | | | 2012 | 1,564 | 69% | | | | | |
| | | | | 2011 | 1,588 | 70% | | | | | |
| | | | | 2010 | 1,590 | 70% | | | | | |
| | | | | 2009 | 1,596 | 70% | | | | | |
| | | | | 2008 | 1,649 | 72% | | | | | |
| | | | | | | | | | | | |
| Pine Mountain | 04007 | 3 | 7,763 | 2016 | 4,689 | 60% | Cattle/ Sheep | Year-long | 11/04/1998 | Soils - Riparian/Wetland Standard -- Current Livestock Management. | RSFO |
| | | | | 2015 | 3,879 | 50% | | | | | |
| | | | | 2014 | 3,144 | 40% | | | | | |
| | | | | 2013 | 3,681 | 47% | | | | | |
| | | | | 2012 | 5,094 | 66% | | | | | |

| Allotment Name | Allotment Number | Number of Operators | Active AUMs | Year | Billed AUMs | % Used | Livestock Type | Season of Use | Land Health Determination Date | Land Health Standard(s) Not Achieved in the Allotment and Significant Causal Factor(s) Identified | FO & HMA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2011 | 5,379 | 69% | | | | | |
| | | | | 2010 | 5,298 | 68% | | | | | |
| | | | | 2009 | 4,474 | 58% | | | | | |
| | | | | 2008 | 3,646 | 47% | | | | | |
| | | | | | | | | | | | |

| Allotment Name | Allotment Number | Number of Operators | Active AUMs | Year | Billed AUMs | % Used | Livestock Type | Season of Use | Land Health Determination Date | Land Health Standard(s) Not Achieved in the Allotment and Significant Causal Factor(s) Identified | FO & HMA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Salt Wells | 04009 | 2 | 2,618 | 2016 | 2,616 | 100% | Cattle | Summer | 1/19/2010 | Riparian/Wetland Standard - Lack of diversity in woody vegetation age-class distribution, excessive sedimentation, channel incision, lack of sinuosity, inadequate riparian vegetation, head cuts, and historic livestock grazing. | RSFO |
| | | | | 2015 | 2,502 | 96% | | | | | SW |
| | | | | 2014 | 2,401 | 92% | | | | | |
| | | | | 2013 | 1,925 | 74% | | | | | |
| | | | | 2012 | 577 | 22% | | | | | |
| | | | | 2011 | 341 | 13% | | | | | |
| | | | | 2010 | 538 | 21% | | | | | |
| | | | | 2009 | 513 | 20% | | | | | |
| | | | | 2008 | 281 | 11% | | | | | |
| | | | | | | | | | | | |
| Mellor Mountain | 04027 | 2 | 6,101 | 2016 | 1959 | 32% | Cattle/ Sheep | Year-long | 10/01/2002 | Riparian/Wetland Standard - Offsite (state/private lands, county roads) impacts are the primary cause and continuing channel re-adjustment is also a causative agent. | RSFO |
| | | | | 2015 | 1389 | 23% | | | | | SW |
| | | | | 2014 | 119 | 2% | | | | | |
| | | | | 2013 | 416 | 7% | | | | | |
| | | | | 2012 | 1,102 | 18% | | | | | |
| | | | | 2011 | 1,386 | 23% | | | | | |
| | | | | 2010 | 1,258 | 21% | | | | | |
| | | | | 2009 | 1,440 | 24% | | | | | |
| | | | | 2008 | 1,845 | 30% | | | | | |

| Allotment Name | Allotment Number | Number of Operators | Active AUMs | Year | Billed AUMs | % Used | Livestock Type | Season of Use | Land Health Determination Date | Land Health Standard(s) Not Achieved in the Allotment and Significant Causal Factor(s) Identified | FO & HMA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |
| Hiawatha Tridistrict | 04300 | 1 | 5,602 | 2016 | 1,959 | 35% | Sheep | Fall/Winter/ Spring | 07/06/2004 | Files located in Little Snake Field Office. | LSFO |
| (50% acres-LSFO: Admin Office; 39% acres-RSFO: combined with Crooked Wash Allotment; 11%-RFO: combined with Maneotis-RS Allotment) | | | | 2015 | 1,389 | 25% | | | | | RSFO |
| | | | | 2014 | 119 | 2% | | | | | RFO |
| | | | | 2013 | 416 | 7% | | | | | |
| | | | | 2012 | 3,150 | 56% | | | | | |
| | | | | 2011 | 3,569 | 64% | | | | | |
| | | | | 2010 | 3,256 | 58% | | | | | |
| | | | | 2009 | 3,337 | 60% | | | | | SW |
| | | | | 2008 | 3,211 | 57% | | | | | |
| | | | | | | | | | | | |
| Canyon-Horseshoe | 04326 | 1 | 2,103 | 2016 | 402 | 19% | Cattle/ Sheep | Fall/Winter/ Spring | unknown | Files located in Little Snake Field Office. | LSFO |
| | | | | 2015 | 575 | 27% | | | | | RSFO |
| | | | | 2014 | 1,313 | 62% | | | | | |
| | | | | 2013 | 229 | 11% | | | | | |
| | | | | 2012 | 877 | 42% | | | | | |
| (71% acres-LSFO: Admin Office; | | 2 | | 2011 | 698 | 33% | | | | | |

