# Environmental Assessment

## Red Desert Complex Herd Management Area Gather
## DOI-BLM-WY-030-EA15-63

BLM
Rawlins and Lander Field Offices, Wyoming

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**Mission Statement**

To sustain the health, diversity, and productivity of the public lands
for the use and enjoyment of present and future generations.

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## 1.0 INTRODUCTION

This Environmental Assessment (EA) has been prepared to analyze the Bureau of Land Management's (BLM) High Desert District, Rawlins Field Office (RFO), and Wind River – Big Horn Basin District, Lander Field Office (LFO), proposal to conduct a wild horse gather in the Lost Creek, Stewart Creek, Green Mountain, Crooks Mountain and Antelope Hills Herd Management Areas (HMAs) – collectively called Red Desert Complex. The "gather area" includes the five HMAs and areas outside of the HMAs where wild horses reside (See Map 1). These HMAs are analyzed as a Complex since the HMAs are adjacent, but not necessarily contiguous, and have animal interchange. The BLM has determined that excess wild horses are present in the Red Desert Complex. The terms "horse" and "wild horse" are used synonymously throughout this document.

The EA contains a site-specific analysis of potential impacts that could result from implementation of any one of three alternatives. It assists the BLM in project planning and ensuring compliance with the National Environmental Policy Act (NEPA), and in making a determination as to whether any "significant" impacts to the human environment could result from the analyzed actions. "Significance" is defined by NEPA and is found in regulation 40 CFR 1508.27. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of "Finding of No Significant Impact" (FONSI). If the decision maker determines that this project has "significant" impacts following the analysis in the EA, then an EIS would be prepared. If the decision maker determines that this project does not have "significant" impacts following the analysis, then an FONSI would be prepared. A Decision Record would then be signed for the EA approving one or a mixture of the alternatives presented in the EA.

The RFO and LFO are located in south central and central Wyoming, covering the eastern third of Sweetwater County, all of Carbon, Albany, Laramie, and Fremont County and portions of Hot Springs and Natrona Counties. The Complex is located in the Sweetwater, Carbon, Fremont and Natrona Counties west and south of Wyoming Highway 789/287 (See Map 1). The Complex encompasses about 753,000 acres of land. About 49,500 acres (about 6 percent) is privately or state owned. The Complex is characterized by gently rolling hills to steep mountainous terrain around Green Mountain and Crooks Mountain, to greasewood flats and sand dunes in the lower portions of Lost Creek and Stewart Creek. Annual precipitation ranges from 5 to 7 inches per year at the lower elevations and 15-20 inches for the upper elevations on Green Mountain and Crooks Mountain, most of which is received in the form of winter snows. This general discussion tiers to the affected environment that is discussed in the Approved Rawlins Resource Management Plan (RMP) (2008b) and in the Approved Lander RMP (2014a)

The definition of Appropriate Management Level (AML) (BLM 2010b) is the population range within which wild horses and burros (WH&B) can be managed for the long term. The AML upper limit is established as the maximum number of WH&B which results in a thriving natural ecological balance (TNEB) and avoids a deterioration of the range. The AML range for wild horses within the Complex is 480-724. This AML was established in the Approved Rawlins RMP (2008b) and in the Approved Lander RMP (2014a) following an in-depth analysis of habitat suitability, resource monitoring, and population inventory data, with public involvement.

Table 1 lists the AML for wild horses in the Red Desert Complex by HMA and grazing allotment. Establishing AML as a population range allows for the periodic removal of excess animals (to the low range) and subsequent population growth (to the high range) between removals.

The current estimated population of wild horses in the gather area is 2,620[1]. This estimate is based on the April 2015 aerial census flights using the double observer method and includes the addition of the 2015 and 2016 foal crop. For more information on the methods of this census and its results, see Appendix 6.

Based upon all information available, the BLM determined that approximately 2,140 excess wild horses exist within the gather area, which would need to be removed to maintain a TNEB, meet local and national wild horse program goals, and other program goals. This assessment is based on the following factors and BLM objectives including, but not limited to:

- Wild horse population double observer census estimates and distribution (Appendix 6).
- The Standards and Guidelines Rangeland Health Assessments (BLM 2003 and BLM 2013b).
- Range trend monitoring and results in areas without Rangeland Health Assessment.
- Actual use by livestock has varied from 10%-70% of authorized use, depending on water and available forage conditions.
- Consideration of preserving and maintaining Greater Sage-Grouse habitat, including Sagebrush Focal Areas.
- Slow horse population growth to maximize the time between gathers;
- Reduce the number of wild horses being placed
    - for adoption/sale; or
    - in short-term holding or long-term pastures;
- Maintain wild horse populations within AMLs; and
- Manage the HMAs to achieve and maintain a thriving natural ecological balance, and multiple-use relationship.
- Manage the HMA populations to preserve and enhance the historic physical and biological characteristics of the herd, including noted Iberian characteristics in the Lost Creek HMA.
- Maintain sex ratios and age structures, which would allow for the continued physical, reproductive, and genetic health of horses.
- Preserve and maintain a healthy and viable wild horse population that will survive and be successful during poor years when elements of the habitat are limiting due to severe winter conditions, drought, or other uncontrollable and unforeseeable environmental influences to the herd. Manage the HMA herds as self-sustaining populations of healthy animals in balance with other uses and the productive capacity of their habitat.

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[1] All wild horse numbers used in reference to current population, gather number, treatment number, etc., are approximate; based upon the 2015 aerial survey (Appendix 6) and adjusted for herd growth rate. This pertains throughout the document. The AML numbers are not approximate, as discussed in the preceding paragraph of the document.

**Table 1. AML by Allotment/HMA and Decision Record Date**

| HMA | Allotment | AML (low)-(high) | Decision Record Date |
|---|---|---|---|
| Stewart Creek | Stewart Creek (#10102) | 125-175 | 2008 |
| Lost Creek | Cyclone Rim (#10103) | 60-82 | 2008 |
| Antelope Hills | Antelope Hills (#17055), Cyclone Rim (#10103) | 60-82 | 2014 |
| Crooks Mountain | Arapahoe Creek (#17056), Alkali Creek Sheep (#17056) | 65-85 | 2014 |
| Green Mountain | Mountain (#32030), Arapahoe Creek (#17056), Whiskey Peak Common (#12003) | 170-300 | 2014 |
| Complex Total | | 480-724 | |

## 1.1 Purpose and Need

**Purpose:** The purpose of the Proposed Action is to address an overpopulation of wild horses within the Complex to achieve TNEB, alleviate deterioration of the rangeland, and to respond to requests to remove wild horses located outside the Complex in areas not designated for their long-term use.

**Need:** The need for the Proposed Action is to achieve and maintain populations within the established AMLs for each HMA (areas designated for their long-term management), to protect rangeland resources from deterioration associated with the current overpopulation, and to restore a TNEB and multiple use relationship on public lands in the Complex consistent with the provisions of 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 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). BLM's management of WH&B must comply with law and policy.

## 1.2 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 proposed action. The BLM's authorized officer will decide whether or not to gather, remove, treat, and release wild horses in the Red Desert Complex.

The decision to be made would not set or adjust AMLs, which were set through previous 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 planning-level decisions which have complied with NEPA requirements and provided opportunity for public review and input.

## 1.3 Scoping

Internal scoping by an interdisciplinary team identified issues of concern to be analyzed. Public comments on the various components of wild horse management on public lands in the Complex have been received throughout the last several years. On April 20th, 2015, the BLM issued a scoping letter for this proposed wild horse gather. In excess of 6,000 comment letters/emails were received from individuals, organizations, and agencies following the issuance of the Red Desert Complex Wild Horse Gather Plan Scoping Letter. These comments represented a wide range of views. The vast majority of 6,000 letters or emails were submitted as a form letter. All substantive comments were considered in the preparation of this EA (Appendix 8).

Resources considered, but not present or affected in such a manner as requiring site-specific analysis in this EA are identified in the Table below.

**Table 2. Resources considered and RMP references**

| Resource/Resource Use | Approved Rawlins RMP FEIS Reference | Approved Lander RMP FEIS Reference |
|---|---|---|
| Air Quality/Greenhouse Gas Emissions | 3-3 to 3-9 | 3.1.1 |
| Environmental Justice | 3-77 | 3.8.4 |
| Fire and Fuels Management | 3-18 to 3-20 | 3.3 |
| Forest Management | 3-21 to 3-23 | 3.4.1 |
| Hazardous Materials | Appendix 32 | 3.8.3 |
| Health and Safety | | 3.8.3 |
| Lands and Realty | 3-24 to 3-26 | 3.6-3.6.3 |
| Lands with Wilderness Characteristics | RMP ROD 1-3 | 3.1.6 |
| Minerals | 3-34 to 3-44 | 3.2 |
| Noise | | 3.4.9 |
| Off-Highway Vehicles | 3-45 to 3-47 | 3.6.4 |
| Paleontology | | 3.5.2 |
| Reclamation | 3-44; Appendix 36 | 3.1.3 |
| Socioeconomics | 3-59 to 3-76; Appendix 35 | 3.8.1, 3.8.2 |
| Special Designations and Management Areas | 3-86 to 3-98 | 3.7.1-3.7.3 |
| Transportation | 3-100; Appendix 21 | |
| Visual Resource Management | 3-120 to 3-122 | 3.5.3 |
| Water Resources/Quality (drinking/surface/ground) | 3-123 to 3-135; Appendix 11 | 3.1.4 |

## 2.0 ALTERNATIVES CONSIDERED

This section of the EA describes the alternatives, including any that were considered but eliminated from detailed analysis. Alternatives analyzed in detail include the following:

- Alternative 1: Remove all wild horses outside of HMA boundaries. Gather horses within the HMA boundaries and utilize fertility control treatments on mares to be released back to the HMA. Release treated mares and studs that were gathered within the HMA, back within the HMA boundaries.
- Alternative 2: Proposed Action: Remove all excess wild horses inside and outside of the HMA boundaries, remove to low AML, and utilize fertility control treatments on mares to be released back within the HMA boundaries.
- Alternative 3: No action--No gather or removal and no fertility control treatments.

### 2.1 Actions Common to Alternative 1 and Alternative 2: Proposed Action

- Approximately 80% of an estimated population of 2,620 wild horses in the gather area would be gathered (2,096 wild horses) beginning in the fall of 2016.
- All wild horses outside of the HMA boundaries, between HMAs or on the checkerboard south of the Complex, would be removed.
- A helicopter inventory would be completed during the gather and prior to releasing any horses back into the Complex.
- Each HMA would be gathered independently due to limited staff availability, weather, and gather logistics. The entire gather may not be completed in one gather session and may have to be continued in subsequent years.
- All capture and handling activities would be conducted in accordance with the Standard Operating Procedures (SOPs) described in Appendix 1 (SOPs). Multiple capture sites (traps) would be used to capture wild horses. Whenever possible, capture sites would be located in previously disturbed areas and would be analyzed as they are identified, including clearances from archeology, weed, botanical and wildlife specialists prior to use. If new trap sites are needed, they also would be surveyed for cultural, botanical, and wildlife resources prior to use. If sensitive resources are encountered (riparian habitat, tall sagebrush, sensitive species habitat, etc.), these locations would not be utilized unless they could be modified to avoid any impacts. Every effort would be made to return the released horses to the same HMA from which they were gathered.
- Livestock operators within the gather area would be notified prior to the gather, enabling them to take precautions and avoid conflict with gather operations.
- Capture techniques would include the helicopter-drive trapping method and/or helicopter-roping from horseback.
- Mares older than one year that would be returned back into the Complex would be treated with a fertility control vaccine (Porcine Zona Pellucida (PZP)). Horses that are a year old or younger would not be treated. Implementation of fertility control treatment on captured mares would be conducted in accordance with the approved standard operating and post-treatment monitoring procedures (Appendix 4). Data on the captured horses would be collected, including sex and age distribution, and color.

- For monitoring purposes, mares treated with the PZP vaccine would be identified by a freeze mark. All treated mares would receive an "HB" brand on the left hip. In addition, a small number would be applied to the left side of the neck to identify what HMA that horse came from, following past branding practices. Horses from Antelope Hills were marked with a 6, Crooks Mountain received a 5, Green Mountain received a 4, Lost Creek received a 2, and Stewart Creek were marked with a 1.
- Hair samples would be collected for DNA analysis to assess the genetic diversity of the herd, per HMA, in accordance with IM No. 2009-062. This IM can be found at: http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/2009/IM_2009-062.html
- Through the capture and sorting process, wild horses are examined for health, injury and any defects using the humane care and treatment methods as described in BLM Instruction Memorandum 2015-070 (BLM 2015a).
- 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 Instruction Memorandum No. 2015-070, *Animal Health, Maintenance, Evaluation and Response* (BLM 2015a). 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. The IM can be found at: http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/2015/IM_2015-070.html
- 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). The IM can be found at: http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/2010/IM_2010-135.html
- 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 would be in accordance with Instruction Memorandum No. 2015-151, Comprehensive Animal Welfare Program for Wild Horse and Burro Gathers (BLM 2015b). This IM can be found at: http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/2013/IM_2015-151.html
- 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 would 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). This IM can be found at: http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/2013/IM_2013-060.html
- Public access to the gather sites/traps may be restricted during gather operations to ensure public and horse safety and minimize disruption to the gather process. Any areas closed would be reopened upon completion of the gather operations. Public viewing of the

gather would be permissible, but it would be managed through the gather incident commander and public affairs officer assigned to the gather.

- 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). This IM can be found at: http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/2013/IM_2013-058.html
- Certified weed free hay would be used to feed the horses while in trap sites and holding locations throughout the gather time period. Prior to the establishment of the trap sites and holding areas, a weed inventory would be performed by a weed specialist. Mobile equipment being transported from an offsite location to the gather areas, would be cleaned prior to arrival to remove any invasive or noxious weed seed and plant parts.
- Horses that are removed would be shipped to BLM holding facilities where they would be prepared for adoption and/or sale to qualified individuals and/or long-term holding.
- Monitoring and data collection would be continued to assess whether healthy and self-sustaining wild horse herds are being maintained on the HMAs over the long term. Monitoring of the gather area would also continue for vegetation and water resources (rangeland health).
- The BLM intends to return to these HMAs within 3 years to gather and treat mares to maintain fertility control measures.

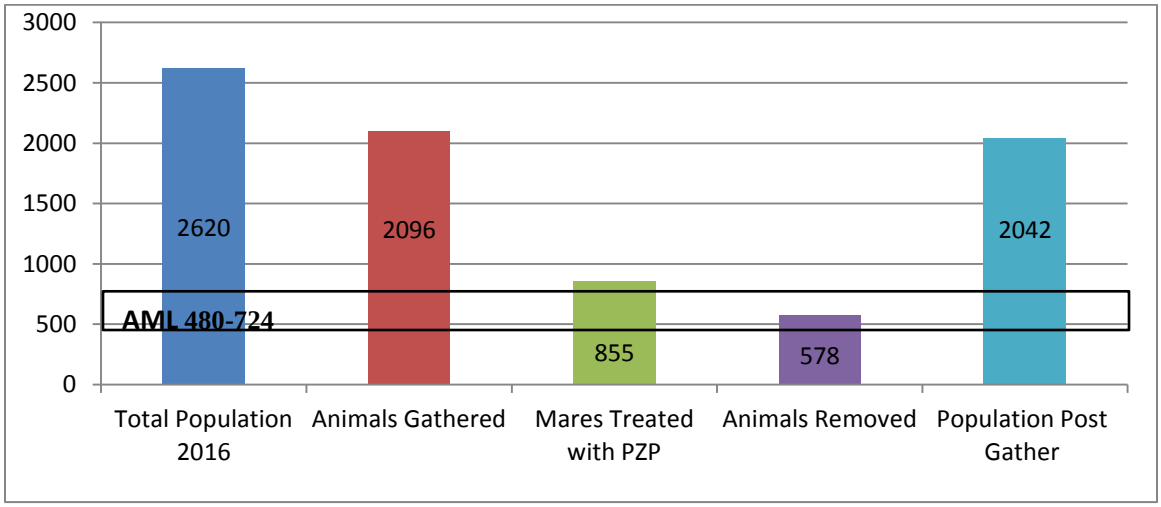
## 2.2 Alternative 1: Remove all wild horses outside of HMA boundaries and utilize fertility control on mares to be released back to the HMA

Approximately 80% of an estimated population of 2,620 wild horses in the gather area would be gathered (approximately 2,096 wild horses) and approximately 578 wild horses would be gathered and removed from outside of the HMA boundaries. Approximately 855 mares would be treated with PZP, and approximately 1,518 wild horses would be released back into the HMAs. The population of horses within the Complex would not be reduced and would remain at approximately 2,042 horses.

The primary objective would be to slow the population growth until another gather could be completed. The BLM intends to return to the Complex within 3 years to gather and remove excess horses and/or gather and re-treat mares to maintain the fertility control measure. The AML ranges established in the approved RMPs for each HMA would continue to be exceeded by over four times.

Figure 1 illustrates how many horses would be affected by the components of Alternative 1.

**Figure 1. Projection of Wild Horse Population under Alternative 1**




## 2.3 Alternative 2: Proposed Action—Remove to low AML and utilize fertility control

Approximately 80% of an estimated population of 2,620 wild horses in the gather area would be gathered (2,096 horses), including 578 wild horses from outside of the HMA boundaries, and all excess horses would be removed—approximately 2096. That would leave 524 horses in the Complex (slightly exceeding the low AML). Historically, on average, 80% of a given horse population is able to be gathered, as a result of varying terrain, tree cover, etc. Due to the high numbers of horses, more than 80% of the population may need to be gathered in order to capture enough adoptable horses to remove, since a portion of the animals gathered may be unadoptable (e.g. due to age). If any mares older than 1 year old are to be released back into the HMAs, they would be treated with PZP. The entire gather may not be able to be accomplished in one year due to budget, housing capacity for horses, weather, etc. The gather would proceed by HMA and

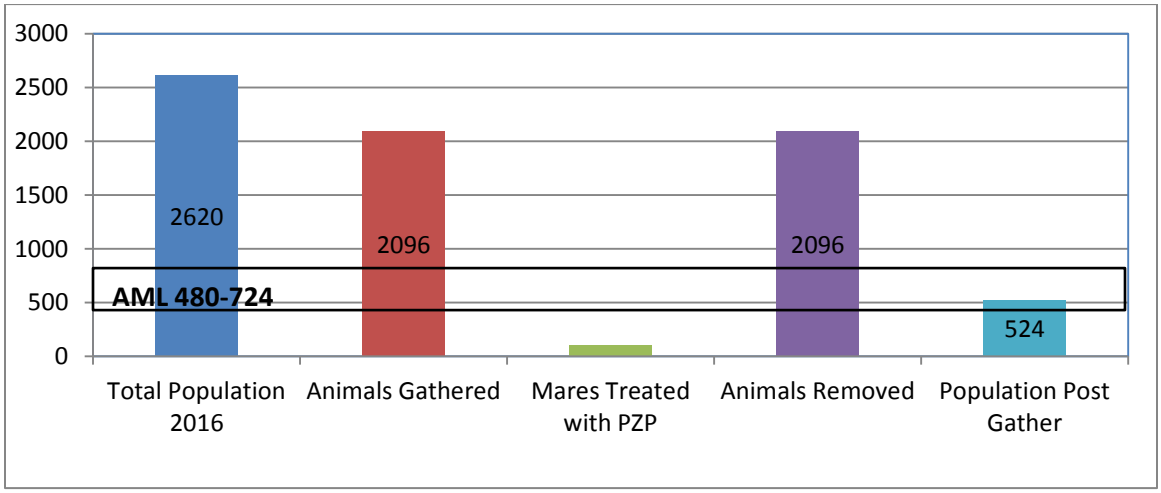
close proximity, utilizing multiple traps in each HMA, to reduce stress on the horses and the distance they would have to travel from their home range.

If gather efficiencies utilizing helicopter drive-trapping do not achieve the desired goals of the Proposed Action or if a follow-up helicopter gather cannot be scheduled to remove remaining excess wild horses, water/bait trapping may be utilized as a supplement to a helicopter gather. Water/bait trapping would be used to remove sufficient numbers of horses to achieve the management targets, to relieve resource concerns, to treat/re-treat mares with PZP, and/or to remove concentrated groups of horses both inside and adjacent to the HMAs. This technique would only be utilized if it is appropriate for a particular portion of an HMA. For example, in isolated cases, water/bait trapping could be utilized to gather small numbers of wild horses for fertility control treatment. Any water/bait trapping activities would be scheduled during time periods that would be most effective and in those isolated areas that would be most conducive for the use of this technique.

The primary objective would be to reduce the population to the lower AML and treat mares with PZP to increase the time interval before another gather would need to be completed. The BLM intends to return to the Complex within 3 years to gather and remove excess horses and/or gather and re-treat mares to maintain AML and the effectiveness of the fertility control measure. AML ranges established for individual HMAs would be achieved.

Figure 2 illustrates how many horses would be affected by the components of Alternative 2.

**Figure 2. Projection of Wild Horse Population under the Proposed Action**



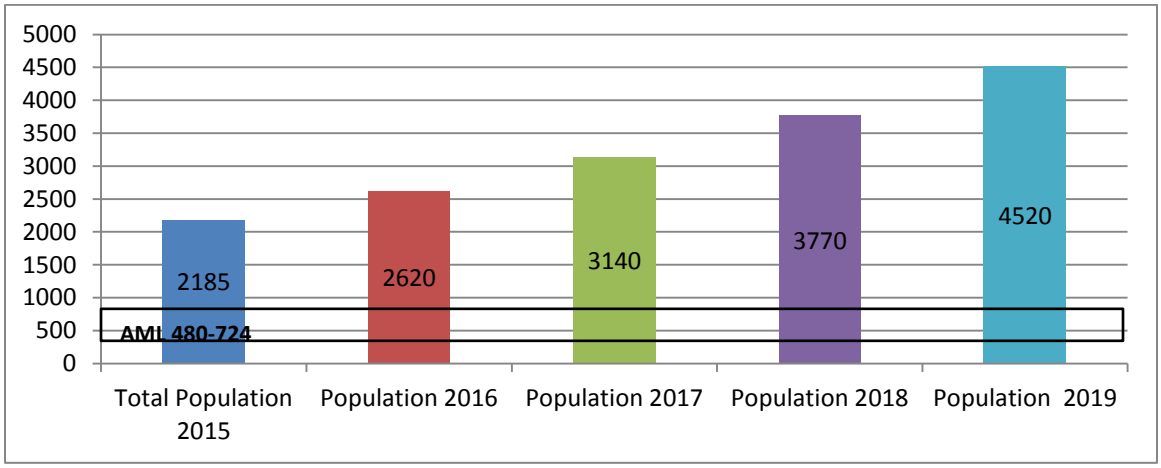
## 2.4 Alternative 3: No Action--No Gather or Removal and no fertility control

A wild horse gather would not be conducted. Wild horse populations would not be actively managed at this time and excess wild horses would not be removed. The population growth suppression program would not be continued. The current estimated population of 2,620 wild horses would continue to increase at an estimated rate of 20% annually and the established AML range would continue to be exceeded.

This Alternative would not achieve the Purpose and Need identified in Section 1.1. However, it is analyzed to provide a basis for comparison with the action alternatives, and to assess the effects of not gathering. The No Action Alternative would not be consistent with the requirement under the WFRHBA, FLPMA, and PRIA to remove excess wild horses and burros from public lands, to prevent damage to rangeland resources from an overpopulation of wild horses, and is also not in conformance with regulatory provisions for management of wild horses and burros as set forth at 43 CFR § 4700 – Protection, Management, and Control of Wild Free-Roaming Horses and Burros.

Figure 3 illustrates how the No Action Alternative would affect the wild horse population. The population from 2015 to 2019 is shown to illustrate what would happen if no gather occurred over the next 4 years. This estimate used a 20% growth rate. The estimated population would double to approximately 4,520 horses, and a gather would need to remove over 4000 excess wild horses in 2019 from the Complex and surrounding areas in order to achieve low range of AML.

**Figure 3. Projection of Wild Horse Population under Alternative 3**



## 2.5 Alternatives Considered But Eliminated From Further Analysis

These alternatives were eliminated from further analysis for many reasons, including: they do not accomplish the management objectives, are not consistent with the RMPs or existing regulations and policy, or pose a health and safety issue for horses and personnel.

### 2.5.1 Use of Bait and/or Water Trapping

The use of bait and or water trapping, though effective in specific areas and circumstances (for example, see Proposed Action), would not be timely, cost-effective or practical as the primary or sole gather method for this Complex of HMAs. This alternative was dismissed from detailed analysis as a primary or sole gather method for the following reasons:

- The gather area is too large to effectively use this gather method as the primary or sole method;
- The number of water sources on both private and public lands within and outside the Complex would make it difficult to restrict wild horse access to selected water trap sites;
- Road access for vehicles to potential trapping locations necessary to get equipment in/out as well as safely transport gathered wild horses is limited;
- The large numbers of horses proposed to be gathered would render water or bait trapping impossible within a reasonable time frame.

### 2.5.2 Other Alternative Capture Techniques

Capture methods other than helicopters to gather excess wild horses, 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.

- Chemical immobilization is a very specialized technique and strictly regulated. Currently, the BLM does not have sufficient expertise to implement this method and it would be impractical to use given the size of the HMAs, access limitations, the number of horses involved, and the approachability of the wild horses.
- Net gunning techniques normally used to capture big game also rely on helicopters and are therefore not under consideration as an alternative to the helicopter-capture method.
- 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, the large geographic extent of the Complex, and the approachability of the wild horses, this technique would be ineffective and impractical to meet the purpose and need. Horseback drive-trapping is also very labor intensive and can be dangerous for the domestic horses and wranglers.

For these reasons, the alternative capture method alternatives were eliminated from further consideration and are not analyzed in detail.