| Allotment Name | Allotment Number | Number of Operators | Active AUMs | Year | Billed AUMs | % Used | Livestock Type | Season of Use | Land Health Determination Date | Land Health Standard(s) Not Achieved in the Allotment and Significant Causal Factor(s) Identified | FO & HMA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 29% acres-RSFO: combined with Horseshoe Wash Allotment) | | | | | | | | | | | |
| | | 2 | | 2010 | 1,265 | 60% | | | | | SW |
| | | 2 | | 2009 | 387 | 18% | | | | | |
| | | 2 | | 2008 | 0 | 0% | | | | | |
| | | | | | | | | | | | |
| Crooked Wash | 10510 | 1 | 87 | 2016 | 0 | 0% | Cattle | Summer | 07/06/2004 | Files located in Little Snake Field Office. | LSFO |
| | | | | 2015 | 37 | 42% | | | | | SW |
| | | | | 2014 | 74 | 85% | | | | | |
| | | | | 2013 | 74 | 85% | | | | | |
| | | | | 2012 | 86 | 99% | | | | | |
| | | | | 2011 | 92 | 106% | | | | | |
| | | | | 2010 | 108 | 124% | | | | | |
| | | | | 2009 | 66 | 76% | | | | | |
| | | | | 2008 | 86 | 98% | | | | | |
| | | | | | | | | | | | |

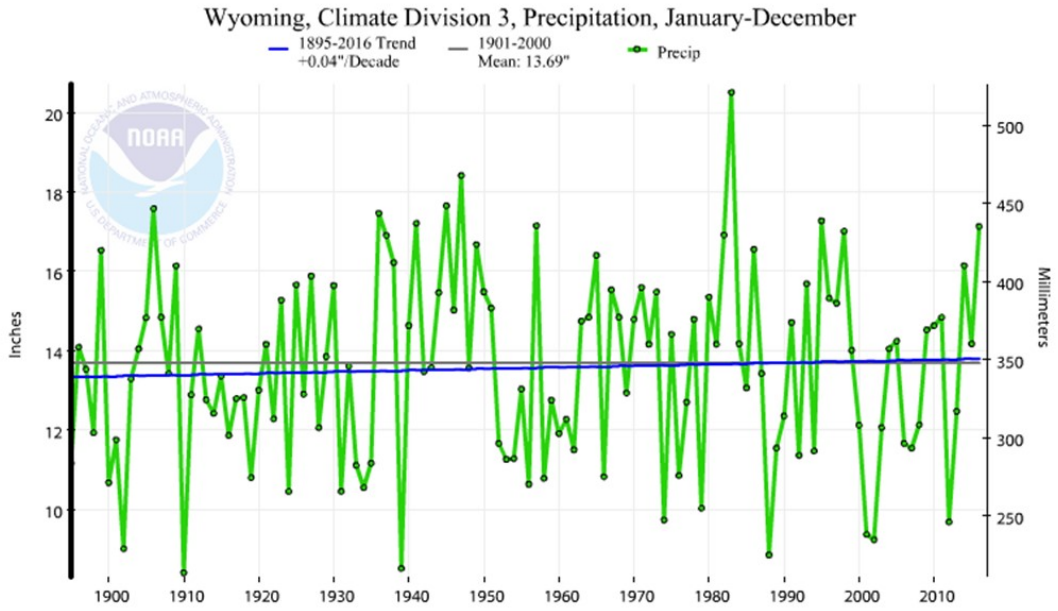
| Allotment Name | Allotment Number | Number of Operators | Active AUMs | Year | Billed AUMs | % Used | Livestock Type | Season of Use | Land Health Determination Date | Land Health Standard(s) Not Achieved in the Allotment and Significant Causal Factor(s) Identified | FO & HMA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Rock Springs | 13018 | 20 | 107,991 | 2016 | 36,801 | 34% | Cattle/ Sheep/ Horses (West of | Year-long | 08/15/2001 | Riparian/Wetland Standard - Livestock; land ownership (checkerboard); Industrial development; sewage treatment, mine de-watering, roads, irrigation diversion, non-native species, wildlife, wild horses, and mining (locatable, leasable and salable). | RSFO |
| | | | | 2015 | 35,445 | 33% | | | | | SW |
| | | | | 2014 | 35,309 | 33% | | | | | AT |
| | | | | 2013 | 36,539 | 34% | | | | | DB |
| | | | | 2012 | 42,358 | 39% | | | | | |
| | | | | 2011 | 46,694 | 43% | the Green River) | (Primarily winter use) | | | |
| | | | | 2010 | 47,300 | 44% | | | | | |
| | | | | 2009 | 47,857 | 44% | | | | | |
| | | | | 2008 | 47,091 | 44% | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Adobe Town | 10502 | 1 | 1,820 | 2016 | 30 | 2% | Cattle/ Sheep | Summer | 09/19/2012 | All standards are met | RFO |
| | | | | 2015 | 73 | 4% | | | | | AT |
| | | | | 2014 | 29 | 2% | | | | | |
| | | | | 2013 | 40 | 2% | | | | | |
| | | | | 2012 | 25 | 1% | | | | | |
| | | | | 2011 | 94 | 5% | | | | | |
| | | | | 2010 | 219 | 12% | | | | | |
| | | | | 2009 | 303 | 17% | | | | | |
| | | | | 2008 | 262 | 14% | | | | | |
| | | | | | | | | | | | |
| Continental | 10506 | 1 | 2,830 | 2016 | 0 | 0% | Cattle | Summer | 09/19/2012 | All standards are met | RFO |

| Allotment Name | Allotment Number | Number of Operators | Active AUMs | Year | Billed AUMs | % Used | Livestock Type | Season of Use | Land Health Determination Date | Land Health Standard(s) Not Achieved in the Allotment and Significant Causal Factor(s) Identified | FO & HMA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2015 | 1,526 | 54% | | | | | AT |
| | | | | 2014 | 1,156 | 41% | | | | | |
| | | | | 2013 | 1,227 | 43% | | | | | |
| | | | | 2012 | 1,554 | 55% | | | | | |
| | | | | 2011 | 1,895 | 67% | | | | | |
| | | | | 2010 | 1,645 | 58% | | | | | |
| | | | | 2009 | 1,440 | 51% | | | | | |
| | | | | 2008 | 1,605 | 57% | | | | | |
| | | | | | | | | | | | |
| Continental Peak | 13011 | 2 | 5,728 | 2015 | 2,716 | 47% | Cattle Sheep | 5/1-10/31 | 1999 | All Standards met except Standard 5 (unknown) and Standard 6 (unknown) | DB |
| | | | | 2014 | 2,075 | 36% | | | | | |
| | | | | 2013 | 2,315 | 40% | | | | | |
| | | | | 2012 | 3,277 | 57% | | | | | |
| | | | | 2011 | 3,053 | 53% | | | | | |
| | | | | 2010 | 2,884 | 50% | | | | | |
| | | | | 2009 | 2,884 | 50% | | | | | |
| | | | | 2008 | 2,646 | 46% | | | | | |
| | | | | | | | | | | | |
| Bush Rim | 13013 | 4 | 3,277 | 2015 | 367 | 11% | Cattle Sheep | 5/25-9/15 | 09/24/1999 | Standards Achieved | DB |
| | | | | 2014 | 367 | 11% | | | | | |
| | | | | 2013 | 926 | 28% | | | | | |
| | | | | 2012 | 367 | 11% | | | | | |
| | | | | 2011 | 367 | 11% | | | | | |
| | | | | 2010 | 367 | 11% | | | | | |
| | | | | 2009 | 367 | 11% | | | | | |
| | | | | 2008 | 0 | 0% | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Red Desert | 13012 | 3 | 9,758 | 2015 | 2,218 | 23% | Cattle Sheep | 5/1-12/15 | 9/24/1999 | Standards Achieved | DB |
| | | | | 2014 | 1,218 | 12% | | | | | |
| | | | | 2013 | 1,388 | 14% | | | | | |