### 2.5.3 Remove or Reduce Livestock within the HMAs

Livestock grazing may be reduced or eliminated under 43 CFR 4100 and must be consistent with multiple use allocations set forth in the land-use plan. Such changes to livestock grazing cannot be made through a wild horse gather decision, and are only possible if the BLM first revises the land-use plans to re-allocate livestock forage to wild horses and to reduce or eliminate livestock grazing.

Furthermore, re-allocation of livestock animal unit months (AUMs) to increase the wild horse AMLs would not achieve a TNEB due to differences in how wild horses and livestock graze. Livestock can be managed through seasons of use, numbers, and different pastures to minimize use of vegetation during the critical growing season or of riparian zones during the summer months. However, wild horses are present year-round and their use of rangeland resources cannot be controlled through establishment of a grazing system. Thus, vegetation use from wild horses can only be addressed by limiting their numbers to a level that does not degrade rangeland resources and affect other multiple uses.

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 applied in cases of emergency and not for general management of wild horses; livestock removal cannot be applied in a manner that would be inconsistent with the existing land-use plans (43 CFR 4710.1).

This action would not be in conformance with the existing land use plans and is contrary to the BLM's multiple-use mission as outlined in FLPMA, and would be inconsistent with the WFRHBA, which directs the Secretary to immediately remove excess wild horses. Additionally this would only be effective for the very short term as the horse population would continue to increase. Eventually, the HMAs and adjacent lands would no longer be capable of supporting the horse populations. Removing approximately 2096 excess wild horses now and treating released mares with a fertility control vaccine would delay the need for future removal of excess horses.

For the reasons stated above, this alternative was dropped from detailed analysis. 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 appropriate public decision-making processes.

### 2.5.4 Change the Current Established AMLs

Changing the established AMLs within the HMAs was not brought forward for detailed analysis. The population range for the Stewart and Lost Creek HMAs is established in the approved Rawlins RMP. To adjust the AML in these HMAs would require an amendment to the RMP. The population range for the Crooks Mountain, Green Mountain and Antelope Hills are established in the approved Lander RMP. To adjust the AML in these HMAs would require an amendment to the Herd Management Area Plan (HMAP), RMP, or both. Current information indicates that the AML ranges for the Red Desert Complex maintains a TNEB. For these reasons and others, this gather document is not the appropriate mechanism for adjusting the AML of an HMA.

### 2.5.5 The use of surgical or chemical sterilization to reduce population growth.

The use of these methods to reduce population growth has not been implemented successfully in wild horse populations. Research on the use of these techniques on wild horse behavior is still being studied. The impacts of these techniques are well understood in controlled settings, but they have not been extensively researched under field conditions. Due to these uncertainties, this alternative was removed from further analysis.

### 2.5.6 Control of Wild Horse Numbers by Natural Means

The use of natural control means, such as natural predation, forage availability, and weather, to control the wild horse population was eliminated from further consideration because it would be contrary to current law, regulation, and policy. BLM is required to protect the range resources from deterioration associated with an overpopulation of wild horses. Wild horse populations are not substantially regulated by predators. In addition, wild horses are a long-lived species with documented foal survival rates exceeding approximately 95% and are not a self-regulating species. As a result, an exponential increase in the wild horse population would occur (see Figure 3 above). This would result in a continued exceedance of the carrying capacity of the range and would cause increasing damage to the vegetation and water sources until severe range degradation or natural conditions like blizzards or extreme drought, cause a catastrophic mortality of wild horses. Horses would also continue to expand in numbers outside of the Complex increasing rangeland degradation across the landscape, resulting in a further loss of a TNEB.

## 2.6 Conformance with Existing Land Use Plans (LUPs)

The Proposed Action is in conformance with the land use plans as required by 43 CFR 1610.5-3(a). Any action in the Rawlins and Lander Field Offices is subject to decisions established by the Rawlins and Lander Resource Management Plans, approved December 24, 2008 and June 26, 2014 respectively, and amended September 21, 2015 (*Approved Resource Management Plan Amendment for Greater Sage-Grouse* and the *Record of Decision and Approved Resource Management Plan Amendments for the Rocky Mountain Region, Including the Greater Sage-Grouse Sub-Regions of Lewistown, North Dakota, Northwest Colorado, Wyoming*). The Red Desert HMA Complex has been designated as suitable for long term, sustained wild horse use in the Rawlins and Lander RMPs. The proposed capture, treatment, and removal conform to the land use decisions and resource management goals and objectives of the Resource Management Plans.

The Rawlins RMP can be accessed at:
http://www.blm.gov/wy/st/en/programs/Planning/rmps/rawlins.html

The Lander RMP can be accessed at:
http://www.blm.gov/wy/st/en/programs/Planning/rmps/lander.html

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

**Conformance with Rangeland Health Standards and Guidelines:** Alternative 2 would be in conformance with the BLM Wyoming "Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management" (BLM 1997). It would assist in maintaining the health of the public lands within each HMA and within the Complex. A copy of the BLM Wyoming "Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management" is available upon request from the BLM. Alternatives 1 and 3 would not be in conformance.

**Relationship to Statutes, Regulations, or Other Plans:** Public lands are managed under the FLPMA (1976), 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. 1702(c)).

Alternative 2: Proposed Action would be in conformance with the WFRHBA and PRIA, while Alternatives 1 and 3 would not be in conformance with the WFRHBA, Sections 1333(b)(2) and 1334, and its implementing regulations found at 43 CFR 4700, and PRIA Section 2(b)(4):

- 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 (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 4720.2-2: If the authorized officer determines that proper management requires the removal of wild horses and burros from 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.

Wild horse gather EAs have been completed which analyzed the impacts of various gather methods on wild horses, and other critical elements of the human environment, to achieve AML. For a list of these documents, see Appendix 2. These documents are available for public review at the Rawlins and Lander Field Offices.

The area was assessed per the Governor's Executive Order EO 2015-4 "*Greater Sage-Grouse Core Area Protection*". The proposed action falls within a Greater Sage-Grouse Priority Habitat

Management Area (PHMA), and also contains Sagebrush Focal Area and General Habitat Management Area (GHMA).

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

# 3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

## Introduction

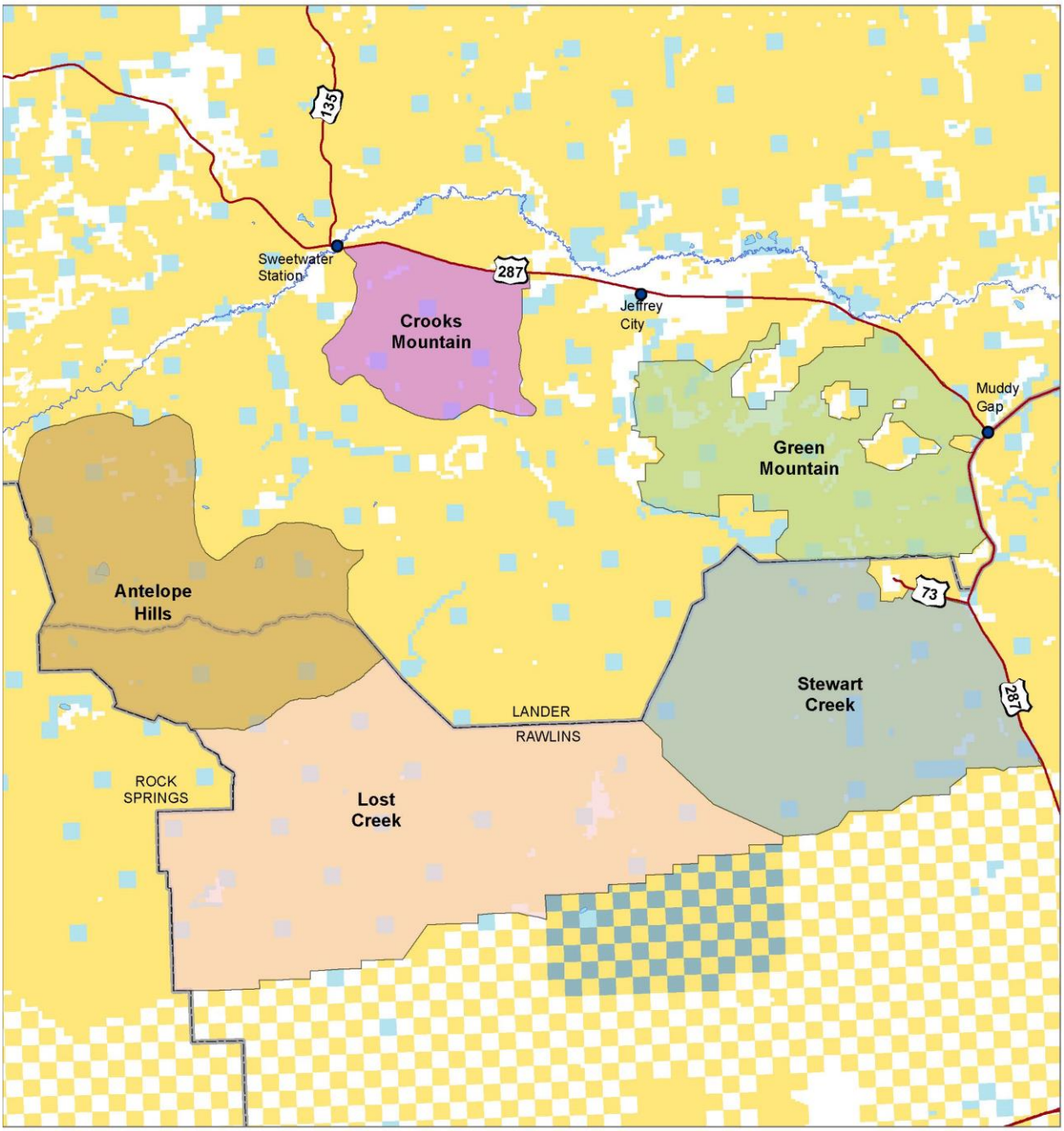
This section of the environmental assessment briefly discusses the relevant components of the human and natural environment which would be either affected or potentially affected by the alternatives. Direct impacts are those that result from management actions while indirect impacts are those that exist 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 Red Desert Complex, specifically Stewart Creek, Lost Creek, Antelope Hills, Crooks Mountain, and Green Mountain HMAs, is tiered to the Final EISs for the Rawlins RMP (BLM 2008a, pp. 139-142) and Lander RMP (BLM 2014a, pp. 69-70), respectively.

## 3.1 Wild Horses

### 3.1.1 Affected Environment

The Complex is located in the Sweetwater, Carbon, Fremont and Natrona Counties west and south of Wyoming Highway 789/287 (See Map 1).

Map 1. Red Desert HMA Complex

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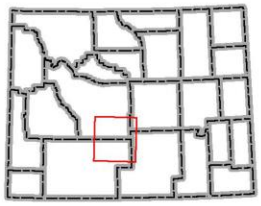
No warranty is made by the Bureau of Land Management (BLM) for use of the data for purposes not intended by BLM.

**Red Desert Complex**
**Wild Horse Management Areas**

- Highways
- BLM field office boundaries
- Bureau of Land Management
- Private
- State
- Wyoming Game & Fish Dept.
- Water



Date: 7/29/2015

**Gather History and Population Estimates**

Gathers have been conducted in the Red Desert HMA Complex numerous times since 1980; most recently in 2011. For gathers conducted within this timeframe and the number of horses gathered, refer to the Tables in Appendix 2.

Table 3 shows the population estimates for the five HMAs and the Complex from 2013-2016. The 2013 and 2014 wild horse estimates were determined using the double observer method in the RFO, and direct count with a correction factor in the LFO. This estimate assumes a 20% growth rate for the adjusted estimate. In April of 2015 (prior to the foaling period), the BLM conducted simultaneous double-count aerial surveys in a mark recapture analysis framework. The Complex population was estimated at 1,821 adult animals. The data were collected using this method and then an analysis was completed to give the point estimate of abundance for the number of horses within each HMA and the Complex, and also uses a 90% confidence interval around those point estimates (see Appendix 6).

**Table 3. Estimated Horse Population by HMA and Year**

| HMA | Population Estimate 2013 | Population Estimate 2014 | Population Estimate 2015 | Population Estimate 2016* |
|---|---|---|---|---|
| Stewart Creek | 302 | 362 | 509 | 610 |
| Lost Creek | 100 | 120 | 234 | 280 |
| Antelope Hills | 94 | 112 | 231 | 277 |
| Green Mountain | 388 | 465 | 982 | 1178 |
| Crooks Mountain | 140 | 168 | 229 | 275 |
| Complex Total | 1,024 | 1,227 | 2,185 | 2620 |

*The 2016 population estimate uses the population estimate from Table 4(below) plus a 20% growth rate to account for foal production/animal death loss in 2015 and 2016.

Table 4 shows the census data collected in April, 2015, by HMA within the Complex, and their correlating AMLs.

**Table 4. Estimated Red Desert HMA Complex Horse Population Inventory**

| HMA | Population Estimate April 2015 | Population Estimate with 90% Confidence | Established AML Range |
|---|---|---|---|
| Stewart Creek | 424 | 405-447 | 125-175 |
| Lost Creek | 194 | 150-241 | 60-82 |
| Antelope Hills | 193 | 162-233 | 60-82 |
| Crooks Mountain | 191 | 167-222 | 65-85 |
| Green Mountain | 819 | 774-892 | 170-300 |
| **Complex TOTALS** | **1821** | **1658-2035** | **480-724** |

For the purposes of this EA, the point estimates of abundance were used, plus an additional number of animals to represent a 20% average growth rate, to estimate the numbers for each proposed alternative. The population estimates for 2015 show a marked increase greater than the expected 20% growth rate in 3 of the 5 HMAs. The factors that may have caused this are: 1) a new/different census method, 2) effectiveness of PZP has faded in treated mares (last treated in 2011), 3) mild winters resulting in lower death loss, 4) movement of horses between HMAs, and 5) higher foal survival.

Wild horse population numbers have the potential to double every four years (NAS, 2013). With fertility control vaccine treatment (PZP), growth rates can be reduced in the short term since treatments are generally effective for up to 22 months, after which they generally return to control levels by year 4 (Turner et al, 2007). Because mares gathered and released in the Complex were treated in the fall of 2011 (during the last gather and removal), population growth was reduced, but horse numbers currently exceed the high end of the AML by over 3.5 times.

BLM utilized the WinEquus model for the three alternatives to analyze possible differences in the wild horse populations between alternatives. Model results are displayed in detail in Appendix 5 (Population Model Overview). The modeling may not necessarily reflect actual on-the-ground results. The objective of the modeling exercise was to identify if any of the alternatives "crash" the population or cause extremely low population numbers or growth rates. Minimum population levels and growth rates determined from modeling were found to be sufficient to maintain population viability.

### 3.1.2 Environmental Consequences

**Effects Common to Action Alternative 1 and Alternative 2: Proposed Action**

Over the past 35 years, various effects to wild horses as a result of gather activities have been observed and studied. Effects to wild horses would be both direct and indirect, occurring to both individual horses and the population as a whole.

The BLM has conducted wild horse gathers since the mid-1970s. During this time, methods and procedures have been identified and refined to minimize stress and adverse effects to horses during gather implementation. The Standard Operating Procedures in Appendix 1 would be implemented to ensure a safe and humane gather occurs and would minimize potential stress and injury to wild horses.

Wild horse gather-related mortality averages about one percent (1.0%) nationwide. About one half of those horses included in all gather related mortality could be humanely euthanized due to pre-existing conditions in accordance with BLM policy (BLM 2015a). The other half is attributable to gather related injuries. These data confirm that the use of helicopters and motorized vehicles are a safe, humane, effective, and practical means for the gather and removal of excess wild horses (and burros) from the public lands. It is BLM policy to restrict the use of helicopters as a tool to gather wild horses from February 28 through July 1, to minimize impacts to foals. The peak of foaling generally occurs during a four-week period from mid-April to mid-May for most wild horse herds.

Individual, direct effects to wild horses include handling stress incurred during capture, sorting, handling, and transportation of the animals. The intensity of these effects varies by individual horse and is manifested by behaviors ranging from nervous agitation to obvious physical distress.

A variety of 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. Injuries resulting from kicks and bites or from collisions with corral panels or gates can occur. Injuries sustained by wild horses while being herded to trap site corrals by helicopter may include bruises, scrapes, or cuts to feet, legs, face, or body from rocks, brush or tree limbs. Wild horses may encounter barbed wire fences and receive wire cuts during gather activities but this type of injury is rarely fatal and can be treated on-site in consultation with a veterinarian.

To minimize the potential for injuries from fighting in the corral, the horses are transported from the trap site to the temporary (short-term) holding facility where studs are separated 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 get injured from fighting.

Indirect individual effects are those which occur to wild horses after all handling and processing is completed. These may include miscarriages, increased social displacement, and conflict among studs. These effects are known to occur intermittently during wild horse gather operations. An example of an indirect individual impact would be a brief 1-2 minute skirmish between two studs opting for dominance and ending when one retreats. Injuries can also occur from these skirmishes and typically involve a bite or bruise from a kick. 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 poor body condition and/or health.

Foals may be orphaned during a gather 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 health. 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.

Mares that receive the fertility control treatment would experience increased levels of stress from additional handling while they are being inoculated and freeze marked. There would be potential additional indirect impacts to animals at the isolated injection site following the administration of the fertility control vaccine. Injection site injury associated with fertility control treatments are extremely rare in treated mares, and may be related to experience of the person administering the vaccine.

Recent research suggests that mares treated with PZP may experience longer lasting contraceptive effects than previously thought, and those effects may last even longer if the mare had been previously inoculated. One study with three herds found that parturition dates varied between treated and untreated mares. Parturition for untreated females ranged from January 15-September 7, while the range for parturition of treated females was February 20- December 22. There was some evidence that the timing of fertilization and parturition could shift back to the natural range after PZP treatment effects have worn off. The same study found that untreated mares had an average foaling rate of 64% (53-74%) while treated mares had an average foaling rate of 26% five years post-treatment (Ransom, 2013). Other research confirmed that over 20 years, treated mares do not continue to cycle resulting in out-of-season births (Kirkpatrick and Turner, 2003), even when on higher planes of nutrition (Kirkpatrick and Turner, 1983). Turner et al (2007) found that the highest success for fertility control has been obtained when applied during the timeframe of November through February in one herd in Nevada. The efficacy for the application of the PZP vaccine (representing the percent of treated mares that do not foal) based on winter applications follows:

| **Year 1** | **Year 2** | **Year 3** | **Year 4** |
|---|---|---|---|
| Normal | 94% | 82% | 68% |

The effect of PZP obviously varies widely between individual horses and herds. Administration of PZP has occurred for several years in this Complex. The preponderance of evidence indicates that PZP is most effective one to two years post treatment, and local evidence seems to support that conception rates in the Complex should return to natural levels[2] in 3-5 years, post treatment.

Based on behavioral studies, PZP does not cause significant changes in behavior at the individual or herd levels. Additionally, PZP contraception appears to be completely reversible. One-time application at the capture site would not affect normal development of a fetus, hormone health of the mare or behavioral responses to stallions, should the mare already be pregnant when vaccinated. The vaccine has also proven to have no apparent effect on pregnancies in progress, the health of offspring, or the behavior of treated mares (Kirkpatrick and Turner, 2003). Mares would foal normally in 2017.

Ransom et al. (2010) found no differences in how PZP-treated and control mares allocated their time between feeding, resting, travel, maintenance, and social behaviors in 3 populations of wild horses, which is consistent findings in another population. Likewise, body condition of PZP-

[2] Untreated females showed average reproductive success of 53.8% (Turner, 2007); and 64.1% (Ransom, 2013)

treated and control mares did not differ between treatment groups in Ransom et al.'s (2010) study. Kirkpatrick and Turner (2002) 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.

In two studies involving a total of 4 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. They found that control mares were herded by stallions more frequently than PZP-treated mares, and Nunez et al. (2009) found that PZP-treated mares exhibited higher infidelity to their band stallion during the non-breeding season than control mares. Madosky et al. (2010) found this infidelity was also evident during the breeding season in the same population that Nunez et al. (2009) studied, resulting in PZP-treated mares changing bands more frequently than control mares. Long-term implications of these changes in social behavior are currently unknown.

A hair sample would be taken from some of the wild horses, typically from the mane, for genetic testing. Based on genetic testing from previous gathers (Appendix 3), the Red Desert HMA Complex demonstrates adequate genetic fitness. Due to the proximity and generally unfenced boundaries between HMAs, adequate drift of individual animals between HMAs has maintained genetic variability. Wild horse movements among the five HMAs in the Complex are apparent through trails and seasonal variation in distribution. It is recognized that individually, the AML for wild horses in three of the HMAs (Lost Creek, Antelope Hills, and Crooks Mountain) may not provide for a genetically diverse population. However, as indicated, these horses interact with each other among herd areas. The interaction and exchange ensures genetic variability. No impacts have been identified from collecting hair samples.

Wild horses not captured may be temporarily disturbed and may move 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 with most, if not all, effects disappearing within hours to several days of release. No observable effects associated with the gather would be expected within one month of release, except for a heightened awareness of human presence.

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

Horses would be gathered into temporary traps and transported to temporary holding corrals to be processed. Those horses not removed would be released back into the HMA. The rest would be transported from the capture/temporary holding corrals to the designated BLM off-range corral facility(s) in accordance with BLM Instruction Memorandum 2015-151(BLM 2015b). From there, they would be made available for adoption or sale to qualified individuals or placed in long-term pastures.

Wild horses selected for removal from the range are transported to the receiving short-term holding facility in straight deck semi-trailers or goose-neck stock trailers. Vehicles would be 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 trailer is in a sanitary condition. Wild horses would be 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 would be 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 would be off-loaded by compartment and placed in holding pens where they would be fed good quality hay and water. Most wild horses begin to eat and drink immediately and adjust rapidly to their new situation. Lactating mares and young foals are put in a separate pen to encourage pairing. At the short-term holding facility, a veterinarian would examine each load of horses and provide recommendations to the BLM regarding care, treatment, and if necessary, euthanasia of the recently captured wild horses. Wild horses in very thin condition or animals with injuries would be 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 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.

**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 2010 through the appropriations language each fiscal year through 2016 for this purpose. See, e.g., *Consolidated and Further Continuing Appropriations Act, 2015*, Pub. L. 113-235, 128 Stat. 2130, 2399 (Dec. 16, 2014). Even during the interval between fiscal years 2005 and 2009 the BLM chose not to destroy excess wild horses due to concerns about public and Congressional reaction to large-scale horse slaughter. Sales of wild horses are conducted in accordance with Instruction Memorandum No. 2014-132, *Guidance for the Sale of Wild Horse and Burros* (BLM 2014c).

**Impacts of Alternative 1: Remove all wild horses outside of HMA boundaries and utilize fertility control**

Approximately 2,096 wild horses would be gathered from the gather area (approximately 80% of the total population). Approximately 578 horses gathered from outside HMA boundaries would be removed. Horses that are gathered within the individual HMA boundaries would be returned to those HMAs. Approximately 855 mares one year or older would be treated with PZP and freeze marked, before being released. Mares that are pregnant at the time of treatment would be expected to foal during the 2017 foaling season, but would not be expected to foal the following 1 or 2 years. The PZP treatment would be expected to slow population growth starting in 2018 and be effective for 1-3 years following treatment. This alternative would slow population growth, but it would not reduce the number of wild horses within the Complex.

The horses would be gathered and sorted according to gather SOPs (Appendix 1, Section A), which reduces injury and fighting among individual horses. However, the current social structure of the wild horse population would be altered upon release of the horses back into the Complex. They may end up in different bands than they were gathered with. There would also be continued competition for available forage and water resources since the low AML would be exceeded by over four times until a gather occurred. This competition would more noticeable in drought years. A gather to remove excess horses could occur the next year, resulting horses being rounded up in two consecutive years.

**Impacts of Alternative 2: Proposed Action--Remove to low AML and utilize fertility control**

BLM would gather approximately 2,096 wild horses from the entire gather area, completing one HMA and surrounding area before moving on to the next. Approximately 578 horses gathered from outside HMA boundaries would be permanently removed. Most of the horses gathered within the Complex would also be removed. The post-gather population of wild horses for the Red Desert Complex would be slightly above the combined low range of AML (approximately 524). The BLM would ensure wild horse numbers within each HMA would not be below the respective low range of AML. Any mares older than 1 year old that are to be released back into the HMAs, would be treated with PZP. The number of mares treated and released would be small due to the inability to gather all horses in some areas due to terrain and tree cover. The current high wild horse numbers and the inability to gather all the horses in some HMAs, may result in the majority of the mares needed to achieve the low AML number not being gathered, and subsequently not treated with PZP. The current social structure of the wild horse population would be altered from the removal of approximately 2,096 horses, but the competition for forage and water resources would be reduced. This would ensure the health of the horses and return an ecological balance with other multiple uses of the landscape.

**Impacts of Alternative 3: No Action--No gather or removal and no fertility control**

No wild horses would be gathered and no fertility control treatment would be implemented at this time, however, a gather would be planned as soon as possible to achieve a TNEB in the Complex and to be in conformance with existing law, regulation, policy, and RMPs. As a result, there would be no change to the social structure of the wild horses. Projected population increases would result in minimal potential for inbreeding over the long term, but would continue to result in increasing competition for available forage and water resources, and eventually lead to long-term deterioration of wild horse health. See Sections 3.3.2 and 3.4.2 for impacts to soils and watershed, vegetation, and special status plants.

Lactating mares, foals, and older animals would be affected more than other horses in the population as they are most susceptible to stress, including forage and water depletion. Social stress among animals would likely increase as a shortage of resources increased.