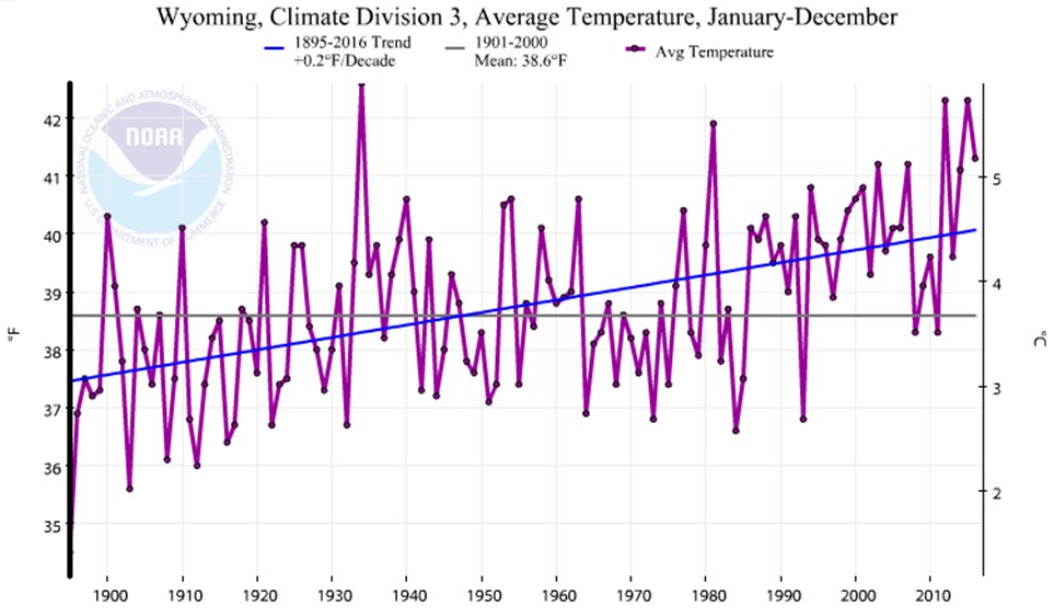
| Allotment Name | Allotment Number | Number of Operators | Active AUMs | Year | Billed AUMs | % Used | Livestock Type | Season of Use | Land Health Determination Date | Land Health Standard(s) Not Achieved in the Allotment and Significant Causal Factor(s) Identified | FO & HMA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2012 | 2,300 | 24% | | | | | |
| | | | | 2011 | 3,462 | 35% | | | | | |
| | | | | 2010 | 2,229 | 23% | | | | | |
| | | | | 2009 | 2,919 | 30% | | | | | |
| | | | | 2008 | 1,836 | 19% | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

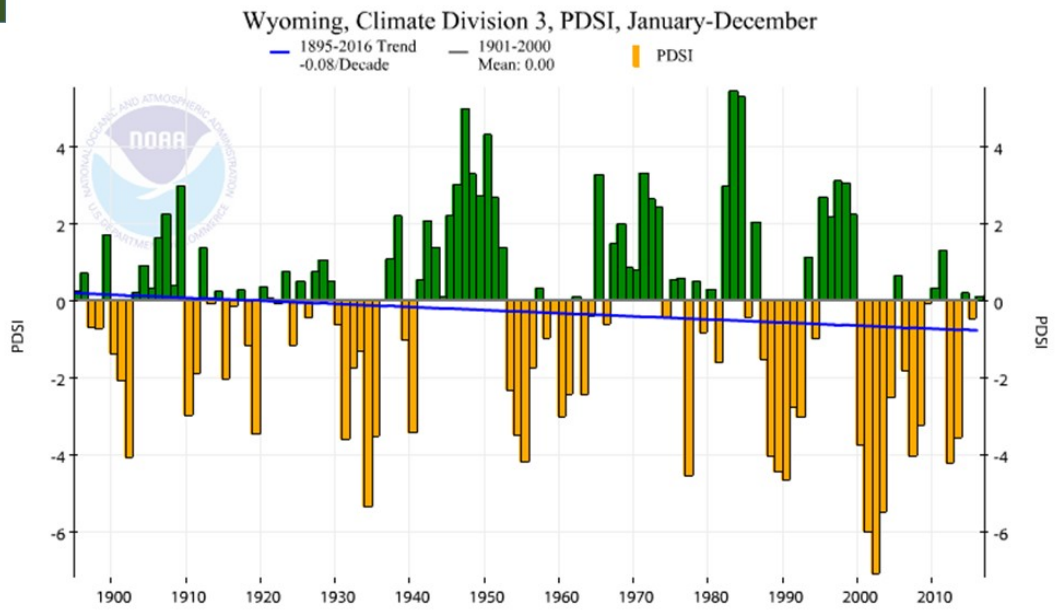
*After-the-Fact Billing (Actual Use)
**RFO-Estimated
RFO – Rawlins Field Office, Wyoming
RSFO – Rock Springs Field Office, Wyoming
LSFO – Little Snake Field Office, Colorado
AT – Adobe Town HMA
SW – Salt Wells Creek HMA
GDB- Great Divide Basin HMA

# Appendix VI
# Precipitation and Temperature Data






PDSI (Palmer Drought Severity Index)

Source: National Oceanic and Atmospheric Administration. 2017. National Climatic Data Center. Wyoming, Climate Division 3, Temperature, January-December 1895-2016. http://www.ncdc.noaa.gov/temp-and-precip/time-series/index.php?parameter=tmp&month=12&year=2012&filter=12&state=48&div=3. Accessed 5/3/2017.

# Appendix VII
# Adobe Town HMA Genetic Information

## I. Adobe Town HMA horses have mixed ancestry

Dr. Cothran's (2003, 2011) reports indicate that horses of Adobe Town have a mixed ancestry, including some component of Iberian ancestry along with other horse breeds. Several lines of evidence make clear that Iberian influence in the gene pool of this complex is present, but not prominent.

a) Coefficients of genetic similarity between sampled horses in the two years sampled did not consistently show a pattern of relatedness to New World or Old World Iberian breed ancestry that was statistically distinguishable from several other categories of horse ancestry. Table 3 in each of Cothran's (2003, 2011) analyses vary in the strength of association between Adobe Town horses and Iberian breeds, as measured by the value of Rogers' genetic similarity coefficient, *S*. In 2003 and 2010, the confidence intervals for *S* overlapped for Light and Racing breeds, Oriental and Arabian breeds, Old World Iberian breeds, New World Iberian breeds, North American Gaited breeds, Heavy Draft breeds, and True Pony breeds (Figure VII-1). Differences in the absolute values for similarity between 2003 and 2010 can be partly explained by the change in which markers were used for the analysis: blood and biochemical markers in 2003, microsatellite markers in 2010.

**Figure 1**

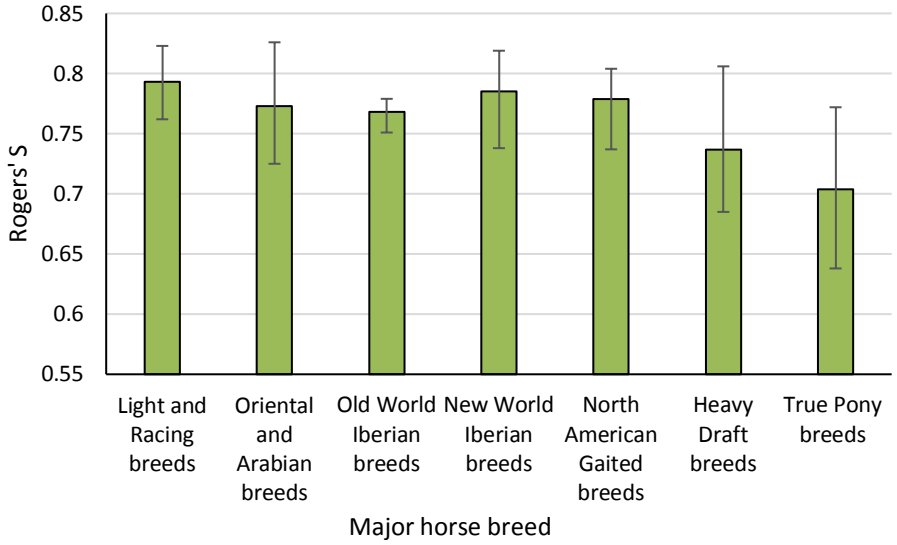



Figure VII-1. Coefficient of genetic similarity (Rogers' S) between sampled Adobe Town horses in 2003 and 2010, and various major horse breed types. Error bars indicate upper and lower confidence intervals. In each year, error bars for the measure of similarity between sampled Adobe Town horses overlap for many major breed types, indicating a lack of statistically significant difference.

b) In trees of relatedness, Adobe Town horses did not nest consistently with particular breed types. More specifically, the following results suggest that the strength of the association between Adobe Town horses and New World Iberian ancestry may have depended on the particular sample of horses in various years. In 2003, the 25 horses sampled from Adobe Town were most closely associated with the Tennessee walker (Cothran 2003; Figure 1). The 105 samples from 2010 clustered within a group of breeds associated with new world Iberian ancestry (Cothran 2010; Figure 1).

c) In a more recent analysis of 68 domestic breeds and samples from 44 feral herds in North America, horse herds from Adobe Town clustered as closely to many breeds associated with North American and Northern European ancestry as to breeds associated with New World Iberian ancestry, such as Criollos (Cothran and McCrory 2014).

**II. Current diversity is high, and loss of genetic diversity due to gather is expected to be low**

Both recent reports from Cothran (2003, 2011) indicate that horses in the Adobe Town HMA had high levels of genetic variation, as measured by allelic diversity. Heterozygosity (Ho) levels depended on the sample; Ho was above the feral herd average in both samples.

It is expected that heterozygosity (one measure of genetic diversity) will be lost from a population at a rate described by the following equation, where $H_1$ is the expected heterozygosity one generation into the future, $H_0$ is the current level of heterozygosity, and $N_e$ is the genetic effective population size.