The body condition of horses would be expected to deteriorate as a result of declining quality and quantity of forage and from the need to travel further from water to find forage. Drought also has an impact on the amount and quality of forage that is produced on the range. As natural

fluctuations of forage production and competition for forage between livestock, wildlife, and wild horse increases, livestock operators may choose to take non-use. If livestock operators take non-use, the operation of livestock water sources would likely decrease, further reducing the availability and reliability of many water sources currently used by wild horses. The potential risk of injury or death would increase as horses search and compete for forage and water. The search for water and forage would also increase the chances of horses to stray outside of HMAs.

## 3.2 Wildlife, Threatened and Endangered Species, Special Status Species, and Migratory Birds

### 3.2.1 Affected Environment

The mosaic of plant communities and topographic features found throughout the Red Desert 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. The Complex has been used by livestock for over 100 years and fences are limited. However, in general the Complex has very low levels of other types of disturbance to wildlife habitat. These disturbances include a few improved county and BLM roads, several powerlines, and small energy projects related to uranium mining and oil and gas development. Due to this lack of major disturbances, the Stewart Creek HMA was selected as a control study site for Greater Sage-Grouse from 2007-2010 to compare with development impacts from the Atlantic Rim Natural Gas Development Project located south and west of Rawlins.

Species which commonly occur in the Complex include coyote, badger, bobcat, desert cottontail, jackrabbit, Wyoming ground-squirrel, golden eagle, kestrel, horned lark, meadowlark, raven, magpie, common nighthawk, and other small mammals and birds. Mule deer, elk and pronghorn, utilize the gather area year-round and approximately 13% of the area is identified as crucial winter range for mule deer and pronghorn and winter or crucial winter range for elk. Antelope and mule deer populations are currently below herd unit population objectives, while elk populations are at their objective. For a complete description of species and habitats found within BLM jurisdiction in the Red Desert Complex, see the Rawlins RMP (2008a, FEIS p. 3-143 to 150) and the Lander Field Office RMP (BLM 2013d, FEIS p. 392-421). A summary of additional wildlife resources identified as being potentially impacted by the project is provided below.

**Threatened, Endangered, Proposed and Candidate Species:**

Potential Black-footed Ferret (Endangered; Non-Essential, Experimental Population [Federal Register October 30, 2015, 10(j) Rule)] habitat (white-tailed prairie dog towns) exists in the Complex. Past surveys conducted in relation to other development activities in the Complex have not recorded the presence of black-footed ferrets. Horse trap sites and staging areas associated with gathers are never placed in prairie dog towns due to the possibility of horses breaking their legs in the burrows or degrading prairie dog habitat. This action would have no impacts to black-footed ferrets and this species will not be addressed further in the document.

The yellow-billed cuckoo, Canada lynx, Preble's meadow jumping mouse, and Wyoming toad are not present and do not have habitat present; therefore, there would be no effect to these species as a result of implementing the proposed gather. No water depletions are associated with the proposed gather; therefore, there would be no effect to any federal listed aquatic species present in or downstream of the North Platte River.

**BLM Wyoming State Sensitive Species**

A number of animal species potentially present have been accorded "sensitive species" status. Sensitive mammal species that have the potential to occur, or that may have habitat located within the gather 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, or may have habitat located within the area include the ferruginous hawk, mountain plover, Greater Sage-Grouse, long-billed curlew, burrowing owl, sage thrasher, loggerhead shrike, Brewer's sparrow, sage sparrow, and bald eagle. Numerous other migratory birds, including sagebrush obligate species, also occur.

BLM records indicate that there are approximately 30 Greater Sage-Grouse (GRSG) leks and associated nesting habitat within or immediately adjacent to the Stewart Creek and Lost Creek HMAs, and approximately 16 occupied Greater Sage-Grouse leks and associated nesting habitat within the Antelope Hills, Crooks Mountain, and Green Mountain HMAs. There are also approximately 31 occupied Greater Sage-Grouse leks within the middle habitat surrounded by the Complex. In accordance with BLM policies and guidance outlined in the RMPs, as amended, timing stipulations and surface disturbance restrictions would be used to determine the location of the trap sites during the gather (Appendix 1).

Of the approximately 753,000 acres making up the Complex, 512,500 acres (68%) is within GRSG Priority Habitat Management Area (PHMA) and 240,500 acres (32%) of the Complex is within General Habitat Management Area (GHMA). Half of the PHMA contains Sagebrush Focal Area[3] (SFA) (approximately 254,000 acres). The RMP Amendment for Greater Sage-Grouse (BLM 2015c) requires that within PHMAs, BLM "Manage herd management areas (HMAs) in GRSG habitat within established appropriate management level (AML) range to achieve and maintain GRSG habitat…"(p. 51). In addition, SFAs will be "Prioritized for vegetation management and conservation actions in these areas, including, but not limited to land health assessments, wild horse and burro management actions, review of livestock grazing permits/leases, and habitat restoration" (p. 38).The BLM is also required to consult with the

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[3] SFAs are areas of highest habitat value for GRSG … for the following reasons:

- They contain high-quality sagebrush habitat and the highest breeding bird densities
- They have been identified as essential to conservation and persistence of the species
- They represent a preponderance of current Federal ownership
- In some cases, they are next to protected areas that serve to anchor the conservation importance of the landscape" (BLM 2015d, p. 17)

Wyoming Game and Fish Department (WGFD) on any project in PHMA as well as to comply with seasonal timing limitations, distance from leks for surface disturbance and disruptive activities, and other protective measures.

With adequate or surplus precipitation during the growing season, residual vegetative cover during the following spring helps to conceal nests from predators and provide hiding cover and adequate food for chicks. With this recent trend, the result has been an upward trend in number of GRSG observed on leks in 2014 and 2015. For the leks within the Complex, maximum males counted in 2015 totaled 945 birds, with an additional 699 males counted on leks located in the middle. Research on GRSG from the Stewart Creek HMA associated with the Atlantic Rim Natural Gas Project showed nesting hens selecting for big sagebrush mean canopy cover of 39 percent and a mean height of 21 inches. It also showed hens moving up in elevation from lower elevation leks, probably relating to selection of the big sagebrush habitat just described, and since higher elevations would correlate to higher precipitation, improved understory herbaceous for nesting cover, and increased forb composition important in the diets of young GRSG chicks.

Other sensitive species that have the potential to occur, or may have habitat include the Western boreal toad, Great Basin spadefoot toad, and the Northern leopard frog.

### 3.2.2 Environmental Consequences

**Impacts of Alternative 1**

BLM wildlife biologists would recommend trap site locations to avoid adverse impacts to wildlife, including occupied GRSG leks, raptor nests, big game crucial winter ranges and other BLM sensitive species habitats. The biologists would also coordinate with the WGFD to identify required SOPs to reduce or eliminate negative effects to wildlife species during trap location site selection. Trap sites would be located to avoid trampling of sagebrush and other shrubs that provide browse for big game and habitat for other wildlife species.

The gathers would occur in mid-summer or later, therefore disturbance to ground nesting birds would be minimal since the chicks of all species would have fledged. Areas exhibiting active Wyoming pocket gopher activity and white-tailed prairie dog towns would be avoided for trap sites to avoid disturbance to these species. Some concentrated disturbance may occur during the actual gathering activity from horses falling thru/crushing shallow burrows; which also occurs as large animals naturally traverse the rangeland.

Wildlife adjacent to trap sites would be temporarily displaced during capture operations by increased activity during trap setup, from helicopter noise, and vehicle traffic, but in most cases displacement should only last 2-3 days in each trap area. Reduction of wild horse numbers outside of HMAs would result in reduced competition for forage and water resources between wild horses and wildlife. Short-term stress and displacement would occur to wildlife during the gather operations, and again when subsequent gathers occurred to reduce the horse population levels to AML.

Wildlife would still be competing with wild horses within the Complex for available forage, space, and water resources as the horse numbers would remain far above AML. These impacts would be higher for elk, than for antelope and mule deer, due to the higher diet overlap between elk and wild horses for grass species. However, during periods of drought and lower forage production, competition for forage with other wildlife species would increase. As wild horse populations increase in the mid and long-term, competition for forage, space and water may lead to displacement of wildlife species, particularly big game, which may result in the use of less preferred habitat, lower animal condition, and lower capability to survive harsh winters. Greater forage use by increasing wild horse populations would potentially result in lower visual security for nesting GRSG and lower nesting success. These potential impacts would also increase during drought years with reduced plant vigor and production. Although these potential impacts may be lessened with reduced stocking and/or elimination of livestock grazing, wild horses graze further from water sources and often spend time on higher terrain, where their forage use would overlap more with nesting GRSG habitat, than compared to cattle grazing. Disturbance associated with wild horses along stream bank riparian habitat and adjacent upland habitat would be reduced outside the Complex only. Riparian habitat within the Complex would continue to be affected by above AML wild horse use, reducing the quality of GRSG late brood-rearing habitat. This would also increase over time as the horse population increases. This would result in continued impacts to all aquatic species due to increased sedimentation and degradation of habitats (See further discussion in Section 3.3.1 and 3.5.1). Although negative impacts associated with this Alternative would not be as great as Alternative 3, the current trend for both riparian and upland vegetation would not achieve the criteria of GRSG SFA habitat.

**Impacts of Alternative 2: Proposed Action**

Impacts would be more beneficial and widespread compared to Alternative 1. The same number of horses would be rounded up, but the number of wild horses removed would be far greater, thereby reducing riparian and upland vegetation forage removal post-gather. The effects of reducing wild horse numbers to the low AML would help to maintain the population within AML for a longer duration, reducing competition for forage and water resources, as well as nesting habitat and hiding cover with wildlife species. More vegetation (hiding cover) and forage would be available for GRSG during critical nesting and brood-rearing periods, which may increase nesting success and populations. There would be reduced forage competition with elk that would help to maintain the numbers and health of this elk herd. The ability of wildlife populations to endure periods of drought or severe winter conditions would be enhanced by promoting the highest habitat quality under this Alternative. Future gathers would not be needed until wild horse numbers once again exceed the high AML. Riparian resources would not be used as heavily, leaving more vegetation for forage and hiding cover, and improving bank and stream condition and water quality. This is the only Alternative that would continue to maintain or improve resource values supporting SFA criteria for GRSG habitat.

**Impacts of Alternative 3: No Action**

Wildlife would not be temporarily displaced or disturbed as a result of gather operations. However, there would be continually increasing competition with wild horses for forage resources, space, and in some situations, limited water. Although diet overlap is highest between

wild horses and elk, fecal analysis data[4] shows higher wild horse use of winterfat during the winter, which may increase diet overlap with antelope and mule deer. The continued competition for resources would lead to increased stress or displacement of native wildlife species, use of less preferred habitat, and greater potential for reduced fitness and increased animal mortality during severe climate seasons. Wildlife may move to locations outside of the Complex, outside of their traditional home ranges, however, these areas would also likely be occupied by horses, as the population continued to grow. The effects would be greater in limited crucial use habitat areas such as winter habitat, birthing/nesting areas, water locations, and in migration habitats. Additionally, increased competition between wild horses and wildlife species for forage resources, particularly in the spring when plants make and store carbohydrates, would impede long-term vegetation recovery, and encourage non-native or invasive plants to become established, reducing the more desirable species used by wildlife.

Wild horse grazing has been associated with reduced plant diversity, altered soil characteristics, lower grass cover, lower grass density, and 1.6 to 2.6 times greater abundance of cheatgrass (Beever et al. 2008, pp. 180-181). GRSG need grass- and shrub-cover for protection from predators, particularly during nesting season (Connelly et al. 2000, pp. 970-971). Reduction in shrub and grass cover can result in increased predation on both nests and birds, leading to lower nesting success and population. Changes in vegetation diversity and cover may also reduce insects important in GRSG diets, as well as to other wildlife species. These potential impacts would increase during drought years with reduced plant vigor and production. Although these potential impacts may be lessened with reduced stocking and/or elimination of livestock grazing, under this Alternative, wild horses would have to graze further from water sources and since they often spend time on higher terrain, their forage use would overlap more with nesting GRSG habitat, than compared to cattle grazing. In addition to effects in sagebrush habitats, free-roaming wild horses can also degrade important meadow and spring brood-rearing habitats that provide forbs and insects for chick survival (Beever and Aldridge 2011, p. 277; Crawford et al. 2004, p. 11; Connelly et al. 2004, p. 7-37), as streams and springs within sagebrush ecosystems receive heavy use by horses (Crane et al. 1997, p. 380). The effect of expanding horse herds on water and riparian resources due to increasing trampling and sedimentation, and reducing aquatic or riparian vegetation negatively affects all wildlife, including aquatic species, by degrading their habitats. This Alternative would not maintain or enhance resource values supporting the designation of SFA for GRSG habitat.

## 3.3 Soils, and Watershed

### 3.3.1 Affected Environment

The soils in the Red Desert Complex 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 western third is a mix of sandy soils with high wind erosion potential and clayey soils with high water erosion potential, low bearing strength and varying amounts of salts. The

[4] Fecal samples collected for vegetation species composition analysis over various seasons and years between 2002 and 2011. Raw data available in RFO files.

eastern 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 Red Desert Complex. More specific soils information can be found in the soil surveys located in the BLM files in the RFO and LFO.

The southern portions of the Complex extend into the Continental Divide closed basin. The northern portion is part of the North Platte River drainage, including Crooks Creek, Arapahoe Creek, Willow Creek, Cottonwood Creek, and other small tributaries. Additional land management guidance is provided by various agencies, compacts and agreements that are focused primarily but not exclusively upon the North Platte River Drainage. There are few riparian areas in the Complex, located along the limited perennial drainages, lakes, and below seeps and springs which do not flow very far.

Data collected from rain gauges within the Lost Creek and Stewart Creek HMAs has reflected a 10 year average (2005-2014) of about 91% of normal precipitation. The long term trend of precipitation data collected since 1986 (30 years) has been downward. Personal observations of longer trend related to ground water and vegetation response have also been downward, with reservoirs and playa lakes that used to fill with water most years now more commonly dry, with sagebrush encroachment into formerly meadow habitat. Within the recent Standards and Guidelines evaluation period (BLM 2013b), there were drought years in 2006 and 2012. The three HMAs encompassing the Northern portion of the Complex have received normal or above normal precipitation five out of 14 years from 2000 through 2014 (BLM Rain Gauge Data). The LFO portion of the Complex has seen several drought years since the year 2000; 2002, 2012, and 2013 were particularly dry years, resulting in low forage production and plant vigor. Additionally, the persistence of upland species within the riparian systems indicates a drying of the riparian areas. As the wild horse population increases, horses must increase their range in search of available forage and water. The BLM works with livestock permittees to manage the rangelands within the HMAs to maintain a balance between use and available forage during drought or poor forage production years by adjusting the amount of livestock use.

Soil and watershed condition and trend have primarily been evaluated by the amount of plant cover and litter and the amount and/or reduction in bare ground. Within the Stewart Creek grazing allotment there are five pace frequency transects, established in 1980 and re-read in 2012, that showed an average decline in bare ground on three transects from 44 percent to 23 percent, and from 55 percent to 36 percent on the remaining two sites. There are also four line-point transects, established in 1995 and re-read in 2012, which also show reductions in bare ground from 40 percent to 23 percent at two sites and from 52 percent to 41 percent at the remaining two sites. In the adjacent Cyclone Rim grazing allotment one pace frequency transect showed a decline in bare ground from 69 percent to 27 percent between 1980 and 2012, while the remaining transects had static or small decreases bare ground over the same time period.

During this same period, livestock actual use has transitioned from higher levels of sheep use to dominance of cattle use, or in the case of Stewart Creek, all cattle use. The number of livestock permittees has also shrunk in both grazing allotments during this period of time--a reflection in the conversion to cattle and changing economics within the livestock industry, which has led to

more livestock nonuse of permitted AUMs. However, in the late 1990's and early 2000's, wild horse numbers were above AML in both the Lost Creek and Stewart Creek HMAs. At that time, utilization studies indicated moderate to high use in riparian habitat and light to moderate use in sites adjacent to riparian habitats. Wild horse numbers exceeding the high AML were identified as a contributing factor to riparian area degradation within the Lost Creek, Stewart Creek, and the portion of the Antelope Hills HMA within the Cyclone Rim Allotment to not meeting the standards for rangeland health in 2002 (BLM 2003). Following this assessment, there have been changes in livestock management, additional water developments, and protection of historic seeps and riparian habitat to improve animal use and distribution across the Complex. Implementation and completion of these projects may have influenced the assessment of the lower half of the Complex completed in 2012 (BLM 2013b). These allotments were found to be meeting upland and riparian standards, with a static to upward trend in soils and watershed health.

### 3.3.2 Environmental Consequences

**Impacts of Alternative 1**

Gather operations would result in disturbance to the soil surface and may cause some soil compaction at the trap sites and holding locations. Short-term trails and soil compaction may also develop adjacent to the trap site where animals enter the trap. Soil movement could occur during and after runoff events, but would only have a minimal local effect. Increased erosion would continue until the vegetation recovers and stabilizes the soil. It is unlikely that any soil movement would reach drainages that would increase sediment loading into the North Platte River drainage since trap sites would be located away from perennial water sources.

Wild horses captured outside the HMA boundaries would be removed. Soils in these areas would receive minimal year-long grazing by wild horses, and would be grazed by livestock following the permitted numbers and season-of-use. Current trends in increased plant cover and litter in the RFO, and corresponding decreases in bare ground should continue, improving soils and watershed health. The overall net reduction in wild horses would have a beneficial effect on soils and vegetation, but not as much when compared to the Alternative 2: Proposed Action. Wild horse population growth would be slower when compared to Alternative 3. As a result, there would be a potential for short term improvement to rangeland health outside of the HMAs only. The AML would continue to be exceeded within the Complex and wild horse populations would continue to increase but at a slightly slower pace. Year-long grazing use by wild horses would continue to cause deterioration of riparian habitat where it is not fenced for controlled use, and it may cause areas receiving concentrated use to shift from an improving trend (reduced bare ground) to static or downward trend in upland locations.

**Impacts of Alternative 2: Proposed Action**

The disturbance associated with capture and removal operations would be the same as for Alternative 1. However, the gather and removal operations would result in lowering wild horse populations to the low end of AML, reducing year-long grazing from wild horses far greater than either Alternative 1 or Alternative 3. Low levels of wild horses and managed livestock grazing

would continue to support improving soil and watershed health trends across most of the Complex. Levels of bare ground would continue to decrease, and improved plant cover and litter would result in increased moisture infiltration and retention, nutrient cycling, and add to organic matter in the soil surface horizon. Riparian habitat frequently used by wild horses and livestock should improve, depending on livestock season and duration of use and the development of additional water sources. However, effects of long-term hydrologic drought would continue to lead to the drying out of riparian habitat. Proper livestock management should maintain or enhance soil stability and plant cover, although species composition in riparian areas would continue slowly shift to plants with lower moisture requirements.

**Impacts of Alternative 3: No Action**

Wild horse population control measures would not be implemented and gather operations would not occur. This would allow wild horse populations to continue to increase within and outside of the Complex. Soil exposure and watershed deterioration would be similar, although greater than Alternative 1, since they would occur at a faster pace due to no fertility control slowing the population growth and the lack of removal of any wild horses. Year-long grazing use by wild horses would continue to cause deterioration of riparian habitat where it is not fenced for controlled use. There would also be an increase in the potential for larger areas receiving concentrated use to change from an improving trend (reduced bare ground) to static or downward trend in upland locations. These potential impacts to soil and watershed health would be higher than Alternative 1. During drought years, these impacts would increase in amplitude and rate of deterioration of soil resources, and would increase the potential for soil movement into the North Platte River drainage.

## 3.4 Vegetation, Special Status Plants

### 3.4.1 Affected Environment

There are a variety of vegetation types in the Complex, although the dominant vegetation type is sagebrush/grass. Other upland types found include saltbush, greasewood, grassland, mountain shrub, and conifer forest. Common upland plant species include Wyoming and mountain big sagebrush, black sagebrush, Douglas' and rubber rabbitbrush, snowberry, bitterbrush, mountain mahogany, winterfat, Oregon grape, Gardner's saltbush, black greasewood, Indian ricegrass, needle-and-thread, bottlebrush squirreltail, Sandberg's and mutton bluegrass, bluebunch and thickspike wheatgrass, basin wildrye, green needlegrass, Idaho fescue, king-spike fescue, Junegrass, and threadleaf sedge. Forbs are abundant, particularly at higher elevations receiving ten inches or more precipitation annually. Common forbs include phlox, buckwheat, sandwort, bearded-tongue, daisy, locoweed, lupine, paintbrush, sego lily, death-camas, goldenweed, aster, violet, buttercup, bluebells, hawksbeard, and yarrow. Native plants comprise the principle species on most sites, although cheatgrass is present in some areas, particularly on sandy soils.

Riparian habitat is rare, occupying about one percent of the landscape. Community types consist of riparian grassland and willow-riparian. Common plant species include Nebraska and beaked sedge, Liddon's sedge, Douglas sedge, tufted hairgrass, redtop, mat muhly, alkali bluegrass, alkali sacaton, alkali cordgrass, inland saltgrass, basin wildrye, Kentucky bluegrass, spike-sedge, American and alkali bulrush, other sedges and rushes, brookgrass, coyote willow, Booth' willow,

Geyer willow, gooseberry, and shrubby cinquefoil. Forbs are more abundant on non-saline sites, and include buttercup, plantain, prickly-lettuce, willow-weed, mint, speedwell, monkey flower, gentian, meadow pussytoes, checker-mallow, cinquefoil, aster, sunflower, wild licorice, strawberry, clover and native thistles.

Wild horses generally prefer perennial grasses as forage when available. Fecal analysis from the Stewart Creek HMA in the spring and fall documented 98 percent diet of grasses and sedges, while fecal analysis from the Lost Creek HMA generally shows wild horses selecting these same species 70-80 percent of the time. The principle change is during winter conditions, when wild horses may select more shrubs, primarily winterfat, and during severe periods it became the dominant plant consumed. In comparison, cattle diets at Stewart Creek were similar during the spring, but contained over 20 percent shrubs during the fall, and antelope diets consisted of 84 percent shrubs during the spring and 99 percent shrubs during the fall, primarily big sagebrush. Diets of elk on Crooks Mountain and Green Mountain would have a high overlap with wild horse diets, similar to the cattle diets already discussed. Wild horse diets at the Lost Creek and Stewart Creek HMAs were led by bluegrass, followed by needle-and-thread and bluebunch wheatgrass, with Indian ricegrass also commonly selected for at Lost Creek. Cattle diets in the Stewart Creek grazing allotment were similar to that of wild horses, except for more sedge in the spring diet, and generally reflects what are the most common and available grass species for ungulates to forage upon[5].

Condition and trend in upland vegetation in the Lost Creek and Stewart Creek HMAs has been collected from pace frequency transects established in 1980 and line-point transects established since 1995, with all transects re-read in 2012. During most of this timeframe, wild horses numbers were at AML and livestock use was declining following sheep conversions to cattle and reduced stocking rates after the Seven Lakes Grazing EIS (1979) was implemented. Projects associated with the EIS included the drilling and equipping of over twenty water wells, most of them in the Stewart Creek grazing allotment, and intended to provide reliable water and proper distribute summer cattle use. However, the combination of large mill fans and high winds resulted in the failure of the pumping facilities, which were later replaced with generators and more recently solar arrays. The majority of these wells currently pump about 3-4 gallons per minute (gpm) and water up to 150 cattle and/or wild horses per day during the peak summer period. Besides varying livestock turn-out location between the east and west sides of the allotment, these wells that are primarily located on the west side, provide the opportunity to affect the distribution of livestock use by changing which wells are on versus the ones that are off. For more recent livestock stocking rates and operation descriptions, refer to the Livestock Grazing Section 3.6.

All five pace frequency transects and the four older line-point transects were re-read and photographed as part of the watershed assessment conducted in 2012 and the report written in 2013. These studies show decreased numbers of rhizomatous wheatgrass and increased

[5] Fecal samples collected for vegetation species composition analysis over various seasons and years between 2002 and 2011. Raw data available in RFO files.

bunchgrasses, primarily Indian ricegrass, needle-and-thread, and little bluegrass (2013b). All of these species are native plants, however, rhizomatous wheatgrass is the least desirable, most grazing tolerant species, and has also decreased in other allotments once changes in grazing management of livestock were implemented. There were also many young plants observed, including grasses, forbs and shrubs, as a result of wet years in 2009-2011, and grazing management that promoted their establishment. Another element of the watershed assessment included establishment or re-read of eight Habitat Assessment Framework (HAF) transects in GRSG nesting/early brood-rearing habitat. The transects depict healthy big sagebrush stands with adequate understory cover, and varying forb cover depending on elevation and precipitation. However, the severe drought year observed in 2012 has since led to decreased cover of sagebrush, particularly in the southwest portions of the Stewart Creek HMA.

Condition and trend in riparian vegetation in the Lost Creek and Stewart Creek HMAs has primarily been through the use of photo-points and personal observations. The overall drying hydrologic trend has resulted in reduced ground water and sagebrush encroachment along lower Stewart Creek, in-sufficient water in upper Lost Soldier Creek to support beaver colonies once present there, and reduced runoff and collection of water in playa lakes within the Cyclone Rim grazing allotment. Wetlands at Lumen Well in Cyclone Rim were fenced for wildlife in the early 1980s to preclude ungulate grazing. In areas of riparian habitat that stay wetted, past compliance checks and utilization studies had shown moderate to high use, resulting in changes in management and later on not meeting Standards of Rangeland Health for riparian/wetland habitat. As a result, Kinch-McKinney spring in Cyclone Rim grazing allotment and lower Stewart Creek in the Stewart Creek grazing allotment, were both protected with exclosure fences with off-site water developed to improve riparian habitat condition on public lands. Chicken Springs, located on private and public land, was fenced out and excluded from ungulate grazing in 1996, and now supports riparian vegetation instead of bare ground. Riparian habitat at and above A&M Reservoir has been excluded from ungulate grazing since the mid-1990s as well, and now supports healthy riparian vegetation. Lost Soldier Creek has improved by restricting livestock grazing during the summer (hot season) and minimizing wild horse numbers when gathers have occurred. Riparian pastures were established at Bull's Creek (2004) and upper Stewart Creek (2006) that have improved riparian habitat on State of Wyoming lands by eliminating summer grazing. Desired grazing species, such as Nebraska sedge and tufted hairgrass, now have the entire growing season for plant growth that should maintain or expand their vigor, production and cover. Openings for plants that reproduce by seed have been reduced, which has led to decreased observations of meadow thistle. In addition, flows into upper Stewart Creek, Lost Soldier Creek, and upper Osborne Draw (above and below A&M Reservoir), have been augmented with well water, which provides additional drinking water and enhances riparian vegetation.

Monitoring in the Antelope Hills HMA, Crooks Mountain HMA, and Green Mountain HMA have primarily been focused on riparian condition in the form of frequency transects, photo points and stubble height evaluations. Upland line point intercept transects established and evaluated between 1999 and 2010, and more recently in 2014 and 2015 indicate a high degree of variability in conditions in upland ecosystems, with most sites falling within a mid to late seral state of ecological succession. Riparian areas make up less than 1 percent of the ecological types in the HMAs. Conditions in these systems prior to 2011 have generally been below what is

expected for the site with inadequate residual stubble height to promote soil stability and water retention. Species vigor on riparian areas has been poor, with higher than expected percentages of bare ground, and encroachment of upland species. Utilization by livestock and wild horses in riparian systems between 2011 and 2013 continued to result in inadequate residual cover. However, conditions have steadily improved in 2014 and 2015 due to favorable climate conditions and livestock herding efforts by grazing permittees. Immigrant Springs and Sulfur Bar Spring (in the Antelope Hills HMA), and Soap Holes and Haypress Creek (in the Crooks Mountain HMA) represent the common areas where vegetation objectives consistently are not met. LFO staff observations indicate concentrations of wild horses at all of these locations. Conversely, upland conditions are generally regarded as good with plant community composition and cover represented within the range of variability that is appropriate for the ecological sites based on the observations of resource professionals and more recent line point intercept transect data collected in 2014 and 2015. Where site characteristics fall outside the normal range of variability, the conditions are believed to be the result of extensive drought conditions, as livestock stocking rates are extraordinarily light at approximately 20 acres/AUM, and use levels have been light (see Section 3.6 for more information).

**Threatened, Endangered, Proposed and Candidate Species**

One federally designated threatened, endangered, proposed, or candidate plant species has the potential to be present--Ute ladies'-tresses (Threatened). The federally listed Ute ladies'-tresses occurs in riparian habitat, which is found in the area, but surveys have not found any populations. Project activities would not take place in riparian habitat; therefore gather activities would result in no impacts to Ute ladies'-tresses.

The blowout penstemon and Colorado butterfly plant and its Critical Habitat are not present and do not have habitat present; therefore, there would be no effect to these species as a result of implementing the proposed gather.

**Sensitive Plant Species**

Sensitive plants that have the potential to occur include the Cedar Rim thistle, Ownbey's thistle, persistant sepal yellow cress, Laramie false sagebrush, and Gibben's penstemon. Prior to placement of horse gather holding facilities, desktop analyses would be conducted to identify areas with known special status plant species (SSPS) or potential habitat. Analyses would be based on occurrence records and potential occurrence modeling data from the Wyoming Natural Diversity Database, as well as BLM internal records. Onsites would be completed for all trap locations and results would guide holding facility placement to avoid SSPS and potential habitat. Therefore, there should be no impacts to SSPS as a result of implementing the gathers beyond what occurs normally by wild horse movements.

**Invasive and Noxious Weeds**

Federal agencies are directed by Executive Order 13112, Invasive Species, to expand and coordinate efforts to prevent the introduction and spread of invasive plant species and to minimize the economic, ecological, and human health impacts that invasive species cause. Weed populations are generally found along dirt roads and two-tracks, in areas of animal (livestock, wild horses and wildlife) concentration, in areas of oil and gas development, and in areas of intense recreational use. Motorized vehicles transporting seeds can be a major source of new infestations of weed species. Within the Lander BLM Field Office portion of the Complex, the

Fremont County Weed and Pest (FCWP) inventoried for the presence of noxious or invasive species in 2007 and are scheduled to re-inventory in 2018. From the inventory in 2007, Early Detection Rapid Response Areas (EDRR) were established where noxious weeds were found and have been visited for treatment at least one time every year. From the 2007 inventory, the FCWP determined that the LFO portion of the Complex was relatively weed-free. The RFO portion of the Complex has not been completely inventoried, but areas inventoried so far are relatively weed-free.

Noxious and invasive species known to occur in the Complex include: Russian knapweed, spotted knapweed, houndstongue, Canada thistle, saltcedar, Russian olive, leafy spurge, whitetop (hoary cress), perennial pepperweed, Swainson pea, black henbane, halogeton, cheatgrass, and Russian thistle. Most of these infestations are small and have been kept in control using the Integrated Pest Management (IPM) approach.

Post–gather weed monitoring of trap sites would be performed for 1-3 years after the project. If noxious weeds are found, the site would gain EDRR status and would be treated every year as needed.

### 3.4.2 Environmental Consequences

**Impacts of Alternative 1**

Gather operations located inside and outside the Complex would result in trampling of vegetation at the trap sites and holding locations. The number of trap sites used during a gather can fluctuate depending on horse distribution, terrain, and seasonal limitations on horse movement (i.e. temperature, precipitation). Each trap site and holding facility varies in size, but is generally less than two acres. If a particular trap site is used, wild horses would be kept there until they can be loaded onto semi-truck trailers and moved to a processing facility. The amount of time wild horses stay at a trap site is generally less than one day. Upland vegetation would be disturbed by trap site construction, and short-term trails may be created near the trap sites. Any vegetation removed would be minimal and localized. These sites are used infrequently, providing the herbaceous vegetation time to recover. However, there could be loss of some vegetation, primarily big sagebrush, within these small concentrated use areas. Overall, the total acreage disturbed would be small in relation to the gather area and these impacts would be on a local scale only. Monitoring post-gather would ensure that any temporary trap site that did not reclaim adequately would receive additional management. In order to avoid riparian area disturbance, trap sites and holding locations would not be located within or directly adjacent to riparian habitat; thus these areas would not be disturbed by gather operations.

The removal of an estimated 578 wild horses from outside HMAs and the implementation of fertility control would eliminate year-long grazing use by wild horses and increase forage availability for livestock and wildlife in the short-term. This would also promote continued improvement in vegetation condition, primarily plant cover and litter, in conjunction with the use of good livestock management practices. Riparian systems outside the Complex, would initially receive more rest that would improve plant vigor and promote expansion of desirable plant species. In the mid and long-term, these beneficial effects to riparian and upland vegetation

would decrease as wild horses within HMAs increased and moved outside the Complex. Within the Stewart Creek HMA this rate of movement by wild horses outside could increase if livestock numbers decrease resulting in fewer water wells being pumped. The 20 percent reduction in wild horses would have a beneficial effect on vegetation outside of the Complex, but not as much when compared to Alternative 2: Proposed Action. Wild horse population growth would be slower when compared to Alternative 3. As a result, there would be a potential for short-term improvement to riparian health and adjacent upland rangeland health outside of the Complex only.

Within the Complex, perennial upland vegetation and riparian would continue to receive increasing year-long grazing as wild horse numbers slowly increase following the fertility control, which is not conducive to maintaining plant health and vigor of desirable species. Plants draw nutrients from reserves in their roots to initiate plant growth in the spring, which must be replenished during the growing season to maintain or expand the root system. Repeated moderate to heavy grazing throughout the growing season does not allow these nutrients to be replaced, resulting in shrinkage of the root system and reduced plant vigor and forage production. This trend could also increase the potential for increases in less desirable native species, such as thickspike wheatgrass and little bluegrass, or invasive species like cheatgrass and alyssum. Bluegrass is currently the highest component of wild horse diets in the Stewart Creek and Lost Creek HMA data[6], and is considered an "increaser" species compared to most other bunchgrasses which are "decreaser" species with higher grazing use during the growing season. However, continued high use of bluegrass could lead to greater amounts of other plant species as wild horse numbers increase. The current high wild horse numbers when combined with actual use levels of livestock use, would result in reduced plant vigor and production of desirable species within riparian habitat and upland vegetation adjacent to this habitat or to other water sources. Negative trends in riparian habitat health already observed would continue or worsen. The effects of these negative trends in vegetation condition for riparian habitat and upland vegetation would be greater during years with lower than average growing season precipitation, and would likely extend further away from water sources. In the Stewart Creek grazing allotment, the potential for negative trend in upland vegetation health would increase if fewer water wells are turned on, resulting in more concentrated grazing around water wells that are being pumped to provide water for livestock and wild horses. .

Water developments constructed (authorized in the 2011 Green Mountain Common Allotment (GMCA) final grazing decision) would result in adjustments in managed livestock use which would reduce livestock use in nearby riparian areas. However, most wild horses would continue to utilize "favored" watering sites which would result in continued concentrated riparian use and degradation. Negative impacts from this alternative would be greater when compared to Alternative 2: Proposed Action, and less than those for Alternative 3.
Reclamation efforts would be less likely to succeed as the wild horse population increases. Oil and gas well pads would require fencing for initial recovery of vegetation; however, once fences

[6] Fecal samples collected for vegetation species composition analysis over various seasons and years between 2002 and 2011. Raw data available in RFO files.

were removed, grazing by wild horses would result in loss of vegetation and destabilization of soils similar to adjacent rangelands. Linear features are rarely fenced due to both the cost and restrictions they would place on movement of wildlife, wild horses, and livestock. These sites would likely receive grazing use that would reduce or eliminate desirable species and promote weeds, less palatable native plant species and bare ground which would, in turn, lead to increased soil erosion and water runoff into drainages and adjacent rangelands.

**Impacts of Alternative 2: Proposed Action**

The impacts associated with wild horse capture and removal operations would be the same as for Alternative 1. However, wild horse numbers would be reduced to the low end of AML, which would have the greatest benefit to vegetation resources of all the alternatives, both inside and outside of the Complex. Outside the Complex the vegetation response would be similar to Alternative 1 in the short term, but would also extend into the mid and long-term since fewer horses would be likely to move outside the Complex in search of forage, water, or due to competition with other wild horses, wildlife, or livestock. This would extend the period of time that benefits to plant vigor and forage production would occur. Long-term benefits to vegetation may also promote the expansion of desirable plant species, resulting in increased species composition, site stability, and reduced potential for invasion and/or expansion of invasive, non-native species.

Impacts to vegetation resources would also be beneficial with the reduction in wild horse numbers and the use of fertility control to slow future population growth. Lower numbers of wild horses with year-long use, in combination with livestock grazing involving some type of deferred-rotation grazing systems, would provide the optimum opportunities for maintaining or improving plant vigor, production and species composition in both riparian and upland vegetation communities. Desirable bunchgrasses, such as Indian ricegrass, needle-and-thread, bluebunch wheatgrass, bottlebrush squirreltail, green needlegrass, and basin wildrye, should be maintained or enhanced by reducing grazing use through all or a portion of the growing season. Key species in riparian habitat, such as Nebraska sedge and tufted hairgrass, would have a greater potential to be maintained or enhanced. A few key riparian areas where wild horses always use, even at lower population levels, may remain in their current condition. Effects of long-term hydrologic drought, that results in the drying out of riparian habitat, would still continue and not be changed by lower levels of use by wild horses or managed use of livestock grazing. The use of pumped water wells to vary seasonal distribution of grazing use by livestock and wild horses in the Stewart Creek grazing allotment could be employed. Water developments constructed (authorized in the 2011 GMCA final grazing decision) within the Antelope Hills HMA would result in improved livestock management which would reduce livestock use in nearby riparian areas. Reduced numbers of wild horses would still utilize “favored” watering sites which would result in continued concentrated riparian use and degradation in these localized areas, however, most riparian habitat should improve with less use. This would also help promote improved upland plant vigor and production, and expansion of herbaceous species where sagebrush die-off occurred after the 2012 drought.

**Impacts of Alternative 3: No Action**

Wild horse population control measures would not be implemented, no gather operations would occur, and wild horse numbers would continue to increase within and outside of the Complex. Negative impacts to vegetation resources would be greater than Alternative 1, and far greater than Alternative 2. Outside of the Complex, year-long use by wild horses would continue and increase as the wild horse population grows and the potential for additional wild horse movement outside of the Complex increases. Grazing use by wild horses and livestock (when present) would continue to overuse desirable plant species in riparian habitat, resulting in lower plant vigor and production, and increase the potential for reduced species composition and an increase in less desirable species, such as Baltic rush, alkali sacaton, mat muhly, Kentucky bluegrass, arrowgrass, and dandelion. At higher levels of utilization of riparian habitat, species of willow may also be overgrazed and reduced in vigor, production, and composition. These impacts to herbaceous and woody species would be compounded by additional years of below average precipitation during the growing season, and the continued drying out of these riparian systems due to the long-term hydrologic drought this region has been experiencing since the 1980s. Currently, there are no areas identified with downward trend in upland vegetation condition, however, as levels of forage use increase in the mid and long-term, the potential for reduced vigor and production of desirable plant species, particularly adjacent to water sources and riparian habitat, would increase. However, wild horses roam much further away from water sources than cattle, so the negative impacts to plant vigor and production may occur further away, as well as close to water sources. These impacts would also extend out farther from water sources as wild horse populations increase and during years with below average precipitation during the growing season. This would also be accompanied by increased potential for the introduction and/or expansion of invasive, non-native plant species where native plant species are being overused. Livestock grazing management may have to change in other pastures or allotments that are not affected by wild horse populations, which could negatively affect vegetation resources where wild horses are not present. However, higher wild horse populations could increase the potential for the fencing of private and state lands, which could lead to improved vegetation conditions in those locations once wild horse use is excluded and good livestock management practices are followed. Reclamation projects of disturbed sites would be difficult to achieve successful results without fencing them to exclude grazing use by wild horses and/or livestock.

Inside of the Complex, wild horse numbers and use would be the highest, resulting in similar impacts as described in the paragraph above, but would occur more quickly in localized areas in the short-term and become broader in effect in the mid and long-term. As wild horse populations increase, the potential to restrict or eliminate livestock use would increase, particularly during years with below normal precipitation. Reducing livestock numbers, and/or deferring turn-out of livestock until after the growing season would reduce the negative impacts upon vegetation resources described above. However, in the Stewart Creek grazing allotment, elimination of livestock use could result in water wells not being pumped. This would concentrate wild horses on remaining water sources, further adding to the negative effects described above, and potentially leading to loss of riparian vegetation and increased levels of bare ground. It could also increase the potential for movement out of the Complex, particularly during drought years, when there may not be adequate water for wild horses or other users.

## 3.5 Recreation

### 3.5.1 Affected Environment

The public enjoys seeing wild horses roaming free. Although demand is not high, some people (residents and nonresidents) make special trips to see wild and free-roaming horses in their natural environment.

Other recreation 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 include camping, hiking, rock hounding, photography, wildlife and wild horse viewing, off highway vehicle (OHV) use, and sightseeing. While varied recreation activities and values occur, the one most likely to be affected is hunting.

Several of the gathers are proposed in elk and pronghorn hunt units currently under Wyoming Game and Fish special management criteria. This means that the Wyoming Game and Fish reduces the amount of special draw licenses to ensure a higher male to female ratio and therefore a higher chance for a hunter to harvest a trophy class animal. In addition, because tag numbers in remain fairly low, hunters expect to be able to find solitude and high numbers of male animals.

### 3.5.2 Environmental Consequences

**Impacts of Alternative 1**

Rangeland health would improve only slightly when compared to the Proposed Action. The aesthetic quality of recreational opportunities, such as hiking, wildlife viewing, and hunting are not expected to be as beneficial as Alternative 2: Proposed Action. Opportunities to view wild horses in the Complex would continue, however, they would be mostly limited to the HMA boundaries. Gather activities may interrupt or interfere with viewing opportunities and make horses harder to find in the short term. Fertility control treatment would be expected to slow population growth; opportunities to view mares with foals during the next 2-3 years would be slightly reduced over the present situation. Viewing opportunities associated with the presence of wild horses would continue to increase.

The gather operation could occur during fall hunting seasons. If gathering occurs during hunting season, the hunting experience could be diminished within hearing distance of the helicopter, paths of horses being gathered, and a resultant increased awareness of game animals to activity. Affected hunters would likely relocate to areas of the hunt unit not affected by the gather activities. This relocation can reduce visitor satisfaction with the hunting opportunities and experience, and or increase hunter densities in areas not disturbed by the gathers. If elk or other big game become displaced due to increasing wild horse populations, the quality of hunting opportunities and hunter success would likely be reduced.

**Impacts of Alternative 2: Proposed Action**

Impacts associated with capture and removal operations would be similar to Alternative 1. Fewer wild horses would be available for viewing following the gather because excess horses within and outside the Compolex would be removed to the low AML. As a result, habitat conditions are likely to improve at a much faster rate than under Alternative 1, resulting in indirect benefits to wildlife (higher reproduction rates, greater hiding cover, less competition for forage/better body condition, etc.) and recreationists (more wildlife). In years 2-3 following the gather, viewing opportunities of mares with foals would be slightly reduced as a result of removing excess wild horses and applying fertility control to a small portion of the mares. Quality of hunting opportunities would be maintained.

**Impacts of Alternative 3: No Action**

Impacts from gather operations discussed under Alternative 1 and Alternative 2: Proposed Action would not occur. However, the impacts from high horse numbers would be similar to but greater than Alternative 1.

## 3.6 Livestock Grazing

### 3.6.1 Affected Environment

The rangelands in the HMAs provide seasonal grazing for cattle and sheep (See Table 5).

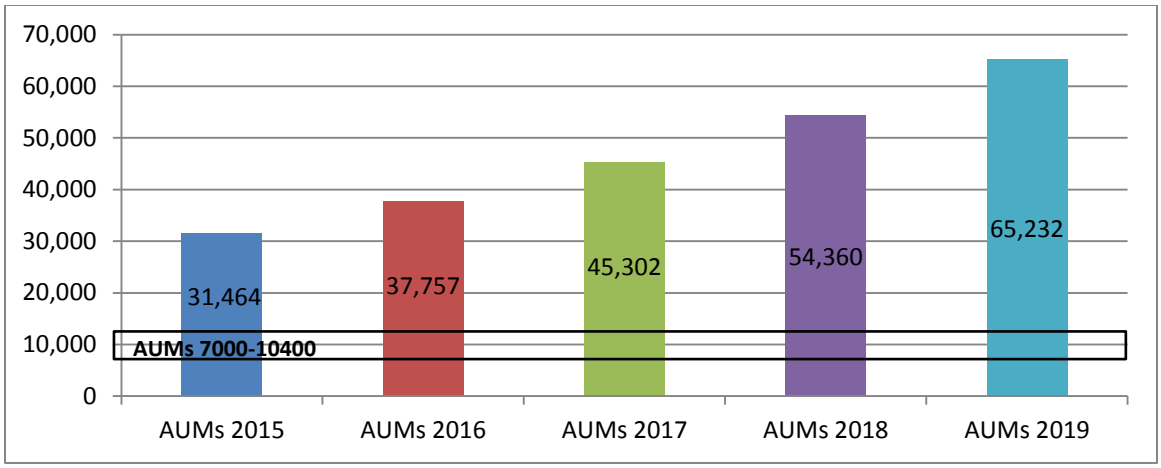
**Table 5. Red Desert Complex Allotments**

| Allotment Name and Number | HMA | Number and Kind of Livestock | Authorized Use Period | BLM AUMs | Exchange Of Use AUMs | Number of Permits within the Allotment |
|---|---|---|---|---|---|---|
| Alkali Creek Sheep #17057 | Crooks Mountain | 2,686 S | 04/01-04/30, 10/02-10/31 | 1,060 | 0 | 1 |
| Antelope Hills #17055 | Antelope Hills | 1,581 C<br>2,868 S | 05/20-09/20, 05/20-10/01 | 8,365 | 1,225 | 10 |
| Arapahoe Creek #17056 | Crooks Mountain, Green Mountain | 2,756 C<br>2,422 S | 05/01-10/01, 11/01-03/31 | 15,077 | 0 | 12 |
| Mountain #32030 | Green Mountain | 371 C | 05/01-11/16 | 1,976 | 305 | 2 |
| Whiskey Peak Incommon #12003 | Green Mountain | 1010 C<br>2,528 S | 06/01-12/31, 07/16-11/30 | 7,739 | 0 | 2 |
| Stewart Creek #10102 | Stewart Creek | 89 C<br>760 C<br>505 C<br>48 C | 11/1-4/30<br>5/16-12/30<br>5/1-11/16<br>5/28-8/30 | 8,380 | 0 | 4 |
| Cyclone Rim #10103 | Lost Creek, Antelope Hills | 600 C<br>2043 C<br>5930 S<br>3580 S<br>811 S<br>170 S | 5/1-12/15<br>11/1-4/30<br>10/1-4/15<br>11/1-3/31<br>5/25-12/9<br>5/1-7/15 | 27,292 | 0 | 4 |

Available forage production within the Complex is allocated to livestock and wild horses. Forage use is authorized to livestock operators based on the Animal Unit Month (AUM) of vegetation production. An AUM is the amount of forage needed to maintain a 1,000 lb. cow and her calf for one month. Approximately 71,000 BLM AUMs of forage have been authorized yearly to the livestock operators (Table 5). Actual use of this allocation varies by year due to precipitation kind, amount and timing; vegetation production; economic and labor fluctuations; and operational needs of the ranch. In the following equation, an Animal Unit (AU) is an adjustment applied to an AUM depending on the animal being compared. The standard AU for wild horses is 1.2. This is based on the efficiency of digestion of feed the horse exhibits vs the standard of a 1,000 lb. cow. Approximately 10,500 AUMs would be used by wild horses at high AML (724 Horses * 1.2 Horses/AU * 12 Months). As wild horse numbers increase, forage used

by wild horses naturally increases. Currently (2016), wild horses use approximately 27,000 AUMs more than they would at high AML (Figure 4).

**Figure 4. Projected AUMs of forage required to maintain wild horses**




The above Figure shows the AUMs required to maintain wild horse numbers (See Figure 3) beginning in 2015. AUMs required to maintain wild horses within the AML range is 7,000 to 10,400.

Two grazing allotments in the RFO occur within the Stewart Creek and Lost Creek HMAs (Map 2), Stewart Creek and Cyclone Rim. Stewart Creek grazing allotment boundary is similar to the HMA boundary, except, the allotment also includes a pasture of about 5,000 acres that contains the town of Bairoil and the Lost Soldier and Wertz oilfields. This grazing allotment is totally fenced to control livestock use, although portions of the west boundary are let-down during the winter to facilitate antelope movement. There are four livestock operations permitted to graze cattle; three with spring through fall use comprising 94 percent of authorized grazing use, and one small permit with winter use. The total authorized grazing use on public lands is 8,267 Animal Unit Months (AUMs), although actual use between 2003 and 2014 averaged 62 percent with a range of 2,314 to 7,573 AUMs. Since 2012, one new livestock operation has used the two largest grazing permits that comprise 92 percent of the authorized public land AUMs. This livestock operation initially reduced stocking rates voluntarily due to reduced forage availability as a result of the severe drought in 2012, the effects of which also carried over into 2013. In addition, several old water wells were re-equipped with solar pumping systems to improve the number and location of reliable water sources. With their private investment into ten new solar arrays and pumps, along with the eight provided by BLM and other partners, this livestock operation is working to improve livestock distribution of use and more fully utilize their grazing permits.