$H_1 = (1\text{-}1/2N_e)H_0$

For example, if $N_e$ is 100, then a population can be expected to lose 0.5% of its heterozygosity per generation. Generation time can be approximated as half of the lifespan, or about 10 years for horses. Effective genetic population size can be estimated by the following formula, where $N_m$ is the number of breeding males and $N_f$ is the number of breeding females.

$N_e = 4N_mN_f/(N_m + N_f)$

For example, in a population with 50 breeding males and 100 breeding females, $N_e$ would be 133 horses.

Under Alternatives A and B, the number of horses on the Adobe Town HMA is expected to be approximately 300 or more males and 300 or more females. BLM recognizes that not all of these animals will necessarily breed, particularly the males. Nonetheless, based on the above equations, the per-generation expected loss of genetic diversity as a result of this gather is expected to be small: less than 1.5% per generation. This will be true even if, under Alternative A, some small fraction of PZP-treated mares becomes infertile for the long term, which is unlikely from a single dose of PZP-22. Moreover, the population is expected to increase in size somewhat after the gather, due to reproduction, such that the number of breeding individuals will increase, with correspondingly lower loss of genetic diversity. As a result, the proposed gather would not be expected to cause any substantial loss of genetic diversity.

**III. On the whole, similarity coefficient for New World Iberian has not changed substantially, relative to similarity coefficients for other major breed types**

The following discussion helps to answer the question, "Is there evidence of a decline over time in the relative contribution of New World Iberian ancestry, as measured in sampled horses in 2003 and 2010?" An examination of the ratios of sampled horses' Rogers similarity coefficient for New World Iberian breed type in the numerator, and the Rogers similarity coefficient for other major breed types in the denominator indicate that there has not been a change in the relative contribution of New World Iberian genetic material in sampled horses over time.

As shown in figure VII-1, the Rogers similarity coefficients are not constant for sampled horses in the two sampled years. Some of this variation can be explained by changes in the markers used for analysis, some can be explained by imprecision in the estimates due to the sampled animals, and some may or may not be due to change in relative contributions of different major breed types over time. Confidence intervals around each of the estimated coefficient values reflect uncertainty in the specific coefficient estimates. It may appear at first glance that the similarity between sampled horses and the various breed types decreased between 2003 and 2010. However, the genetic loci used for the analysis of similarity in 2003 were blood markers and biochemical markers ('allozymes'), whereas the genetic loci used in 2010 were variable nuclear tandem repeat markers ('microsatellites'). Because the same exact markers were not used for the similarity analysis in all years, measures of similarity to various major breed types may differ between 2003 and 2010, independent of any potential underlying changes in genetic diversity for the sampled population.

Despite apparent changes in the absolute value of Rogers similarity coefficients in the two years, one may ask what the ratio of Rogers similarity coefficients for two breed types is, within each sampled year. If the relative contribution of New World Iberian genetic material decreased from 2003 to 2010, then one would expect the relative ratio of the similarity coefficients to change. In mathematical terms this can be expressed as follows.

Define the symbol $R_{breed,year}$ as the Rogers similarity coefficient for a given major breed type and year. Cothran reported R values for seven major breed types (Light and Racing breeds, Oriental and Arabian breeds, Old World Iberian breeds, New World Iberian breeds, North American Gaited breeds, Heavy Draft breeds, and True Pony breeds). In each of his reports (Cothran (2003, 2010) included a measure of uncertainty for each of those measures, shown as 'Std,' the standard error of the estimate. Standard errors are a measure of precision, and can be used to estimate confidence intervals around a given estimate. Usually, standard errors are shown with the lower case sigma symbol 'σ,' where standard error for a given similarity coefficient could be subscripted by breed type and year. For example, the standard error for the similarity coefficient to New World Iberian (NWI) breed type in 2003 could be indicated as $\sigma_{NWI,2003}$.

Define the symbol '$z_{NWI,breed,year}$' as the ratio of Rogers similarity coefficient for New World Iberian breed types divided by the Rogers similarity coefficient for a different breed type, for a given year. For example, '$z_{NWI,LR,2003}$' as the ratio of the Rogers similarity coefficient of New World Iberian (NWI) breed types in 2003 in the numerator, divided by the Rogers similarity coefficient of Light and Racing (LR) breed types in 2003 in the denominator:

$$z_{NWI,LR,2003} = \frac{R_{NWI,2003}}{R_{LR,2003}}$$

If a sample of horses has equal levels of similarity to New World Iberian breed types as to the other breed type, then that ratio would one.