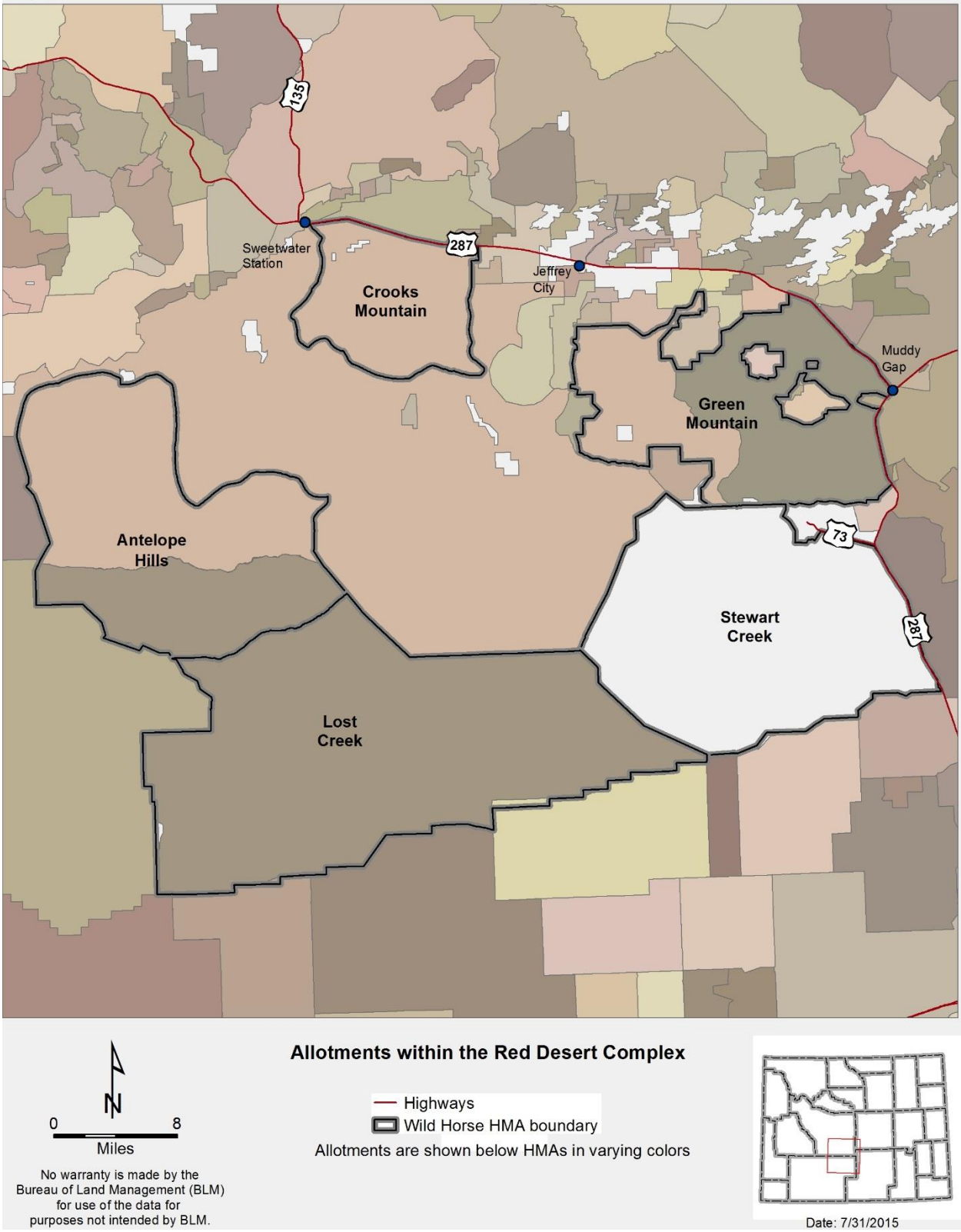
Cyclone Rim grazing allotment encompasses all of the Lost Creek HMA in the southern portion, and part of the Antelope Hills HMA along the northern border. This grazing allotment is not fenced along the northern border where it follows Cyclone Rim. There are six livestock operations permitted to graze cattle (57 percent of allotted AUMs) and sheep (43 percent), with over three-quarters of the grazing use permitted during the fall and winter. The total authorized grazing use on public lands is 27,292 AUMs, although actual use between 2003 and 2014 averaged 35 percent with a range from 7,334 to 11,309 AUMs. Grazing use has primarily been

made by three livestock operations, one with summer cattle use, one with winter cattle and sheep use, and one with winter sheep use. All three of these livestock operations are fairly consistent in their year-to-year grazing use, and have increased voluntary nonuse during drought years. The lack of fencing along Cyclone Rim and winter let-down fencing along the northeast border results in reduced cattle use on the northern portion of the grazing allotment, due to the concern of lost cattle if they drift north and into other grazing allotments. There has been limited conversion to solar pumping systems on water wells, with generators still in use that are moved to different well locations to manage livestock distribution of use.

The Stewart Creek and Cyclone Rim grazing allotments were assessed for meeting the Standards for Rangeland Health (BLM 2003 and BLM 2013b), and initially failed Standard #2 for Riparian Health partly due to livestock grazing. As a result, an exclosure was constructed on lower Stewart Creek in Stewart Creek grazing allotment and a spring development/exclosure was constructed at Kinch-McKinney Spring in Cyclone Rim grazing allotment to protect and enhance these sites, which were meeting Standard #2 in the latest assessment. In addition, BLM has worked with grazing permittees in the Stewart Creek grazing allotment to protect riparian habitat on private and State of Wyoming lands by constructing exclosures and riparian pastures to further improve riparian area management. These projects result in removing access by livestock and wild horses to natural water sources, which now require pumping of water wells to provide adequate water during most of the summer and fall months. Water wells are used on the western two-thirds of this allotment to rotate seasonal grazing use to improve perennial plant vigor and production. Within the Cyclone Rim allotment, one solar-equipped water well is operated by the BLM to provide an alternate water source, in addition to water wells being operated by the permittee. However, the low of amount of summer livestock grazing does not require as much water pumping when compared to the Stewart Creek allotment.

Five grazing allotments in the LFO occur within the Antelope Hills, Crooks Mountain, and Green Mountain HMAs. In 2011, the GMCA was divided into four smaller allotments (Antelope Hills, Arapahoe Creek, Alkali Creek Sheep, and Mountain). Permitted use in the GMCA averaged approximately 47,672 total AUMs from 1980-2010 with actual use averaging approximately 48% of total permitted use. The actual use from 1980 ranged from approximately 7,735 AUMs in 2002 up to 34,903 AUMs in 1994. In 2011, the LFO issued a final grazing decision that modified the existing grazing rotation, implemented new grazing infrastructure and vegetation standards, and reduced AUMs by approximately 45%. The resulting permitted use for the Antelope Hills, Arapahoe Creek, Alkali Creek Sheep, and Mountain allotments is approximately 26,476 total AUMs. Total authorized used since 2011 has averaged less than 70% ranging from 6,846 AUMs in 2013 to 13,153 AUMs in 2012. While 2014 and 2015 represented improvements in forage production, livestock permittees continued to take various levels of voluntary non-use. Like the RFO, this nonuse has been voluntarily taken by permittees due to drought and reduced vegetation production. Livestock grazing permittees in the Antelope Hills, Arapahoe Creek, and Alkali Creek Sheep allotments are required to meet stubble height and other vegetation monitoring standards. This portion of the Complex has more natural perennial water sources and water wells are not as relied upon for livestock watering.

Map 2. Allotments within the Red Desert HMA Complex



The former GMCA was evaluated for rangeland health in 2002, including the Antelope Hills, Crooks Mountain, and Green Mountain HMAs. An update to the 2002 evaluation was conducted in 2010 and supplemental information regarding rangeland health was incorporated into the environmental analysis for permit renewal. The general findings of both the 2002 and 2010 evaluations indicate that upland range conditions are acceptable and meet the Wyoming Standards for Rangeland Health. Conversely, riparian conditions and the adjacent uplands within 300 feet, have been identified in degraded condition with a high degree of departure from what is expected for these sites and thus do not meet the Wyoming Standards for Rangeland Health. Recent observations continue to support the findings of the 2002 and 2010 evaluations. Failure to meet rangeland health standards has been attributed largely to livestock grazing, with areas of concentration associated with wild horses and wildlife. Specifically, the areas of Immigrant Springs and Sulfur Bar located in the Antelope Hills HMA, as well as Soap Holes and East Arapahoe Creek in the Crooks Mountain HMA have higher concentrations of wild horses that contribute to riparian use.

Quantitative monitoring data within the HMAs are limited and primarily focused on riparian condition based on the qualitative assessments conducted in 2002. Frequency data was collected between 2002 and 2008 at 17 separate riparian sites within the former GMCA, 8 of which were located in or adjacent to the Antelope Hills, Crooks Mountain and Green Mountain HMAs. These data indicate a higher percentage of bare ground than expected, with declining levels of vegetative cover, and a lack of age class diversity in woody species. Additionally, the persistence of upland species within the riparian systems indicates a drying of the riparian areas. Congruent stubble height data collected in these same locations indicated continued overgrazing resulting in inadequate residual cover to maintain soil stability and foster riparian recovery. However, following changes in grazing management (2011-Present), the more recent stubble height data indicates that stubble height objectives of 4-6 inches are generally met within riparian key areas. The exception to this is in the vicinity of Immigrant Spring, Sulfur Bar, and Soap Holes where objectives have not been met on average over the past 3 out of 5 years. If stubble height requirements are reached or exceeded, permittees are required to remove livestock from either the selected regions or eventually from the allotment. While it is difficult to draw conclusions from or separate wild horse and livestock utilization in these systems, the continued inability to meet stubble height objectives can reasonably be attributed to both livestock and wild horse use.

Fencing is primarily used to manage livestock within designated pastures or grazing allotments. Fencing can help reduce impacts to soil and plants by providing rest or deferment from livestock use. Because of the number of HMAs within the Red Desert Complex, there is a limited amount of fencing within the gather area when compared to adjacent areas of both field offices.

### 3.6.2 Environmental Consequences

#### Impacts of Alternative 1

The proposed gather could directly interfere with livestock operations within or adjacent to the HMAs. Gather operations may temporarily cause some disturbance to livestock, especially when the livestock are also being gathered and moved. Livestock operators would be notified prior to

the gather, enabling them to take precautions and avoid conflict with gather operations. If gather operations are conducted after the authorized grazing period, the interference to livestock operations could be eliminated, but most operators have livestock use permitted during the summer and fall.

Over the short term (1-3 years), the quantity of forage for livestock use would be fully available outside the Complex where wild horses would be removed. In addition, there would be decreased competition for water resources and reduced fence damage and associated maintenance costs incurred by permittees. Over the mid to long-term, these benefits to livestock grazing would decrease as the potential for wild horses to move outside of the HMAs increases. However, during drought years, the potential for wild horse movement outside of the HMA boundaries may be even greater, resulting in increased competition with livestock for forage and water. In Stewart Creek allotment, under drought conditions (which average one out of five years—see Section 3.4.1), combined with wild horse numbers over four times AML, livestock operators may reduce or eliminate cattle. In pastures where livestock use was not being made, water wells that are maintained by the permittee would not be turned on which would limit water availability, further encouraging horses to leave this HMA and affect other livestock operations outside the HMA.

Within HMAs, wild horses would be gathered, mares would be fertility treated, and the horses would be placed back into their respective HMAs. Since the horse numbers would still exceed the AML, there would be continued competition with livestock for forage and water. As wild horse populations increase, livestock operators may have to decrease or remove livestock, with these impacts likely greater to those operations with fall or winter permitted seasons of use. Livestock operators may have to further decrease livestock use or eliminate livestock use all together in some areas within HMAs in drought years. Livestock operators may be asked to turn on and maintain all water wells to provide adequate water for livestock and wild horses, instead of leaving some water wells off to rotate distribution of grazing use (for further discussion, see Section 3.4.1). This would increase the time spent on management of livestock and facilities. Displacement of livestock would continue around water sources. However, as time progresses, livestock and wild horse conflicts would increase as the horse population increases due to direct competition for forage, space, and water. All operators are required to meet rangeland health requirements, and some livestock operators are required to meet additional requirements in order to continue using their permits. Where minimum stubble height requirements are already met by wild horse use, livestock operators may not be able to turn out their livestock, causing a direct impact to their operations.

Currently (2016), an estimated 27,000 AUMs are used by wild horses beyond what would be used at AML. By 2017, this number of AUMs would equal the current actual use being made by livestock grazing within the Complex, and when added together would equal the entire AUM level permitted to livestock operators. In drought years there would not be adequate forage to meet this demand and livestock use would be reduced. Over the mid to long-term (3+ years), wild horse numbers would increase because of the fertility control treatments would no longer be effective. As a result, there would be greater competition with permitted livestock for forage and water, and the potential that livestock use would be reduced or eliminated would increase, particularly during drought years.

As wild horse populations increase, the potential for movement outside of the Complex would also increase, as available forage, water, and space would become more limiting within HMAs. As the wild horses expand their range, additional livestock operators would be impacted, including those with large amounts of private land. Landowners would request lawful removal of wild horses from private land as wild horses return to areas outside HMAs. Range conditions within HMAs would deteriorate, which may further restrict livestock use, and even after wild horses are gathered in the future, long-term vegetation recovery may require continued reduced use to non-use by livestock operators. A TNEB would not exist within the HMAs and ability to achieve rangeland health standards would become increasingly difficult. In addition, rangeland health would be slow to recover once degraded, since some portions of the Complex receive only five to seven inches of precipitation annually, which could further extend the time period of reduced flexibility and capability for livestock operations to use their permitted AUMs.
A complete analysis of livestock grazing and grazing impacts within a portion of the Red Desert Complex can be found in the Green Mountain Common Grazing Allotment EA located at:

http://www.blm.gov/wy/st/en/info/NEPA/documents/lfo/greenmtn_common.html.

Grazing is also addressed in the Record of Decision and Approved Rawlins Resource Management Plan (BLM 2008b, p. 18-19; BLM 2008a, p. 4-69 to 4-82), Great Divide Basin/Ferris Mountain and Seminoe Mountain Watersheds Standards and Guidelines Assessment (BLM 2013b), and the Lander RMP (FEIS) (BLM 2013d p. 479-487).

**Impacts of Alternative 2: Proposed Action**

Impacts associated with capture and removal operations would be similar to Alternative 1. Short-term impacts associated with wild horse removals from outside HMAs would also be similar to Alternative 1. Benefits to livestock operations outside of HMAs would occur in the mid and long-term, in terms of reduced competition between livestock and wild horses for forage and water, reduced fence maintenance, and increased availability of forage for livestock, when compared to Alternatives 1 and 3. Conflicts between livestock and wild horses would also not occur when wild horses are not present in grazing allotments outside of HMAs, and since the potential for their movement would be reduced since populations would be at AML.

Within HMAs, livestock/wild horse conflicts would be fewer when compared to Alternatives 1 and 3 because there would be fewer wild horses. Competition for forage and water would be reduced, and some water wells could be left off at varying times to rotate distribution of grazing use to improve plant vigor and rangeland condition. Reduced populations of wild horses in conjunction with livestock management would promote maintenance and/or recovery of most areas supporting riparian habitat. Flexibility in livestock management would be enhanced, since the numbers of livestock, season of use, and level of permitted AUMs used would be based on climate and management needs, and not on the population of wild horses. Levels of actual AUM use by livestock would vary between 40 and 80 percent of permitted AUMs due to climate and/or management needed to achieve Standards for Healthy Rangelands. Requests by livestock permittees and/or private landowners to remove wild horses from private lands would be decreased, and the potential that these lands would be fenced and no longer accessible by wild

horses would be lessened. With wild horse numbers reduced to the lower end of AML and birth control measures implemented, future wild horse gathers would be more infrequent, further reducing disturbance to livestock and management operations.

**Impacts of Alternative 3: No Action**

A wild horse gather would not take place and population control methods would not be implemented. This would allow wild horse populations to continue to increase and likely continue expanding outside of established HMAs. Forage use demand would increase exponentially as horse populations continue to expand. Currently (2016), an estimated 27,000 AUMs are needed by wild horses beyond what would be used at high AML. The additional forage demand would increase to an estimated 35,000 AUMs in 2017, which is equal to the current actual use of AUMs by livestock. With annual increases in wild horse populations, the total forage needs for the projected 2019 wild horse population, over 65,000 AUMS, would approach that which has been authorized for livestock, 71,000 AUMs, within the Complex (Figure 4).

Livestock operators may have to further decrease livestock use or eliminate livestock use all together in some areas to compensate for the increased forage use by wild horses. In some areas, particularly adjacent to water sources, livestock and wild horse conflicts would increase as the wild horse population increases due to direct competition for forage, space, and water. Fence maintenance costs would increase as livestock permittees attempt to restrict wild horse movement outside of the Complex. However, conflicts within the Complex would be reduced as permitted livestock grazing becomes more restricted or eliminated. All operators are required to meet rangeland health requirements, and some livestock operators are required to meet additional requirements in order to continue using their permits. Where minimum stubble height requirements are already met by wild horse use, livestock operators may not be able to turn out their livestock, causing a direct impact to their operations.

Wild horse use would not be limited to HMAs. As the wild horses expand their range, additional livestock operators would be impacted, including those with large amounts of private land. Requests for lawful removal of wild horses from private land would likely increase as horse ranges expand in search of forage, water and space. Range conditions within HMAs would deteriorate more quickly than Alternative 1, which may result in lower amounts of or elimination of livestock grazing, particularly during drought. Degraded range conditions may further restrict flexibility of livestock use, and even after wild horses are gathered in the future; long-term vegetation recovery may require continued reduced use to non-use by livestock operators. A TNEB would not exist within the Complex and ability to achieve rangeland health standards would become increasingly difficult. In addition, rangeland health would be slow to recover once degraded, since some portions of the Complex receive only five to seven inches of precipitation annually, which could further extend the time period of reduced flexibility and capability for livestock operations to use their permitted AUMs.

## 3.7 Cultural Resources

### 3.7.1 Affected Environment

Prehistoric sites known to exist within the HMAs include open camps and lithic scatters. Historic sites include trash dumps, trails, roads, and structures associated with early settlement and commerce, or with the local ranching industry. Additionally, stone circle sites, rock alignments, rock art and other sites potentially sensitive to Native American Tribes may occur. 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 or relocation of the proposed 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" (SHPO Protocol Appendix B-21).

### 3.7.2 Environmental Consequences

**Impacts of Alternative 1 and Alternative 2: Proposed Action**

Prior to construction, all gather sites and temporary holding facilities would be surveyed for historic properties by the RFO and LFO archeologists, and a determination made if a Class III inventory is necessary. 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 or mitigate adverse impacts to significant cultural resource site(s). Direct or indirect impacts to cultural resources are not anticipated to occur from implementation of Alternative 1 or 2: Proposed Action.

Within the Complex, impacts to historic properties from trampling during the gather operations would not exceed what occurs from natural horse movements. Fewer horses would result in reduced potential disturbance to historic properties from trampling or rubbing.

**Impacts of Alternative 3: No Action**

At the present time and for the short-term, taking no action to remove excess wild horses would not be expected to adversely affect historic properties. However, a substantial increase in the number of wild horses over time may adversely affect historic properties from trampling, rubbing or otherwise changing the character of a site.

## 4.0 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 what 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

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 Past, Present, and Reasonably Foreseeable Future Actions applicable to the assessment area are identified in Table 6. Assessment areas are determined by what is practical and reasonable for each resource. These activities can reduce the quantity and quality of vegetation, as well as quality and quantity of water, and result in human presence.

**Table 6. Past, Present, and Reasonably Foreseeable Future Actions**

| Project – Name or Description | Status (x) | | |
|---|---|---|---|
| | Past | Present | Future |
| Livestock grazing | x | x | x |
| Wild horse gathers | x | x | x |
| Mineral exploration/Oil and gas exploration/Abandoned mine land reclamation | x | x | x |
| Recreation | x | x | x |
| Water and spring development | x | x | x |
| Fence construction (including protective fencing) | x | x | x |
| Invasive weed inventory/treatments | x | x | x |
| Wildlife/Big game studies | | x | x |
| Wild horse issues, AML adjustments and planning | x | x | x |

The BLM is likely to conduct substantially similar gather, treatment and removal of wild horses within these HMAs during the period of 2017 to 2019 to maintain or achieve wild horse populations within AML, maintain fertility control treatments, and prevent deterioration of range health. Beginning in the fall of 2016, the grazing permittees will start constructing the Granite Creek Rocks Fence in the Antelope Hills Allotment to improve riparian habitat. This fence would bi-sect the northern portion of the Antelope Hills HMA. This fence was carefully designed to mitigate impacts to wild horses migrating through the HMA, while protecting wetland habitat from livestock grazing use (portions of the fence will be removable--removed when livestock are not present).

Other foreseeable activities currently being proposed within the gather area include the following[7]:

- Continental Divide-Creston Natural Gas Project. This is a proposed infill drilling of natural gas wells in the western portion of the Complex. This area has already experienced development for oil and gas and involves drilling additional wells and constructing associated infrastructure.
- Riley Ridge to Natrona Project. This is a proposed pipeline project that stretches from near Big Piney, Wyoming, to almost Casper, Wyoming. This project would traverse the West and Northern portions of the Complex.
- Sheep Mountain Uranium Project. This is an operational uranium mine that is in the northern portion of the Complex.
- Lost Creek Uranium In Situ Recovery Project Modifications EIS. This is a proposed expansion of the operational in situ uranium mine in the central portion of the Complex.

**Effect of Past, Present, and Reasonably Foreseeable Future Actions**

The resources evaluated in this section for cumulative effects include: Wild Horses, Wildlife, Livestock Grazing, Vegetation, Soils, Watershed, and Recreation.

## 4.1 Wild Horses

Numerous gathers of wild horses have occurred throughout the Red Desert Complex and gather area in the past. The most recent gather was in November of 2011; these gathers were necessary to bring the population in line with population management goals. Repeated horse gathers or gathers conducted too frequently can affect wild horse behavior making them harder to capture and places added stress on those captured and processed. Fertility control has been implemented in the past.

All of the above projects and activities would have impacts on wild horses from increased surface disturbance which results in vegetation removal, increased human presence, increased risk of horse/vehicle collisions, and could displace wild horses during construction and operation.

The gathers represent the largest and most direct impacts to horses and the highest proportion of the population. These stresses affect far more horses when numbers are allowed to significantly exceed the AML range. As a result of leaving the population above AML, future gathers would be unavoidable and the horses would be subject to additional gathers in order to achieve AML and conformance with existing law, regulation, and policy. Alternative 1, when combined with these past, present, and reasonably foreseeable future actions, and the identified mitigation measures for projects, the potential for adverse cumulative impacts to wild horses would be higher than for Alternative 2 and 3.

[7] For more information on these projects, see the BLM NEPA Hotsheet (BLM 2016).

Implementation of Alternative 2: Proposed Action, would benefit wild horses because there would be improved quality and quantity of resources (forage, water, and space). The application of fertility control and removals of horses to the lower limit of the AML would slow population growth over the next 2-3 year period, thereby further reducing the need to remove large numbers of horses. The gathers represent the largest and most direct stresses to horses and the highest proportion of the population. These stresses affect far more horses when numbers are allowed to significantly exceed the AML range. No other projects or predators remove large numbers of horses from the population. As a result of the removal of horses, there would be fewer horses potentially affected by vegetation removal and increased human activity during construction and operation of projects. These impacts, when combined with past, present, and reasonably foreseeable future actions, and the identified mitigation measures for projects, would further reduce the potential for adverse cumulative impacts to wild horses compared to Alternatives 1 and 3.

Implementation of Alternative 3: No Action would result in no long-term cumulative benefits to wild horses. At the current rate of annual population growth, the projected wild horse population could exceed 4,000 animals within 4 years. Left unchecked, irreparable damage to the habitat could result in the need to remove all wild horses from the Red Desert Complex. However, genetic variability would be the highest. When combined with past, present, and reasonably foreseeable future actions, and the identified mitigation measures for projects, the potential for adverse cumulative impacts to wild horses would be higher than for the other alternatives.

## 4.2 Wildlife, Threatened and Endangered Species, Special Status Species, and Migratory Birds

Historic use by livestock and wild horse grazing, recreation, mineral exploration, and mining have likely impacted wildlife, special status species, and migratory bird habitat within the gather area, especially near water locations. These activities have resulted in the loss and alteration of habitat and disruption of movement patterns. The current overpopulation of wild horses is also increasing the competition for available forage, water and thermal protection. Cumulative impacts associated with range management, such as construction of water projects and invasive weed treatments to enhance rangeland condition, are beneficial for wildlife and wildlife habitat.

The cumulative impacts associated with implementation of Alternative 2: Proposed Action would lead to overall improvement of rangeland resources and wildlife habitat. If Alternative 1 were selected it would only lead to improvement of rangeland resources and wildlife habitat outside of the HMA boundaries where horses were removed. Under Alternative 2, the improvements would be seen on a larger scale and last longer as fewer horses would inhabit the Complex. Under Alternative 1, vegetation outside of the HMA boundaries would improve until horses re-inhabit them in search of food and water as a result of competition from horse populations being above AML within the HMAs. Under Alternative 2: Proposed Action, wild horse populations would be managed within the AML range over the next 3-4 year period. As a result, fewer wild horses would be present and the quality and quantity of these resources would be expected to improve or at least be maintained. When combined with past, present, and reasonably foreseeable future actions, and the identified mitigation measures, the potential for

adverse cumulative impacts to wildlife habitat from implementation of Alternative 2 would be negligible.

No long-term cumulative benefits to any rangeland user would be expected with implementation of the No Action Alternative. The No Action Alternative would be expected to result in rangeland deterioration, and lead to long-term reduction of range and riparian health. Once range and riparian health is reduced past a certain point, any management actions are unlikely to significantly improve habitat for wildlife, sensitive species, or other values without considerable monetary and time input.

## 4.3 Livestock Grazing, Vegetation, Soils and Watershed

The vegetation within the Red Desert Complex has been utilized since the area was first settled. Domestic livestock have grazed all portions of the gather area in the past and are expected to continue in the future. Water is a limiting resource in some areas. As a result, existing water sources tend to be heavily utilized by livestock, wildlife, and wild horses which results in soil compaction, soil exposure and erosion, streambank alteration, and competition for clean water.

Implementation of Alternative 1 or 2 would contribute to isolated areas of vegetation disturbance as a result of the gather activities. Under Alternative 1 and Alternative 3, AML would still be exceeded. High horse numbers, when combined with other foreseeable future actions such as recreation, mineral exploration and reclamation, livestock grazing, and invasive weed treatment, would result in greater risk to the resources. Forage use/loss by horses and livestock is greater than the loss from other ongoing and proposed projects. Also the riparian degradation associated with this level of use would exceed the significance criteria identified, as the areas would not be maintaining a proper functioning condition riparian rating. Under the Proposed Action, however, the achievement of AML in conjunction with proper livestock grazing management and other foreseeable future actions such as recreation, mineral exploration and reclamation, and invasive weed treatment, would contribute to improved vegetative resources and achieve a TNEB.

Under Alternative 1 and 2, where horses are removed, excessive use by wild horses would not occur at water sources, and utilization and competition between animals would be reduced. Key forage and browse species would improve in health, abundance and robustness, and would be more likely to set seed and reproduce, which in turn would contribute to improvements in rangeland health.

Implementation of the No Action Alternative would result in continued expansion in extent and severity of degradation of vegetation in upland and riparian areas by wild horses due to increasing population. In the long term, this would result in more palatable native vegetation being replaced by more opportunistic native and/or non-native species. These species tend to both expand in disturbed soil and be less palatable. Past degradation would not be offset and downward trends would continue to occur. When combined with past, present, and reasonably foreseeable future actions the potential for cumulative impacts to livestock grazing, vegetation, and soils is expected to be higher than Alternative 1 and 2 due to continually increasing wild horse populations.

## 4.4 Recreation

Implementation of any of the alternatives would allow for continued viewing of wild horses.

Under Alternative 1, the aesthetic values provided in association with a variety of recreational opportunities would be dependent on where the activity is sought. Viewing of wild horses outside of the HMA boundaries would be difficult as most of these horses would be removed. While inside the HMA boundaries, encounters with wild horses would still be available as they currently exist. Other recreational opportunities, other than wild horse viewing, would be better outside the HMA boundaries as competition decreases and forage resources improve.

Implementation of Alternative 2 would result in horses being harder to find as a result of a lower population. Other various recreational opportunities would benefit from fewer horse encounters by maintaining horses within AML.

Implementation of the No Action Alternative would allow for recreational opportunities as they currently exist. Viewing opportunities of wild horses would be greater; however, heavy utilization of vegetation would occur, impacting the aesthetic values associated with various recreational opportunities. As animal health declines or animals leave the HMAs in search of food and water, some recreational opportunities would be less enjoyable. Increased horse numbers can interfere with recreation activities also, which would occur more frequently under this alternative. When combined with past, present, and reasonably foreseeable future actions the potential for cumulative impacts to recreation is expected to be higher under Alternative 1 and 3 due to less aesthetic values, and increased encounters with horses during recreation activities.

# 5.0 MITIGATION MEASURES AND SUGGESTED MONITORING

The BLM Contracting Officer Representative and Project Inspectors assigned to the gather would be responsible for ensuring contract personnel abide by contract specifications and standard operating procedures and policies (SOPs). Ongoing rangeland, riparian, and wild horse monitoring would continue, including periodic aerial population surveys.

The Red Desert Complex horses and rangeland health 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, riparian health, among other items.

Project design features and monitoring are incorporated into the proposed action through SOPs, which have been developed over time. These SOPs (Appendices 1 and 4), along with BLM IMs 2010-135 (BLM 2010a), 2015-070 (BLM 2015a), 2015-151 (BLM 2015b) represent the "best methods" for reducing stress and injury 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, and standard operating procedures presented as part of the proposed action and alternatives, no mitigation measures are proposed or required.

## 6.0 RESIDUAL IMPACTS

There would be residual impacts associated with the implementation of Alternatives 1 and 3 and would result from the horse population levels being above a thriving natural ecological balance. Forage and water resources would continue to receive high use, and rangeland health would continually degrade as horse populations continued to increase and expand the rangeland they use. This level of use would increase slower under Alternative 1, but would still occur at natural rates as soon as the effectiveness of PZP faded 2-3 years after treatment. Under Alternative 3, the rate of population increase would continue at the present rate, therefore the deterioration of riparian areas and vegetation would continue as present rates. These effects would continue to be observed until horse populations were reduced to the AML as established under the approved Rawlins and Lander RMPs. Also the riparian degradation associated with this level of use would exceed the significance criteria identified, and thus be out of conformance with, the RMPs, as the riparian habitat would not be maintaining a proper functioning condition riparian rating.

Alternative 1 and Alternative 2 would have other residual impacts as well. Horses that were gathered may be more wary of human interactions as a result of the gather process. Some horses may be more likely to run from humans, vehicles, and aircraft. Horses that were gathered and released may become more difficult to gather in the future. Individual horses react differently to these experiences, some horses become intolerant of human presence and interaction, while others do not show any reaction to gather activities. Most individual horses recover from these activities fairly quickly and resume normal horse behavior within 24 hours of being released.

## 7.0 TRIBES, INDIVIDUALS, ORGANIZATIONS, OR AGENCIES CONSULTED

Tribes, individuals, organizations, and agencies were included in the scoping process (Appendix 7). The letter soliciting scoping comments for the proposed gather in the Red Desert Complex was mailed February 20, 2015. In addition, public hearings are held annually on a state-wide basis regarding the use of motorized vehicles, including helicopters and fixed-wing aircraft, in the management of wild horses. During these meetings, the public is given the opportunity to present new information and to voice any concerns regarding the use of the motorized vehicles. The High Desert District Office hosted the state-wide meeting on May 5, 2015; the current gather operation SOPs were reviewed in response to the concerns expressed and no changes to the SOPs were identified.

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## APPENDIX 1 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* (BLM 2009b), IM 2015-151, and IM 2015-070.

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 and IM 2015-151.

### 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, strays, 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. Once archaeological 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.

4. 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).

5. No surface disturbing activities within 0.25-mile radius of the perimeter of occupied or undetermined Greater Sage-Grouse leks inside General Habitat Management Areas (GHMA).

6. No surface disturbing and/or disruptive activities or surface occupancy would occur within Greater Sage-Grouse nesting habitat from March 15 through June 30 in the LFO.

7. No surface disturbing and/or disruptive activities would occur within Greater Sage-Grouse PHMA nesting habitat, or within 2 miles of the lek or lek perimeter outside PHMA from March 15 through July 14 in the RFO (BLM 2015c, p. 36).

## 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

- Rawlins Field Office – Contracting Officer's Representative/Project Inspector: Benjamin Smith
  Alternate – Contracting Officer's Representative/Project Inspector: 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 2 Historical Gather Environmental Analyses and Tables

1. Lander Resource Area Wild Horse Herd Management Plan, Lander Herd Management Area Evaluation / Capture Plan and the associated Environmental Analyses WY-036-EA3-010 and WY-036-EA3-013, 1993.

2. The Great Divide Resource Area Wild Horse Herd Management Area Evaluation / Capture Plan and the associated Environmental Analyses WY-037-EA4-122 and WY037-EA4-121, 1994.

3. Wild Horse Gathering Inside and Outside of the Muskrat Basin, Rock Creek Mountain, Dishpan Butte and Conant Creek Wild Horse Herd Management Areas, EA No. WY-050-EA1-039, 2001.

4. Wild Horse Gathering Inside of the Green Mountain Wild Horse Herd Management Area EA No. WY-050-EA2-031, 2002

5. Wild Horse Gathering Inside and Outside of the Crooks Mountain Wild Horse Herd Management Area, EA No. WY-050-EA2-032, 2002.

6. Antelope Hills/Cyclone Rim Horse Management Area Capture/Removal and Fertility Control Lander Field Office, EA No. WY-050-EA4-060, 2004.

7. North Lander HMA Complex (Conant Creek, Rock Creek Mountain, Dishpan Butte and Muskrat Basin) Capture/Removal and Fertility Control Lander Field Office EA No. WY-050-EA4-061, 2004.

8. Green Mountain Horse Management Area Capture/Removal and Fertility Control Lander Field Office, EA No. WY-050-EA5-133, 2005.

9. Crooks Mountain Horse Management Area Capture/Removal and Fertility Control Lander Field Office, EA No. WY-050-EA06-129, 2006.

10. Removing Excess Wild Horses From the Adobe Town and Salt Wells Creek HMAs of the Rawlins and Rock Springs Field Offices EA No. WY030-05-EA-158, 2006.

11. Removing Excess and Stray Wild Horses From the Area North of Interstate 80 and West of US HWY 287 in the Rawlins Field Office, EA No. WY030-06-EA-165, 2006.

12. Adobe Town – Salt Wells Creek Herd Management Complex – Management Action and Environmental Assessment EA No. WY040-07-EA-37, 2007.

13. Wild Horse Gathering for the North Lander Complex Wild Horse Herd Management Areas (Conant Creek, Dishpan Butte, Rock Creek Mountain and Muskrat Basin)

Capture/Removal and Fertility Control, Lander Field Office, EA No. EA WY-050-EA08-95, 2008.

14. Wild Horse Gathering for the Red Desert Complex Wild Horse Herd Management Areas (Lost Creek, Stewart Creek, Green Mountain, Crooks Mountain, Antelope Hills), EA No. WY-030-2009-0258-EA, 2009.

15. Adobe Town – Salt Wells Creek Herd Management Area Complex Wild Horse Gather, EA No. WY-040-EA10-109, 2010.

16. Wild Horse Gathering for the North Lander Complex (Conant Creek, Dishpan Butte, Rock Creek Mountain and Muskrat Basin HMAs), EA No. WY-050-EA12-33, 2012.

**Historic Gather Numbers: Lost Creek and Stewart Creek HMAs**

| Year | **HMA Name** | **Number Gathered** | **Number Removed** |
|---|---|---|---|
| 1986 | Lost Creek, Stewart Creek & Antelope Hills/Cyclone Rim (Previously Seven Lakes HMA) | 88* | 88* |
| 1987 | Lost Creek, Stewart Creek & Antelope Hills/Cyclone Rim (Previously Seven Lakes HMA) | 184* | 184* |
| 1988 | Lost Creek, Stewart Creek & Antelope Hills/Cyclone Rim (Previously Seven Lakes HMA) | 63* | 63* |
| 1989 | Lost Creek, Stewart Creek & Antelope Hills/Cyclone Rim (Previously Seven Lakes HMA) | 154* | 154* |
| 1995 | Lost Creek & Stewart Creek (Gathered and documented as one) | 121 | 121 |
| 1997 | Lost Creek & Stewart Creek (Gathered and documented as one) | 190 | 143 |
| 1998 | Lost Creek & Stewart Creek (Gathered and documented as one) | 81 | 50 |
| 2001 | Lost Creek HMA | 302 | 302 |
| 2001 | Stewart Creek HMA | 105 | 105 |
| 2002 | Lost Creek HMA | 21 | 21 |
| 2002 | Stewart Creek HMA | 283 | 283 |
| 2003 | Stewart Creek HMA | 94 | 94 |
| 2006 | Lost Creek HMA | 285 | 231 |
| 2006 | Stewart Creek HMA | 267 | 212 |
| 2009 | Stewart Creek HMA | 305 | 212 |
| 2009 | Lost Creek HMA | 287 | 224 |
| 2011 | Lost Creek HMA | 114 | 73 |
| 2011 | Stewart Creek HMA | 205 | 106 |
| | **TOTALS:** | **3,149** | **2,666** |

**Historic Gather Numbers: Antelope Hills/Cyclone Rim HMA**

| Year | HMA Name | Number Gathered | Number Removed |
|---|---|---|---|
| 1986 | Antelope Hills/Cyclone Rim | 88* | 88* |
| 1987 | Antelope Hills/Cyclone Rim | 184* | 184* |
| 1988 | Antelope Hills/Cyclone Rim | 63* | 63* |
| 1989 | Antelope Hills/Cyclone Rim | 154* | 154* |
| 2000 | Antelope Hills/Cyclone Rim | 59 | 59 |
| 2001 | Antelope Hills/Cyclone Rim | 50 | 50 |
| 2004 | Antelope Hills/Cyclone Rim | 258 | 208 |
| 2009 | Antelope Hills/Cyclone Rim | 144 | 77 |
| 2011 | Antelope Hills/Cyclone Rim | 156 | 80 |
| | **Totals** | **1,156** | **963** |

**Historic Gather Numbers: Crooks Mountain HMA**

| Year | HMA Name | Number Gathered | Number Removed |
|---|---|---|---|
| 1985 | Crooks Mountain | 708 | 708 |
| 1996 | Crooks Mountain | 380 | 319 |
| 1998 | Crooks Mountain | 295 | 220 |
| 2002 | Crooks Mountain | 103 | 103 |
| 2006 | Crooks Mountain | 74 | 74 |
| 2009 | Crooks Mountain | 26 | 0 |
| 2011 | Crooks Mountain | 72 | 17 |
| | **Totals** | **1,658** | **1,441** |

**Historic Gather Numbers: Green Mountain HMA**

| Year | HMA Name | Number Gathered | Number Removed |
|---|---|---|---|
| 1980 | Green Mountain | 255 | 255 |
| 1984 | Green Mountain | 199 | 199 |
| 1993 | Green Mountain | 413 | 318 |
| 1995 | Green Mountain | 107 | 88 |
| 1996 | Green Mountain | 105 | 105 |
| 1997 | Green Mountain | 220 | 145 |
| 2002 | Green Mountain | 155 | 155 |
| 2003 | Green Mountain | 75 | 75 |
| 2005 | Green Mountain | 574 | 490 |
| 2006 | Green Mountain | 89 | 89 |
| 2009 | Green Mountain | 472 | 330 |
| 2011 | Green Mountain | 352 | 240 |
| | **Totals** | **3,016** | **2,489** |

## APPENDIX 3 Genetic Diversity and Variability

### Genetic Diversity and Viability

Blood samples were collected from horses removed during the 2001 and 2006 gathers to develop genetic baseline data (e.g. genetic diversity, historical origins of the herd, unique markers). Genetic samples (hair samples) were taken in 2009 and these samples were analyzed by Dr. E. Gus Cothran, Equine Genetics Laboratory, Texas A&M University (Cothran 2010). His conclusions and recommendations regarding genetic diversity in the Red Desert Complex of HMAs herd are summarized as follows:

#### Summary of the Lost Creek HMA

"Genetic variability of this herd is fairly high. The values related to allelic diversity and heterozygosity are high. Genetic similarity results suggest a herd with mixed ancestry that primarily is North American. There is a possibility of some, although limited, Iberian ancestry."

#### Recommendations for the Lost Creek HMA

"Current variability levels are high enough that no action is needed at this point. The herd should be monitored to make sure population size remains stable or increase to make sure no dramatic reductions in variability take place."

#### Summary of the Stewart Creek HMA

"Genetic variability of this herd is generally high. The values related to allelic diversity are near above average while heterozygosity is high. The herd appears to be in genetic equilibrium despite a high percentage of alleles at risk of loss. Genetic similarity results suggest a herd with mixed ancestry that primarily is North American."

#### Recommendations for the Stewart Creek HMA

"Current variability levels are high enough that no action is needed at this point. The herd should continue to be monitored to make sure that population size does not fall to low levels (less than 100)."

#### Summary of the Antelope Hills/Cyclone Rim HMA

Genetic variability within the Antelope Hills/Cyclone Rim herd is near and slightly above the average for wild herds. The Herd has genetic markers that would reflect a similarity for the New World Spanish horse breeds. The genetic similarity to this group is relatively high for a mustang herd. In conclusion, the data support a strong Spanish heritage for this herd but there likely is some other type of blood within the group. The Antelope Hills portion of the herd shows a number of markers that are suggestive of Spanish blood, however, the overall similarity is greatest with the North American breeds and Spanish breed similarity is relatively moderate. Although one cannot rule out Spanish heritage, it does not look like that is the main component of this herd.

**Recommendations for the Antelope Hills/ Cyclone Rime HMA**
This herd has reasonably high genetic variability so that no action need be taken at this time. However, the AML for this herd is fairly low so that future monitoring will be needed.

**Summary of the Green Mountain and Crooks Mountain HMAs**
Blood samples were collected from Crooks Mountain and Green Mountain wild horses in previous gathers to develop genetic baseline data (e.g. genetic diversity, historical origins of the herd, unique markers). The samples were analyzed by a geneticist to determine the degree of heterozygosity for the herd. The results showed enough genetic diversity to prevent inbreeding and negative genetic mutation. This genetic data would be incorporated into the Herd Management Area Plan in the future. There is known movement between the HMAs (Green Mountain, Antelope Hills/Cyclone Rim, Stewart Creek and Lost Creek) and this helps to diversify these gene pools and contribute to herd heterozygosity.

The following summarizes current knowledge of genetic diversity as it pertains to wild horses.

- Smaller, isolated populations (<200 total census size) are particularly vulnerable when the number of animals participating in breeding drops below a minimum needed level (Coates-Markle, 2000).
- It is possible that small populations will be unable to maintain self-sustaining reproductive ability over the long term, unless there is a natural or management-induced influx of genetic information from neighboring herds. An exchange of only 1-2 breeding age animals per generation would maintain the genetic resources in small populations of about 100 animals, thus obviating the need for larger populations in all cases (Singer, 2003).
- There is little imminent risk of inbreeding since most wild horse herds sampled to date, have large amounts of genetic heterozygosity, genetic resources are lost slowly over periods of many generations, wild horses are long-lived with long generation intervals, and there is little imminent risk of in breeding or population extinction (Singer, 2003).
- Genetic effective population size (Ne) is a difficult number to calculate for wild horses, since the calculation is complicated by many factors inherent in wild horse herds. No single universally acceptable formula exists to deal with these complexities, and no standard goal for Ne or loss of genetic resources currently exists for wild horse herds. A goal of Ne=50 is currently being applied in wild horse herds (Singer, 2000).
- Current efforts with wild horses suggest management should allow for a 90% probability of maintaining at least 90% of the existing population diversity over the next 200 years (Coates-Markle, 2000).

The following summarizes what is known about the Red Desert HMA Complex as it pertains to genetic diversity:

- Ne (genetic effective population size) for Red Desert HMA Complex has not been established.

## APPENDIX 4 Standard Operating Procedures for Application of Fertility Control

The following management and monitoring requirements are part of the Alternatives analyzed.

- 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, and a smaller number on the left side of the neck to track what HMA that mare came from, for treatment tracking purposes. 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 National Program Office (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 5 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, including 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 – Red Desert Creek Complex

To complete the population modeling for the Red Desert Complex, 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?
- What effect does fertility control have on population growth rate?
- What effects do the different alternatives have on the average population size?
- What effects do the different alternatives have on the genetic health of the herd?

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

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

The following table displays the removal parameters utilized in the population model for the Proposed Action and all Alternatives:

**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 1:

**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: 2016
- Initial gather year: 2016
- Gather interval: regular interval of three years
- Gather for fertility treatment regardless of population size: No
- Continue to gather after reduction to treat females: N/A
- Sex ratio at birth: 53% males
- Percent of the population that can be gathered: 80%
- 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 Fertility Control Only (Treat & Release) | Alternative 2 (Remove to Low Limit of Management Range & Fertility Control) | Alternative 3 (No Removal & No Fertility Control) |
|---|---|---|---|
| Management by removal and fertility control | Yes | Yes | N/A |
| Management by removal only | No | No | N/A |
| Threshold Population Size for Gathers in the HMAs | 1,703 for the Complex. This is the number of wild horses projected to be inside of the Complex with 482 outside of the HMA boundaries. | 125 Stewart Creek<br>60 Lost Creek<br>170 Green Mountain<br>65 Crooks Mountain<br>60 Antelope Hills | N/A |
| Target Population Size Following Gathers | 1,703 for the Complex. This is the number of wild horses projected to be inside of the Complex with 482 outside of the HMA boundaries. | 125 Stewart Creek<br>60 Lost Creek<br>170 Green Mountain<br>65 Crooks Mountain<br>60 Antelope Hills | N/A |
| Gather for fertility control regardless of population size | Yes | Yes | N/A |
| Gathers continue after removals to treat additional females | Yes | Yes | 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.

Data from the January 2000 Clan Alpine study, in Nevada, determined the fertility rates for the 2-year PZP vaccine with the treatment of 96 mares. The test resulted in fertility rates in treated mares of 6% year one and 18% year two.

Interpretation of the Model

The estimated populations for the population modeling consist of: 2,185 wild horses in the Red Desert Complex based on the April 2015 census plus a 20% foal crop. 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 2015. 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 2025. 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.

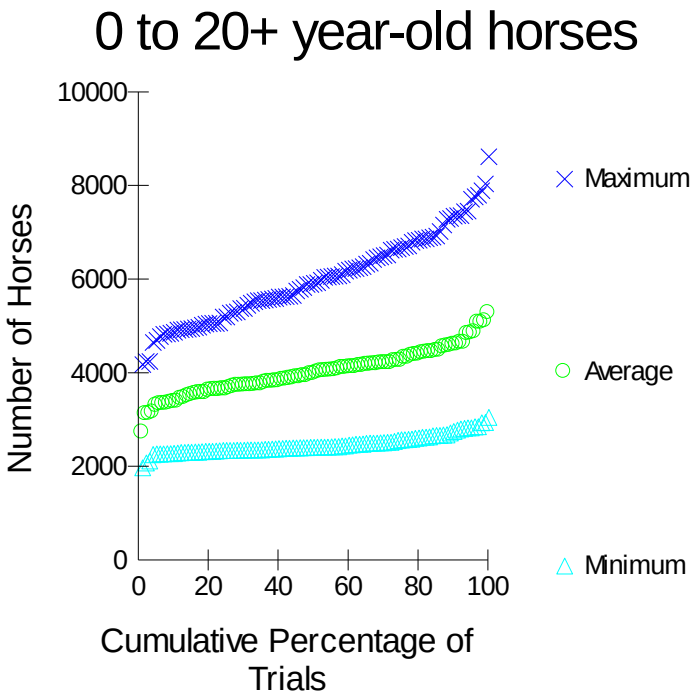
The initial herd size, sex ratio and age distribution for 2016 was structured by the WinEquus Population Model using data from the horses gathered and removed during the 2011 gather. This initial population data was then entered into the model and the model was used to predict various outcomes of the different alternatives, including the No Action Alternative for comparison purposes.

The parameters for the population modeling were:

1. Gather when population exceeds 1,703 wild horses in the Red Desert Complex for Alternative 1 and 724 wild horses in the Red Desert Complex for Alternative 2.
2. Foals are not included in AML
3. Percent to gather: 80%
4. Three years between gathers
5. Number of trials: 100
6. Number of years: 10
7. Initial calendar year: 2016
8. Initial population size: 2,185 wild horses in the Red Desert Complex.
9. Population size after gather would be: 480 wild horses in the Red Desert Complex.
10. Implement selective removal criteria
11. Fertility control Yes for Alternative 1 and Yes for Alternative 2, the Proposed Action

**<u>Alternative 1</u>-**

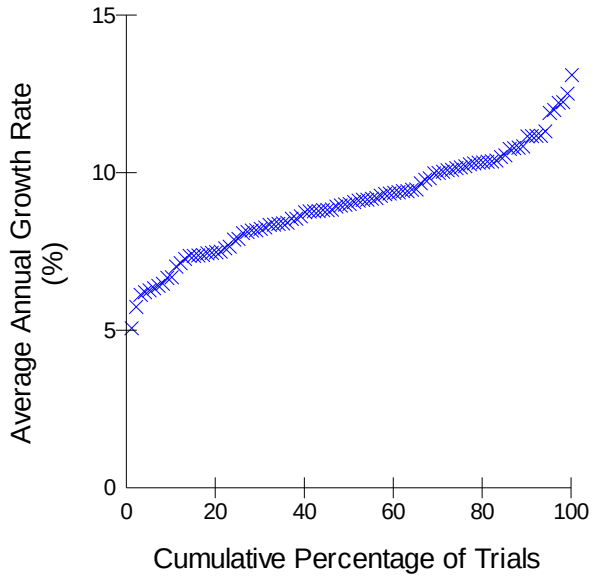
***Population Size and Modeling Graph and Table (Fertility Control Only (Treat & Release))***



| POPULATION SIZES IN 11 YEARS* | | | |
|---|---|---|---|
| | MINIMUM | AVERAGE | MAXIMUM |
| Lowest Trial | 1992 | 2733 | 4149 |
| 10th Percentile | 2301 | 3391 | 4910 |
| 25th Percentile | 2358 | 3670 | 5256 |
| Median Trial | 2426 | 4002 | 5940 |
| 75th Percentile | 2587 | 4298 | 6708 |
| 90th Percentile | 2778 | 4611 | 7372 |
| Highest Trial | 3065 | 5285 | 8638 |

* 0 to 20+ year-old horses

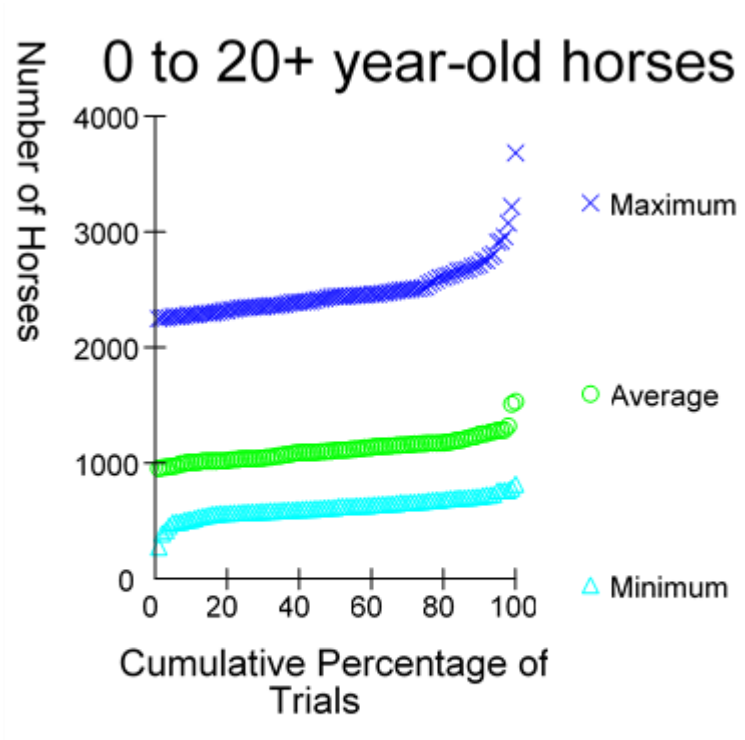
***Growth Rate Modeling Graph and Table***




| AVERAGE GROWTH RATE IN 10 YEARS | |
|---|---|
| Lowest Trial | 5.1% |
| 10th Percentile | 6.9% |
| 25th Percentile | 8.0% |
| Median Trial | 9.1% |
| 75th Percentile | 10.2% |
| 90th Percentile | 11.2% |
| Highest Trial | 13.1% |