The confidence interval for the above ratio can be approximated using the Taylor method (also known as the delta method), based on the values of $R_{NWI,2003}$, $\sigma_{NWI,2003}$, $R_{LR,2003}$, and $\sigma_{LR,2003}$, and taking into account what critical t-value ($t_{crit}$) is desired to reflect acceptable levels of type I error rate (Franz 2007). Continuing with the same example, the upper and lower limits of the confidence interval would be defined by:

$$z_{NWI,LR,2003} \pm t_{crit} \sqrt{\frac{\sigma_{LR,2003}{}^2}{R_{LR,2003}{}^2} + \frac{\sigma_{NWI,2003}{}^2}{R_{NWI,2003}{}^2} - 2\frac{\sigma_{LR,2003} * \sigma_{NWI,2003}}{R_{LR,2003} * R_{NWI,2003}}}$$

The benefit of examining these ratios and their associated confidence intervals is that one may examine the relative contributions of New World Iberian breed type genetic markers, relative to various breed types. All ratios for Figure VII-2 were calculated by comparing similarity coefficients only within single years (2003 or 2010).

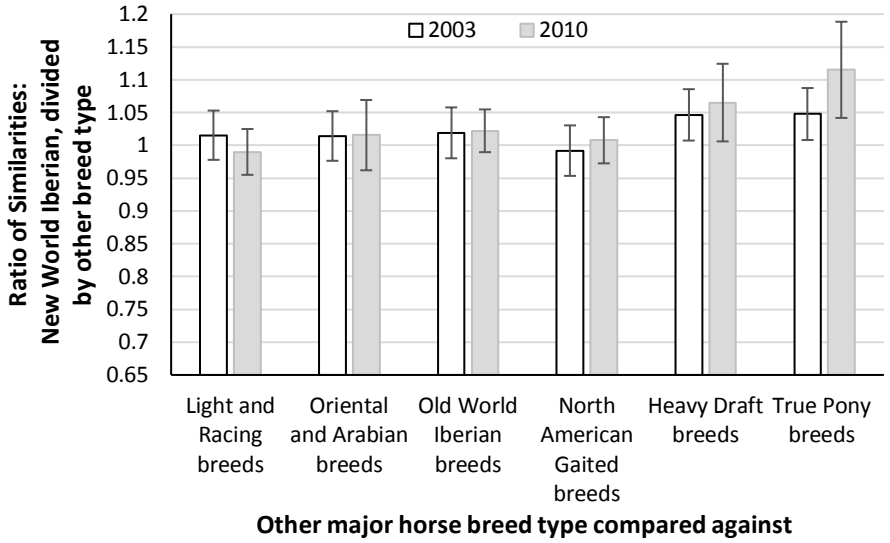



Figure VII-2. Ratios of Adobe Town genetic similarity coefficient (Rogers' S) for New World Iberian breed type, divided by genetic similarity coefficient for various other breed types. Values are based on Cothran (2003, 2011). Error bars indicate 80% upper and lower confidence intervals. For most major breed types, error bars for the ratios overlap over time, indicating a lack of statistically significant difference between sampling occasions.

Figure VII-2 reflects 80% confidence limits, which will always be narrower than the more typically analyzed 90% or 95% confidence intervals. Despite using only 80% confidence intervals, this measure of precision indicates that any apparent changes in the values of ratios did not change substantially over time. Statistically significant changes would typically be indicated by having non-overlapping confidence intervals. There appears to be no statistically meaningful change in the relative similarity of sampled horses to the New World Iberian, relative to any

other major breed type, in the two sampled years. The seeming increase in the relative similarity of New World Iberian breed types with respect to True Pony breed types is well within the confidence intervals, and so would not be statistically significantly different. One may conclude that the relative change of New World Iberian types with respect to all other major breed types did not appear to have any statistically significant decrease, based on the sampled individuals.

What does this analysis indicate about whether or not there has been a decline in the relative contribution of horses with New World Iberian genetic markers in the Adobe Town samples? The apparently statistically stationary values for the ratios of similarity coefficients for comparisons across most major breed types can be interpreted as an indication that the relative similarity of sampled Adobe Town horses to the New World Iberian breed types has not substantially changed over the 2003 and 2010 sampling intervals.

**Literature Cited in Appendix VII**

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# Appendix VIII
# Colonial Spanish Horse Type Matrix

D.P. Sponenberg, Chuck Reed

A matrix of characters can be used to effectively evaluate horses for their relative consistency with Spanish type conformation. All horses vary, as do all populations. This matrix scores a variety of conformational traits related to Colonial Spanish Horse type. A score near 1 for each trait is most consistent with an Iberian origin, those with a score near 5 are much less typical.

When evaluating individual horses it is possible for a non-Iberian horse to be fairly low-scoring. This is much less likely when entire populations are scored, so that it is recommended that the matrix be used on populations rather than on individual horses. Populations that have over 80% low-scoring horses are likely to be Iberian in origin, and those with over 90% low scoring horses are nearly always proven to have had an Iberian origin. Those with 50% or fewer Iberian type horses are unlikely to prove out to be Iberian in origin.