**Alternative 2: Proposed Action:**

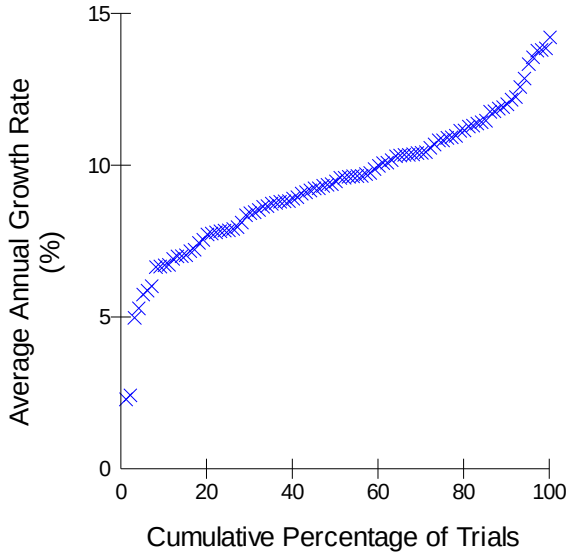
***Population Size and Modeling Graph and Table (Remove to Low Limit of Management Range & Fertility Control)***




| POPULATION SIZES IN 11 YEARS* | | | |
|---|---|---|---|
| | **MINIMUM** | **AVERAGE** | **MAXIMUM** |
| Lowest Trial | 275 | 956 | 2262 |
| 10th Percentile | 516 | 1006 | 2293 |
| 25th Percentile | 576 | 1038 | 2360 |
| Median Trial | 620 | 1110 | 2452 |
| 75th Percentile | 672 | 1172 | 2548 |
| 90th Percentile | 714 | 1251 | 2746 |
| Highest Trial | 820 | 1532 | 3683 |

* 0 to 20+ year-old horses

***Growth Rate Modeling Graph and Table***



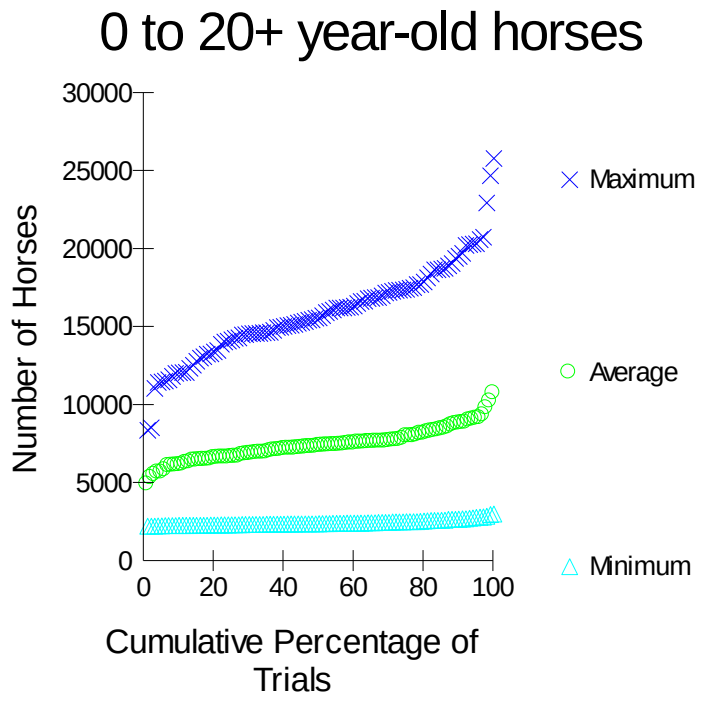

| **AVERAGE GROWTH RATE IN 10 YEARS** | |
|---|---|
| Lowest Trial | 2.3% |
| 10th Percentile | 6.7% |
| 25th Percentile | 7.9% |
| Median Trial | 9.6% |
| 75th Percentile | 10.9% |
| 90th Percentile | 12.1% |
| Highest Trial | 14.2% |

**<u>Alternative 3</u> – No Action**

The changed parameters for the population modeling were:

Do not gather in 2016
Foals are not included in AML
Percent to gather: 0

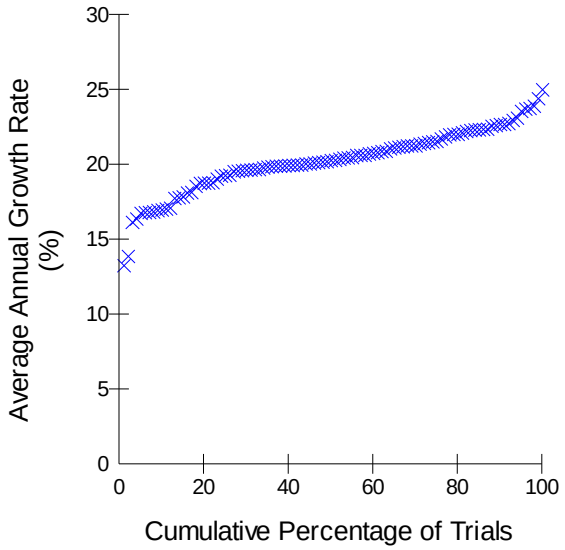
***Population Size Modeling Graph and Table (No Removal & No Fertility Control)***




| POPULATION SIZES IN 11 YEARS* | | | |
|---|---|---|---|
| | MINIMUM | AVERAGE | MAXIMUM |
| Lowest Trial | 2267 | 4914 | 8423 |
| 10th Percentile | 2314 | 6175 | 12110 |
| 25th Percentile | 2358 | 6684 | 14265 |
| Median Trial | 2426 | 7387 | 15697 |
| 75th Percentile | 2552 | 8005 | 17486 |
| 90th Percentile | 2724 | 8839 | 19663 |
| Highest Trial | 3051 | 10761 | 25839 |

* 0 to 20+ year-old horses

***Growth Rate Modeling Graph and Table***




| AVERAGE GROWTH RATE IN 10 YEARS | |
|---|---|
| Lowest Trial | 13.3% |
| 10th Percentile | 17.0% |
| 25th Percentile | 19.3% |
| Median Trial | 20.3% |
| 75th Percentile | 21.7% |
| 90th Percentile | 22.7% |
| Highest Trial | 25.0% |

## APPENDIX 6 Population Estimate and Methods

# M E M O R A N D U M

To: Paul Griffin (BLM)
CC: Dennis Carpenter, Scott Fluer, Bryan Fuell, Ben Smith, Trent Staheli, Rubel Vigil, Tim Vosburgh, June Wendlandt, Bea Wade (BLM).
From: Bruce Lubow, IIF Data Solutions
Date: 17 July 2015
RE: Statistical analysis for 2015 survey of the Red Desert Complex horse population.

### I. Summary Table

| | | |
|---|---|---|
| Survey areas and Dates: | April 6, 2015 | Antelope Hills HMA and 'the middle'. |
| | April 7, 2015 | Crooks Mountain HMA, Green Mountain HMA, Stewart Creek HMA and 'the middle'. |
| | April 9, 2015 | Green Mountain HMA, Stewart Creek HMA. |
| | April 10, 2015 | Stewart Creek HMA, Lost Creek HMA. |
| Type of Survey | Simultaneous Double-observer | |
| Aviation Company | Tony Herbie, pilot, Sky Aviation (Worland, WY) | |
| Agency Personnel | Ben Smith, Trent Staheli, Tim Vosburgh, Eric Collier (BLM), Paul Griffin (USGS) | |

Table 1. Estimated population sizes (Estimate) are for the numbers of horses in the surveyed areas at the time of survey. For HMAs and for the complex as a whole, 90% confidence intervals are shown in terms of the lower limit (LCL) and upper limit (UCL). The coefficient of variation (CV) is a measure of precision; it is the standard error as a percentage of the estimated population. Number of horses seen (No. Seen) leads to the estimated percentage of horses that were present in the surveyed area, but that were not recorded by any observer (% Missed). The estimated number of horses associated with each HMA but located outside the HMA's boundaries is already included in the total estimate for that HMA. I also present the estimated numbers of horses in certain discrete areas outside of the HMA boundaries of interest to managers; these horses are already reflected in the HMA totals and complex total estimates, but are provided here for reference.

| Area | Age Class | Estimate (No. Horses) | LCL [a] | UCL | Std Err | CV | No. Horses Seen | % Missed | Estimated # of Groups | Estimated Group Size | Foals per 100 Adults [b] | Est. No. Horses Outside HMA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Antelope** | Total | 208 | 171 | 253 | 23.8 | 11.5% | 193 | 7.0% | 16 | 12.9 | 7.6 | 112 |
| **Hills** | Foals | 15 | 9 | 22 | 3.8 | 25.9% | | | | | | |
| **HMA[c]** | Adults | 193 | 162 | 233 | 20.3 | 10.5% | | | | | | |
| **Crooks** | Total | 202 | 175 | 235 | 20.2 | 10.0% | 187 | 7.6% | 35 | 5.8 | 5.7 | 127 |
| **Mountain** | Foals | 11 | 8 | 14 | 1.7 | 15.9% | | | | | | |
| **HMA** | Adults | 191 | 167 | 222 | 18.7 | 9.7% | | | | | | |
| **Green** | Total | 854 | 803 | 931 | 44.9 | 5.3% | 795 | 6.9% | 99 | 8.6 | 4.2 | 137 |
| **Mountain** | Foals | 35 | 30 | 42 | 4.5 | 12.9% | | | | | | |
| **HMA** | Adults | 819 | 774 | 892 | 41.3 | 5.0% | | | | | | |
| **Stewart** | Total | 431 | 412 | 454 | 14.3 | 3.3% | 421 | 2.4% | 55 | 7.8 | 1.7 | 6 |
| **Creek** | Foals | 7 | 6 | 9 | 0.5 | 7.1% | | | | | | |
| **HMA** | Adults | 424 | 405 | 447 | 14.1 | 3.3% | | | | | | |
| **Lost** | Total | 208 | 163 | 258 | 28.7 | 13.8% | 188 | 9.5% | 18 | 11.4 | 6.9 | 20 |
| **Creek** | Foals | 13 | 9 | 18 | 2.3 | 17.0% | | | | | | |
| **HMA[c]** | Adults | 194 | 150 | 241 | 26.7 | 13.8% | | | | | | |
| **Complex** | Total | 1903 | 1817 | 2014 | 59.9 | 3.1% | 1784 | 6.3% | 224 | 8.5 | 4.4 | 402 |
| **Total** | Foals | 81 | 70 | 94 | 6.2 | 7.7% | | | | | | |
| | Adults | 1822 | 1739 | 1921 | 54.9 | 3.0% | | | | | | |

Table1 (continued)

**Estimated numbers of horses in sub-areas; these horses are already included in the totals for the HMAs and complex, above.**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **"The Middle"** | Total | 300 | 277 | 331 | 16.0 | 5.3% | 287 | 4.3% | 33 | 9.0 | 6.3 | 270 |
| | Foals | 18 | 15 | 21 | 1.3 | 7.6% | | | | | | |
| | Adults | 282 | 260 | 311 | 14.9 | 5.3% | | | | | | |
| **Crooks North** | Total | 31 | 26 | 38 | 3.9 | 12.8% | 29 | 5.8% | 8 | 4.0 | 3.4 | 28 |
| | Foals | 1 | 1 | 2 | 0.1 | 11.8% | | | | | | |
| | | 30 | 25 | 37 | 3.9 | 13.1% | | | | | | |
| **Green Mountain North** | Total | 38 | 23 | 55 | 7.9 | 20.7% | 36 | 6.3% | 3 | 12.1 | 3.0 | 19 |
| | Foals | 1 | 0 | 3 | 0.6 | 49.5% | | | | | | |
| | Adults | 37 | 23 | 53 | 7.4 | 19.9% | | | | | | |
| **Green Mountain South** | Total | 40 | 24 | 54 | 8.6 | 21.3% | 36 | 10.6% | 6 | 6.9 | 3.0 | 32 |
| | Foals | 1 | 0 | 3 | 0.4 | 37.5% | | | | | | |
| | Adults | 39 | 23 | 53 | 8.4 | 21.4% | | | | | | |

[a] 90% confidence interval based on percentiles of bootstrap simulation results. The lower 90% confidence interval limit (LCL) is actually less than the number of horses sighted during the survey for these estimates. This is a normal statistical result and reflects the fact that a confidence interval expresses what would likely happen if the survey were repeated. If repeated many times, some surveys would miss more horses and produce lower estimates, even after corrections, than were actually observed during this survey. Clearly, I conclude that there are at least as many horses as were observed during this survey, rather than using the lower confidence limit as a minimum number.

[b] The estimated ratio of foals to adults reflects what was observed during these April surveys and likely does not represent the full cohort of foals for this year.

[c] Initial counts of raw numbers of horses seen, circulated within BLM Wyoming, had 11 more animals seen in Antelope Hills HMA and 11 less animals seen in Lost Hills HMA; this discrepancy was because a group of 9 adults and 2 foals in 'the middle' were initially associated as being closer to Antelope HMA. For this analysis, though, that group of 9 adults and 2 foals was associated with Lost Creek HMA.

## II. Narrative

In April of 2015, Bureau of Land Management (BLM) personnel conducted simultaneous double-count aerial surveys (Lubow and Ransom 2007) of the wild horse populations in the Red Desert complex of Wyoming. This complex includes all of the Antelope Hills HMA, Crooks Mountain HMA, Green Mountain HMA, Stewart Creek HMA, and Lost Creek HMA, as well as the lands adjacent to and nearly surrounded by (in the middle of) these five HMAs (Figure 1). In keeping with recommendations of the National Academies of Science recommendations (NAS 2013) and BLM policy (BLM 2010), these areas were surveyed together at one time, using a survey method that allows for estimating the number of horses that were present, but not seen by any observer.

I analyzed these data to estimate sighting probabilities, which I then used to correct the raw counts for systematic biases (undercounts) that are known to occur in aerial wildlife surveys, and to provide confidence intervals (which are measures of uncertainty) associated with the estimated population sizes for the HMAs and surrounding areas that were surveyed.

*Population Results*

The estimated total horse populations (Table 1) within these areas provided a relatively large sample size of observations (184 horse groups, Table 1, Figure 1), on which to base statistical estimates of sighting probability. Estimated sighting probabilities were high, resulting in a statistically estimated 93.7% of horses present in the surveyed areas being observed, on average, although the percentage missed was as high as 9.5% at Lost Creek HMA. The high sighting probability resulted in reasonable confidence intervals and coefficients of variation that are adequate for management purposes. Biases in the estimates could still exist due to heterogeneity of sighting probabilities that were not fully accounted for in this dataset, particularly due to the fairly large number of back seat observers used in this survey, as I discuss below.

The simultaneous double count method has not been used to estimate this population prior to the current survey, so the estimates presented here may not be comparable to those made by other methods in the past, which differed both in field technique and correction methods for missed horses. However, the correction for missed horses estimated here is similar to the assumed percentage missed in prior surveys (10%). Nevertheless, there have been very large increases in the estimated population between surveys in 2011 and 2013 and again between 2013 and 2015. In discussions with district personnel, I have identified several possible explanations for the surprisingly large increases between 2013 and 2015; however I have no information to address the changes between 2011 and 2013.

1. The prior method may have undercounted by more than the 10% assumed. This is particularly likely because only 2 observers were used in addition to the pilot, so one side was surveyed by a single individual. Comparing flight paths from earlier surveys to the current one, there were a few areas with significant vegetation that were not covered as well (wider transects) although the coverage was similar in most areas. Also, photographs of large groups were not used in the past. The observers and pilot used on earlier surveys were different and I have no information on their sighting acuity. All of these differences in methodology could have led to larger numbers of horses being missed in the past than the 10% that was assumed.
2. Foaling rates after the 2013 survey (i.e., in 2014) may have been exceptionally high. This population was treated with PZP in 2011, so it is likely that mares were especially well nourished and in good health after not foaling for the prior 2 years and could have had high pregnancy rates and produced healthy foals with unusually high survival rates.

3. Two problems may have occurred with the 2015 survey that could have inflated the estimates. First, some groups may have been observed and counted multiple times. This is a particular concern given the interruption of the survey due to weather. Observers made every effort to identify larger groups using photos and eliminate any duplicate observations from the dataset, but this effort may not have been 100% successful, especially for smaller groups for which photographs were not available. Second, it is also possible that horses not present during the prior survey found a way to immigrate into the survey area before the 2015 survey, causing an increase in the actual population present. These issues and suggested improvements are discussed further, below.

**Sighting Probability Results**

The front observers saw 87.9% of the groups (90.5% of the horses) seen by any observer, whereas the back seat observers saw 78.7% of all groups (82.4% of horses) seen (Table 2). These results demonstrate that simple raw counts do not fully reflect the true population without statistical corrections for missed groups, made possible by the double observer method and reported here. There were undoubtedly additional groups not seen by any observer; I address this issue in the analysis that follows.

The analysis method used for the surveyed areas was based on simultaneous double-observer data collected during these surveys. Informed by preliminary analyses and *a priori* reasoning, all models used in the double-observer analysis contained an estimated parameter for an intercept common to all observations. Ten groups were recorded on the centerline, so I also included a parameter in all models to account for the inability of back-seat observers to see this type of group. A total of 14 groups were recorded as seen spread across both sides of the flight path and visible from both sides of the helicopter. Front seat sighting probability for these groups was much higher, given their availability to all both front-seat observers, so an additional parameter was included to account for this added visibility.

I did not consider effects on detection probability of vegetation type, vegetation cover, or lighting conditions due to insufficient variation in the values of these covariates–nearly all observations were in open vegetation, 0% cover, and high contrast lighting. Only 10 observations (5 tree cover, 5 broken cover; all at Green Mountain) had any concealing vegetation recorded and all but 1 of these had ≤30%, the remaining 1 had 50% cover. These data provided an insufficient sample size to estimate the effect of vegetation. I did not attempt to estimate effects for any site (HMA) individually. Other than covariates that were recorded, sighting conditions and the range of overall topography and vegetation was similar at the sites. Furthermore, 3 of the 5 sites had ≤12 observed groups; too few to reliably estimate a unique site effect.

In preliminary analyses, I determined that there was overwhelming support for differences between the 2 front-seat observers and among the 5 back-seat observers, so I included separate additive parameters for each unique individual in all models.

In addition to the parameters included in all models, described above, I tested 6 possible effects on sighting probability by fitting models for all possible combinations of these effects, resulting in 64 alternative models. The 6 effects were: (1) an additive effect for groups located on the pilot's side of the flight path on the front-seat observers combined sighting probability due to the pilot's focus on flying and the obstructed view from the opposite side; (2) group size; (3) horse activity (moving); (4) snow and snow squared (both included if either was); (5) rugged terrain; and (6) distance of the horse group from the observers.

The effects of distance (99.5% of model weight) and snow (92.0% of model weight) were very strongly supported. Effects of group size (63.8%) and rugged terrain (47.5%) received modest support. The effects of horse movement (28.9%) and pilot-side effect (25.3%) received minimal support, so were unimportant predictors of sighting probability in this dataset.

All groups visible on both sides of the aircraft were seen by the front observers, making sighting probability 100% for these groups (Table 3). Visibility in the front for groups on the pilot's side was essentially the same as for the primary observer's side, which seems to indicate that the pilot had a good ability at spotting groups. Groups that were larger, moving, in smooth terrain, or closer to the observers were more visible, as expected. Sighting probability was lower for the average back seat observer than for either front-seat observer. Sighting probability in the front was higher for observer BS than for TS. Sighting probability varied dramatically among back-seat observers.

The estimated sighting probabilities for the combined observers ranged across horse groups from 42.5-100%. For front-seat observers, independent sighting probability ranged from 29.4-100% and for back-seat observers it was from 13.7-98.7% (excluding groups on the centerline, which were unavailable to back seat observers). Comparing actual horses seen to the estimated population size computed from the estimated sighting probabilities, I estimate that 6.3% of the horses in these combined surveys were never seen by any of the observers, with as much as 9.5% missed in Lost Creek HMA (Table 1). The high overall sighting probabilities resulted in good confidence intervals and coefficients of variation, averaging 3.1% for the complex and ranging from 2.4% to 9.5% across the individual HMAs. Even in this survey area with excellent sighting conditions characterized in most places by very open and relatively smooth terrain, adjustment to raw counts for those groups not seen by any observer are needed. This underscores the importance of using a statistical method for correcting raw counts.

**Assumptions and Caveats**

The results obtained from these surveys are estimates of the horses present in the areas surveyed at the time of the survey and should not be used to make inferences beyond this context.

The reliability of results from any population survey that is based on the simultaneous double-observer method rests on several important assumptions.

1. First, the method assumes that all groups of animals are flown over once during a survey period, and thus have exactly one chance to be counted by the front and back seat observers, or that groups flown over more than once are identified and considered only once in the analysis. Groups counted more than once would constitute 'double counting,' which would lead to estimates that are biased higher than the true number of groups present. Photography and the identification of 'marker' horses (e.g., horses with unusual coloration) in each group, and variation in group sizes, helped to reduce the risk of double counting during aerial surveys. This was probably not a large problem in this data set because staff from the Lander Field Office and Rawlins Field Office were meticulous about searching for and removing possible double-count observations from the data, with reference to detailed notes about horse color, photographs, and way point locations of observations (P. Griffin, pers. comm.).

   Additionally, groups that are never available to be seen (for example, due to temporary emigration from the study area, due to moving, undetected, from an unsurveyed area to one already surveyed, or due to being in such dense tree cover that they were effectively invisible to any observer) can lead to estimates that are negatively biased compared to the true population size. Although attempts were made to minimize the potential for horse movement among survey days by making use of fences, rivers, and topographic barriers, inter-day horse

movements during a multi-day survey could potentially bias results if those movements result in unintentional double counting or unavailability of groups.

Unfortunately, there was a one day break in the survey, due to a winter storm; the survey through the first 2 days had covered Antelope Hills, Crooks Mountain, and most of the areas in 'the middle' of the complex. Fences separated most of the areas surveyed up to the end of the second day from the unsurveyed areas, with the exception of within Stewart Creek. The survey staff was hopeful that the rim dividing Stewart Creek would limit movement from areas surveyed before the storm to areas surveyed after the storm.

The results presented here are based on a survey design and methods that assume that any unobserved movements were random, so combined effects of double counting and unavailable groups, if there were any, would cancel each other out.

2. Second, this method assumes that all horse groups with identical sighting covariate values have equal sighting probability. If there is additional variability in sighting probability not accounted for in the sighting models, such heterogeneity could lead to a negative bias (underestimate) of the population. However, given the relatively good sighting conditions that led to high sighting probabilities during this survey, this issue is unlikely to be important. It is possible that there could have been horse groups in heavily forested areas, for example in Green Mountain HMA, with substantially different detection probabilities that were not well represented in the observation data. If this was the case, then the estimated abundance for such areas (Table 1) would be lower than the true value. However, this potential problem is mitigated by the fact that transects over the heavily vegetated areas were generally spaced <0.5 miles apart, thereby compensating for the reduction in visibility caused by the vegetation.
3. A third assumption is that the number of horses in each group is counted accurately. In very large groups it may be common to miss a few horses unless photographs are taken and scrutinized after the flight. Relying on raw counts made from the airplane could lead to biased low estimates of population size. Using photography is in the drafted standard operating procedures for BLM double-observer aerial surveys for horses, when group size is ≥20. Group sizes ranged from 1 to 100 horses in this survey with 53 groups (15%) containing >10 horses (14 groups of those groups had >20 horses), so inaccurate counting would have been a substantial risk for some groups. Observers circled over large groups to get as accurate a count as possible and did use photography consistently to record group size of most large groups.

Given the several potential sources of bias, listed above, it is more likely that the estimates are somewhat lower, rather than higher, than the true population, unless the problem of potential double counting was not adequately avoided. However, given the high sighting probabilities and precision estimated for these surveys, the population estimates I present here provide a sound and reliable basis for management decisions.

**Recommendations for Future Surveys**

Several observations about the data may offer opportunities to improve future surveys.

1. There is a substantial benefit to maximizing the sighting probabilities and minimizing the number of different factors that cause variation in sighting probability. By far the most potent means to accomplish both objectives is to reduce the number of observers used in future surveys. In this survey, 2 individuals observed from the front seat and 5 from the back. One of these (EC) observed only 9 groups–less than an ideal sample size for estimating individual

acuity. There is no need to rotate observers in the front seat–a single observer should be used for the entire set of surveys, if possible, and no more than 2. It is preferable to have one observer consistently in the front seat, rather than having observers rotate from front to back seats. In a data set such as this, though, where there are a substantial number of observations from two districts, it is understandable if the district specialist sits in the front during the portion of the survey over their district. Using a single pilot is also preferred, as was done in this case. Back seat observers must be rotated, as they were, but they should be limited to as few as possible–ideally only 2 but no more than 3 or 4 unique individuals. All observers should be present long enough to accumulate >30 observations. Most important, observers should be carefully selected based on their past performance and ability to spot horses. The wide variation in acuity of the observers used in this survey suggests an opportunity to both reduce the total number of observers while retaining only those with high sighting probabilities (Table 3). It is especially important to use highly qualified observers in the front seat. These changes could improve the precision and reduce the risk of undetected biases in future results.

2. The presence of heavy vegetation cover in the Green Mountain HMA poses a challenge. It would be good to have sufficient data to estimate the effect of this vegetation cover given the tight transect spacing over it. The current dataset did not an adequate sample size. A future survey might be done when the population is larger, thereby providing a larger sample size. Or, a future survey could be pooled with the current one to obtain a larger sample size. To make this effective, it is important that future surveys be done under as similar conditions to the current one as possible. It is especially important for the observers used in the future to be primarily ones who already flew this survey.

3. I emphasize the continued importance of using photography for large horse groups (>10 is preferable, >20 is extremely important) so that group sizes recorded in flight can be validated with reference to photographs after the flight to ensure that such groups are counted accurately. Given that this population may have a tendency to form large groups, it is all the more important to have accurate counts of group size for each large group. A reliable, high-resolution camera with an adequate telephoto or zoom lens for the distance between observer and horses should continue to be used for this purpose.

4. The pilot followed predetermined transect lines (Figure 1) that were loaded into the pilot's GPS unit during most of the fight that were the same pattern of planned flight lines as was used for these surveys in 2014. The flight lines were generally spaced between 0.5-2.0 miles apart, depending on topography and vegetation. Tighter transects were flown over the mountains in the Green Mountain HMA and extending to the west beyond the boundary of that HMA (Figure 1). Slightly tighter transects over the eastern portion of the mountains in Green Mountain HMA might be desirable. Nevertheless, the high overall sighting probabilities estimated for this survey indicate that the transect layout generally provides good coverage.