On every horse, however many of these characteristics that can be observed should be scored. Add up the total score, and then divide that total by the number of items scored. A score of 1 is a very typey horse, a score of 2 an acceptable horse, a score of 3 a marginal horse. Scores of 4 and 5 deviate significantly from Spanish type. In a population of purely Spanish origin the scores should cluster strongly in categories 1 and 2, with very few in 4 and none in 5.

| most typical – score 1 | not typical - score 5 |
|---|---|
| HEAD PROFILE | |
| either<br>1. concave/flat on forehead and then convex from top of nasal area to top of upper lip (subconvex)<br>2. uniformly slightly convex from poll to muzzle<br>3. straight | 1. dished as in Arabian.<br>2. markedly convex. |
| HEAD FROM FRONT VIEW | |
| Wide between eyes (cranial portion) but tapering and “chiseled” in nasal/facial portion. This is a very important indicator, and width between eyes with sculpted taper to fine muzzle is very typical. | Wide and fleshy throughout head from cranial portion to muzzle. |
| NOSTRILS | |
| Small, thin, and crescent-shaped. Flare larger when excited or exerting. | Large, round, and open at rest. |
| EARS | |
| Small to medium length, with distinctive notch or inward point at tips | Long, straight, with no inward point at tip. Thick, wide, or boxy. |
| EYES | |
| Vary from large to small (pig eyes). Usually fairly high on head | Large and bold, low on head. |
| MUZZLE PROFILE | |
| Refined, usually with the top lip longer than the bottom lip | coarse and thick with lower lip loose, large, and projecting beyond upper lip. |
| MUZZLE FRONT VIEW | |
| Fine taper down face to nostrils, slight outward flare, and then inward delicate curve to small, fine muzzle that is narrower than region between nostrils. | Coarse and rounded, or heavy and somewhat square as the Quarter Horses, rather than having the tapering curves of the typical muzzle. |
| NECK | |
| Wide from side, sometimes ewe-necked, attached low on chest | Thin, long, and set high on chest. |

| most typical – score 1 | not typical - score 5 |
|---|---|
| HEIGHT | |
| Usually 13.2 to 14.2 hands high. Horses over 15 hands are not typical | Under 13 hands or over 15 hands is not typical |
| WITHERS | |
| Pronounced and obvious. “sharp” | Low, thick, and meaty. |
| BACK | |
| Short, strong. | Long, weak, and plain. |
| CROUP PROFILE | |
| angled from top to tail. Usually a 30 degree slope, some are steeper | flat or high |
| TAIL SET | |
| Low, tail follows the croup angle so that tail “falls off” the croup. | High, tail up above the angle of the croup. |
| SHOULDER | |
| Should be long, and 45 to 55 degrees | Short, and steeper than 55 degrees |
| CHEST SIDE VIEW | |
| Deep, usually accounting for half of height | Shallow, less than half of height |
| CHEST FRONT VIEW | |
| Narrow, and “pointed” in an “A” shape. | Broad, with chest flat across. |
| CHESTNUTS | |
| Small, frequently absent on rear, and flat rather than thick | Large, and thick |
| COLOR | |
| Any color. In populations the black-based colors are relatively common. No bonus points for any color, no suspicion of impurity on any color | No color is penalized |
| REAR LIMBS FROM REAR VIEW | |
| Straight along whole length, or inward to have close hocks and then straight to ground (“close hocks”), or slightly turned out from hocks to ground (“cow hocks”) but not extreme. Legs very flexible. At trot the hind track often lands past the front track. | Excessive “cow hocks.” Heavy, bunchy gaskin muscle, tight tendons. |
| FEATHERING ON LEGS | |
| Absent to light fetlock feathering, though some have long silky hair above ergot and a “comb” of curled hair up back of cannon. Some horses from mountain areas have more feathering than typical of others, and lose this after moving to other environments. | Coarse, abundant feathering as is seen in some draft horse breeds. |
| REAR | |
| Contour from top of croup to gaskin has a “break” in line at the point of the butt. | Contour from top of croup to gaskin is full and round “apple butt” with no break at the point of the butt. |
| HIP FROM REAR | |
| Spine higher than hip, resulting in “rafter” hip. Usually no crease from heavy muscling | Thickly muscled with a distinct crease down the rear. |
| HIP FROM SIDE | |
| Long and sloping, well angled, and not heavy. | Short, poorly angled. |
| MUSCLING | |
| Long and tapered | Short and thick “bunchy” |
| FRONT CANNON BONES | |
| Cross-section is round. Best to palpate this below the splint bones. | Cross section is flat across the rear of the bone. |