5. Temporary emigration into or out of the surveyed areas was unlikely to have been a significant problem. The survey area (including the area outside of HMAs referred to as "the middle") is bounded by highways and fences along most of the north, west, and east sides. There are gaps that would permit horses to cross the study area southern boundary of Lost Creek HMA; however, this is an area of relatively low horse density. There are certainly opportunities for horses to move among some of the HMAs within the overall complex, particularly between Antelope Hills and Lost Creek. Extending future surveys outside of the

HMA boundaries in this area should be considered in areas where there may be wild horse activity.

6. The survey design and execution was adequate to minimize the possibility of horse movements within the survey area that could result in undercounting or no opportunity to observe some groups more than once, except for the unexpected interruption of the survey due to weather. If a storm is forecast that will disrupt a survey and the aircraft will continue to be available, it is better to wait to begin the survey of a given HMA or complex until the storm has passed. To the extent possible, future inventories should continue to include all the HMAs in this complex together on consecutive days.

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Lubow, B.C., and J.I. Ransom. 2007. Aerial population estimates of wild horses (*Equus caballus*) in the Adobe Town and Salt Wells Creek Herd Management Areas using an integrated simultaneous double-count and sightability bias correction technique. Open File Report 2007-1274. U.S. Geological Survey. 13 p.

National Research Council. 2013. Using Science to Improve the BLM Wild Horse and Burro Program. The National Academies Press. Washington, D.C.

**Table 2**. Tally of raw counts of horses and horse groups by observer (front and back) and survey year for combined HMAs. This table is based on raw counts (not statistical estimates) and, therefore does not address groups not seen by any observer.

| Observer | Groups Seen (Raw Count) | Horses Seen (Raw Count) | Actual Sighting Rate[a] (Groups) | Actual Sighting Rate[a] (Horses) |
|---|---|---|---|---|
| **Front** | 182 | 1,614 | 87.9% | 90.5% |
| **Back** | 163 | 1,470 | 78.7% | 82.4% |
| **Both** | 138 | 1,300 | 66.7% | 72.9% |
| **Combined (either)** | 207 | 1,784 | | |

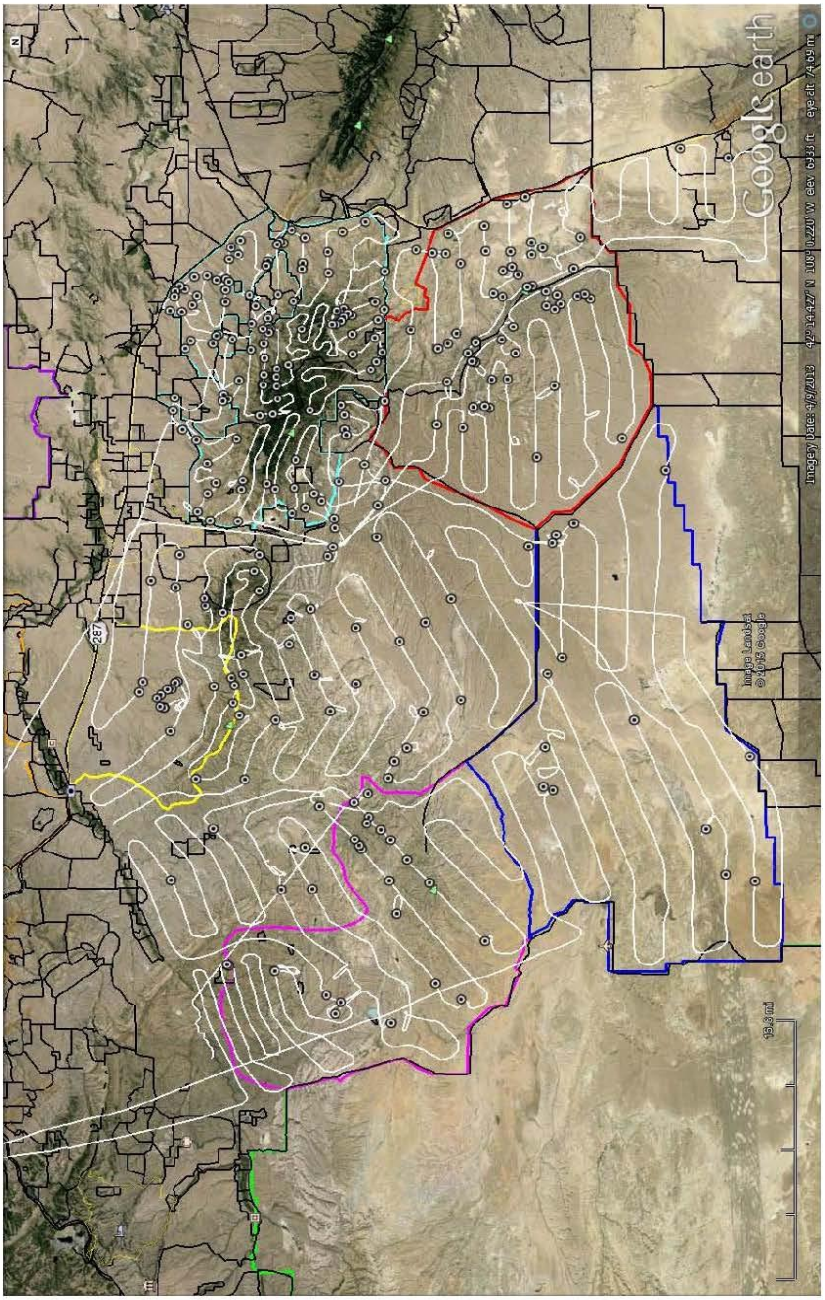
[a] Percentage of all groups/horses seen that were seen by each observer.

**Table 3**. Illustration of the effects of observers and sighting condition covariates on estimated sighting probability of horse groups for both front and rear observers. Baseline case (**bold**) is for observers in the indicated seat (except for horses on the pilot's side observed in the front). The baseline is for front observer TS, the average back-seat observer, a group size of 6 horse (the median value observed), horses not moving, smooth terrain, no snow cover, and the most common distance category (¼-½ mile). Other cases vary a covariate, one effect at a time, as indicated. Sighting probabilities for each row should be compared to the baseline (first row) to see the effect of the change in observer or condition. Baseline values are shown in bold wherever they occur. Sighting probabilities are calculated from weighted averaged model parameters across all 64 models.

| | Sighting Probability, Front Observer | Sighting Probability, Back Observer |
|---|---|---|
| **Baseline** | **86.3%** | **78.3%** |
| Effect of horses on centerline | **86.3%** | 0.0% |
| Effect of horses on both sides | 100.0% | **78.3%** |
| Effect of Pilot's side[a] | 86.9% | **78.3%** |
| Effect of group size (N=1) | 84.5% | 75.7% |
| Effect of group size (N=10) | 87.7% | 80.3% |
| Effect of horse movement | 87.2% | 79.6% |
| Effect of rugged terrain | 79.7% | 69.3% |
| Effect of snow cover (50%) | 72.1% | 59.6% |
| Effect of snow cover (100%) | 73.5% | 61.4% |
| Effect of distance (0-1/4 mile) | 91.4% | 85.9% |
| Effect of distance (1/2-1 mile) | 74.4% | 62.5% |
| Effect of observer BS in front | 91.5% | **78.3%** |
| Effect of observer PG in back | **86.3%** | 53.2% |
| Effect of observer TV in back | **86.3%** | 87.0% |
| Effect of observer BS in back | **86.3%** | 77.8% |
| Effect of observer TS in back | **86.3%** | 95.7% |
| Effect of observer EC in back | **86.3%** | 50.8% |

[a] Sighting probability for the front observers acting as a team when the horses were on the pilot's side of the flight path, regardless of which of the front observers saw the horses first.

**Figure 1** (following page)**.** Map of surveyed areas in the Red Desert complex, including Antelope Hills HMA (pink), Crooks Mountain HMA (yellow), Green Mountain HMA (light blue), Stewart Creek HMA (Stewart Creek), and Lost Creek HMA (dark blue). White lines indicate the actual path of the helicopter taken during surveys. Circles are GPS waypoints at the locations where observers saw groups of animals. Black lines depict fencing. Adjacent and nearby management areas not included in this survey are shown for reference: Divide Basin HMA (green), Dishpan Butte HMA (orange), and Muskrat Basin HMA (purple).


Google earth
Image Landsat
© 2013 Google
Imagery Date: 5/8/2013 42° 14' 42.7" N 108° 0' 22.0" W elev 6433 ft eye alt 74.69 mi
287
15.8 mi

12

## APPENDIX 7 Individuals, Organizations, Tribes or Agencies consulted

- Wyoming Governor's Office
- Andrea Lococo, Animal Welfare Institute
- Government and Legal Affairs, Animal Welfare Institute
- c/o Ernie Evans, Bureau of Indian Affairs
- Carbon County Commissioners
- Carl L Huhnke, Central Bank & Trust
- Congresswoman Cynthia M Lummis
- Deniz Bolbol
- Liz Clancy Lyons, Doris Day Animal League
- Double D Ranch, Dwayne and Denise Oldham; Ed Womack
- Office of the Governor, Environmental Policy Division
- Doug R Anesi, First Interstate Bank
- Douglas L Thompson; Chairman, Fremont County Commission
- Gail O'Neal
- Gerald Nelson
- Hooved Animal Humane Society
- Jack Corbett
- Wyoming Advocates for Animals, Jeannie R. Stallings
- Fremont County Cattlemen, Jim Hellyer
- Kathy Gregg
- Kevin Edinger, NRCS
- Marybeth Devlin
- Mathew Dillon
- Mike Henn, Wyoming State Land & Farm Loan Office
- Jeri Trebelcock, Popo Agie Conservation District
- Animal Protection Institute of America, Public Land Wildlife Division
- REP. Larry Meuli, MD
- REP. William "Jeb" Steward
- Rock Springs Grazing Association
- Ron Cunningham
- Scott Harnsberger
- State Planning Coordinator
- Steve Poitras, NRCS
- Tim and Heather O'Neal
- Tom Morrison
- Tyrel Nicholas
- U.S. Senator John A. Barrasso
- U.S. Senator Mike Enzi
- Lander Fish and Wildlife Conservation Office
- US Fish and Wildlife Service
- US Rep. Cynthia Lummis: ATTN: Pat Aullman
- US Rep. Cynthia Lummis; ATTN: Bonnie Cannon

- US Rep. Cynthia Lummis-Cheyenne FO
- US Senator Mike Enzi: ATTN: Reagon Green
- US Senator Mike Enzi: ATTN: Robin Bailey
- US Senator Mike Enzi: Casper Field Office
- US Senator Mike Enzi: Cheyenne Field Office
- Travis Bruner, Executive Director, Western Watersheds Project
- Jonathan B. Ratner, Director, Western Watersheds Project
- Tribal Historic Preservation Office, Wilfred Ferris
- Northern Arapahoe Tribal Historic Preservation Officer, Yufna Soldier Wolf
- Linda Serdiuk, Wind River Backcountry Horsemen Assoc.
- Wyoma D. Burris
- Jason Fearneyhough, Director, Wyoming Department of Agriculture
- Natural Resource & Policy Section, Wyoming Department of Agriculture
- Office of the Director (5), Wyoming Game & Fish Department
- Wyoming Game & Fish Department, Amy Anderson
- Wyoming Livestock Board
- Jennifer Womack
- Wyoming Livestock Roundup
- Field Director, Wyoming Outdoor Council
- Dick Loper, Wyoming State Grazing Board
- Patricia M. Fazio, Ph. D. Statewide Coordinator, Wyoming Wild Horse Coalition
- Executive Director, Wyoming Wildlife Federation
- Harold Schultz, Wyoming Wildlife Federation
- Wyoming State Historic Preservation Office (SHPO)
- Wyoming State Lands & Investments
- Wyoming Travel & Tourism
- Wyoming Planning Office
- Shoshone Business Council
- Shoshone Rose Casino
- Wyoming Business Council
- Wind River Visitors Council, c/o Paula McCormick
- Lander Chamber of Commerce
- City of Lander, c/o Mayor Mick Wolfe
- Arapahoe Business Council
- Abernathy Ranches, LLC
- David, Lyle and Colleen
- Armstrong Ranch, Inc.
- Armstrong , John D. & or William L. Bregar
- Jolley Livestock Grazing Association, LLC
- Poor Farm DTA, LP
- Anderson, Christopher and Susan
- Walking S Grazing Association, LLC
- Stewart Creek LLC
- Schiff of Wyoming, LLC. Split Rock Ranch

- Faris, Allen Guy
- Chris Anderson, ET AL.
- Quarter Circle Block, LLC
- Joshua Anderson Ranch Management, LLC
- Whitlock, Robert or Judy
- Alkali Creek Grazing Association

**APPENDIX 8 Summary of Scoping and Public Comments**

| Comment No. | Comment or Issue | BLM's Response |
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| 1 | Humane Handling and Treatment. Methods used to avoid injury and possible death to foals of the year and older horses during gather operations. Impacts that gathering and processing would have on the horses. | BLM has developed standards for the humane handling and treatment of wild horses (IM 2015-151) which would be implemented under all action alternatives. The impacts of gathering and processing horses is part of the EA. Refer to Section 3.1.2. See also Appendix 1 |
| 2 | Horses relocated back in to the HMA boundaries, and remedy conditions that are allowing horses to move outside of the HMA boundaries. | In accordance with the WFRHBA, the BLM manages the HMAs to maintain a thriving natural ecological balance, as reflected in the AMLs of the approved RMPs. Relocating horses to the HMA would not address the Complex being over AML, would not maintain a thriving natural ecological balance, or meet the purpose and need. Also, past relocation efforts have shown that horses that are relocated generally return to the same area within 24 hours. Removal of horses outside the HMAs in in compliance with the WFRHBA, FLPMA, and 43 CFR 4700. |
| 3 | Increase AMLs to population levels. | Thanks for your comment. Outside the scope of this EA. Appropriate Management Levels are established through LUP decisions and are not adjusted in a gather EA. |
| 4 | Compensate ranchers for partial or full non-use or permanent retirement of grazing permits within HMAs. | Thanks for your comment. Outside the scope of this EA. BLM does not compensate permittees for taking non-use on their permits. The amount of use on a given allotment may be adjusted and is agreed upon between the BLM and the permittee. |
| 5 | Minimally intrusive gather methods that preserve herd social structure, using bait and water trapping gather methods instead of helicopter gather methods. | Gather methods that have been considered in drafting this EA include bait and water trapping. However, due to the size of the Complex, number of horses above AML, limited access to many areas, and the multitude of available water sources, this method was not carried forward in the analysis as a sole gather method. The Proposed Action was adjusted to allow this this technique if it is found to be plausible on a localized basis on an HMA-level. Helicopter gathers have been shown to be safe and humane |

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| | | in gathering wild horses. See Section 2 for alternatives considered in the drafting of this EA. |
| 6 | Economic analysis of the cost of removing horses from the range vs. relocating them back within HMA boundaries. (The lifetime costs, estimated by BLM to be $43,000 per horse removed, should also be included in this analysis.) | Economic analysis for the removal of horses has been analyzed on a national basis. For information on the wild horse budget, visit: http://www.blm.gov/wo/st/en/prog/whbprogram/history_and_facts/quick_facts.html |
| 7 | Analysis of surgical or chemical sterilization. Number of mares proposed to receive contraception or sterilization. | See Section 2.5.5. Sterilization of mares is not proposed and was not analyzed. The number of mares proposed to receive contraception is identified in Ch. 2 of the EA. |
| 8 | Sex ratio skewing | Sex ratio skewing is not proposed in this gather and as a result is not analyzed in this EA This has been utilized in this Complex and it has not been shown to reduce population growth, therefore was not considered because it would not meet the purpose and need. |
| 9 | PZP could be applied without the need for roundups, a comprehensive fertility control program should be developed to avoid future gathers. | PZP has been successfully applied through intensive darting programs. Such a program has not been employed, and is not plausible, in this Complex due to its size, number of horses above AML, and difficult access to horses when PZP would be most effective. However, if this technique is found to be plausible on a localized basis on an HMA-level, it may be implemented after the herd size were reduced to AML. This potential program was added to the Proposed Action. |
| 10 | The PZP administration should also be tracked because repeated administration of this drug will cause sterility in mares. Past scientific monitoring research and report data for all contraception applications including but not limited to capture and field darting and type of fertility drug, number and estimated age of each mare darted and identifying marks of each animal for purposes of non-removal of those mares during | Research has shown that some mares never reproduce after repeated application of PZP. In this complex, PZP was last applied in 2011. Using current census estimates shows that we are not experiencing prolonged reproduction suppression in all treated mares. Past application of PZP to mares is tracked by giving treated mares a brand. An EA is to provide an analysis to make a reasoned choice among alternatives and to determine whether or not a significant impact would occur. EA's are concise and summarize necessary data and research relevant to the direct and indirect effects of the proposed action and reasonable alternatives, and cumulative impacts. The EA summarizes |

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| | the proposed capture. If no identifying marks, then method of determining which mares will be given fertility control and/or removed during the upcoming capture plan. The same request for all fertility treatments of this herd for the past twenty years. | information necessary to meet that requirement. Cumulative impacts, which include the incremental impact of the action when added to other past actions, are disclosed in Section 4, and in a manner consistent with 43 CFR 46.115. Application of fertility control vaccines by darting has not occurred in the Red Desert Complex. Mares that have received fertility control vaccinations during past gather operations were given a freeze mark for future identification. |
| 11 | BLM mustang horse camping tours. | BLM does not provide camping tours. Thank you for your comment. |
| 12 | AMLs should be reevaluated to ensure genetic variability. Please provide records which show results of genetic testing for the past 20 years. Manage horses to ensure genetic diversity and prevent inbreeding. | AMLs are established through the land use planning process and will not be amended in this EA. It is however recognized that individually these HMAs populations are near the threshold for decreased genetic variability. However when considered as a complex population with interchange between each, genetic variability is preserved. A brief description of results for genetic tests completed in 2009 for the Rawlins HMAs and 2006 for the Lander HMAs can be found in Appendix 3. |
| 13 | Boundary adjustment to include area between Stewart Creek and Green Mountain. | HMA boundary adjustments are part of the land use planning process. This is outside the scope of this EA. |
| 14 | Livestock AUM's must be reevaluated, re-prioritized, reduced, and/or eliminated if necessary to insure that forage within the HMAs is devoted principally to the welfare of wild horses in keeping with the Multiple use management concept. Accurate and comprehensive disclosure of AUMs allotted to wild horses, livestock and wildlife. | AUM allocations are outside the scope of this EA. An alternative to remove or reduce livestock, which would allow for reallocation of AUMs, was considered but not carried forward for detailed analysis because these decisions are made in the LUP process, see Section 2.5.3. |
| 15 | Any efforts to control wild horse populations should include protection of predators, specifically mountain lions – the most natural and least expensive way to control populations of all wildlife. | Control of wild horse populations by natural means, including predation, was considered but not carried forward for detailed analysis because it would be contrary to the WFRHBA, FLPMA and PRIA. BLM is required to prevent range degradation from overpopulation of wild horses. Predators of sufficient size and number to |

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| | | regulate horse populations do not exist within the Complex. See Section 2.5.6. |
| 16 | Varied herd growth rates and each herd should be evaluated separately. | Treatment of these HMAs as a Complex does not preclude analysis on the individual HMA basis. Gathering, removing and possible treatment would be done on an HMA basis. |
| 17 | Impacts of the roundup are disruptive and damaging to the environment and ecosystem on every level. | Gather operations do cause disruption and damage on a local scale for a short period of time, but they are conducted to minimize impacts, are not expected to result in long term effects to the environment, and relieve other long-term impacts. Gather SOP's can be found in Appendix 1. |
| 18 | Noise from helicopters is tremendously disturbing to wildlife, such as sage grouse. | Protective stipulations relating to wildlife during gather operations are part of this EA, see Gather SOP's found in Appendix 1. Thanks for your comment. |
| 19 | Equipment used for gather activities increase global warming and should not be allowed. | The use of other gather methods were considered but not carried forward for detailed analysis in this EA. These methods may or may not result in fewer emissions. Other methods of gathering may take longer and have a similar impact over time. See Section 2.5. Thank you for your comment. |
| 20 | Dust generated by gather activities can cause infections to horses, and harm wildlife. | Dust abatement measures are part of the SOP's for gather operations found in Appendix 1. Thank you for your comment. |
| 21 | Gather operations would apply stresses that would make horses more likely to consume halogeton, which causes poisoning if eaten in large amounts. | Halogeton does cause toxicity in horses if consumed in sufficient amounts. There has been no observed increase in halogeton consumption in wild horses during or post gather operations. |
| 22 | Gather activities could cause damage to riparian habitats by trampling of the area by horses being gathered and equipment used to gather and transport them. | Riparian habitats would be avoided for trap site locations. Riparian habitats may be crossed while horses are being gathered. This impact would be on a small percentage of riparian habitat and only where horse actually crossed it. |
| 23 | Detailed map of fence boundaries, including allotments, pastures, water sources or improvements, exclosures, and range improvement projects. | Map 2 provides an overview of HMAs overlaid on allotment boundaries. Range improvements are a valuable tool for the BLM management of the public lands. However the Proposed Action and the alternatives were designed specifically to address the need to remove excess wild horses to |

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| | | maintain the established AMLs and a thriving natural ecological balance. Please refer to Section 1.1 for the purpose and need for this action. |
| 24 | All capture methods planned for the next ten years and the number of horses to be removed using each method. | This is unknown at this time and would be determined at the time of future gathers. |
| 25 | If bait/water trapping is to be utilized, how will the public be informed, who will decide on euthanasia and will they be disposed of, and how will the public be informed of this action. | Bait and water trapping as a sole gather-method was an alternative considered but not carried forward in this EA. Euthanasia decisions are the responsibility of the Lead COR with counsel with the onsite APHIS veterinarian on special cases. Horses would be disposed of in accordance with state regulations. Daily reports are posted to the internet summarizing activities performed each day the gather takes place. These reports include the number gathered, the number removed, the number released, and any deaths associated with the gather. |
| 26 | Request that scientific monitoring data, including data that supports the claim that horses are overpopulating the HMA land and /or causing damage to the range versus livestock and wildlife and other multiple uses. | The EA provides the data and analysis to make a reasoned choice among alternatives and to determine whether or not a significant impact would occur. EA's are concise and summarize necessary data and research. See Section 3. |
| 27 | Methods used by BLM to determine and differentiate between livestock, wild horse and wildlife usage of water resources on the HMA within the past ten years and include the research data and reports. A proposed EA concerning any wild horse gather management must include all of the uses in the district that use any water and any land use, including surface and sub-surface | BLM does not manage water usage. |

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| 28 | Provide all scientific monitoring research and report data for all pre and post capture actions on each of the HMAs within the past 20 years, including but not limited to aerial and ground observation that verifies the post roundup census population of WH&B. | An EA is to provide an analysis to make a reasoned choice among alternatives and to determine whether or not a significant impact would occur. EA's are concise and summarize necessary data and research relevant to the direct and indirect effects of the proposed action and reasonable alternatives, and cumulative impacts. The EA summarizes information necessary to meet that requirement. Cumulative impacts, which include the incremental impact of the action when added to other past actions, are disclosed in Section 4, and in a manner consistent with 43 CFR 46.115. Past gather information can be found in Appendix 2. |
| 29 | Scientific monitoring data and reports for all previous captures that verifies the roundups contributed to range health improvement solely due to the removal of wild horses. This must include population data, and any changes in livestock and wildlife use. | An EA is to provide an analysis to make a reasoned choice among alternatives and to determine whether or not a significant impact would occur. EA's are concise and summarize necessary data and research relevant to the direct and indirect effects of the proposed action and reasonable alternatives, and cumulative impacts. The EA summarizes information necessary to meet that requirement. Cumulative impacts, which include the incremental impact of the action when added to other past actions, are disclosed in Section 4, and in a manner consistent with 43 CFR 46.115. |
| 30 | Detailed list and analysis of impact of all other "multiple uses" on the HMA. | An EA is to provide an analysis to make a reasoned choice among alternatives and to determine whether or not a significant impact would occur. EA's are concise and summarize necessary data and research. For impacts associated with the alternatives and cumulative impacts see sections 3 and 4 in the EA. |
| 31 | BLM reasoning and research and report data that wild horses are in excess on the HMA. Include reasoning behind the annual livestock usage versus wild horse allocations. Include data that supports the percentages of AUMs for private livestock versus wild horses is a legally supported authorization. | Based upon all information available, the BLM determined that approximately 2,140 excess wild horses exist within the Complex (inside of HMA boundaries and outside) and would need to be removed to maintain a thriving natural ecological balance. This assessment is based on the following factors including, but not limited to:<br>• Wild horse population double observer census estimates and distribution;<br>• Range trend monitoring and results; and<br>• The Standards and Guidelines Rangeland Health Assessments (2013b and 2003). |

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| | | Allocation of AUM's was completed during the land use planning process. According to the Rawlins and Lander RMPs, livestock grazing is an authorized use in wild horse HMAs. |
| 32 | Include details of plan to maintain or recover the short and long term genetic diversity and health of each of the proposed remaining herds. | Genetic testing of horses gathered in the Complex is included in 2 Alternatives in the EA to ensure that genetic viability is maintained. |
| 33 | Total number and age of mares, stallions and foals that were returned to the range after each previous capture in the last twenty years and the general area that they were released and reasoning of why they were released there. | An EA is to provide an analysis to make a reasoned choice among alternatives and to determine whether or not a significant impact would occur. EA's are concise and summarize necessary data and research relevant to the direct and indirect effects of the proposed action and reasonable alternatives, and cumulative impacts. The EA summarizes information necessary to meet that requirement. Cumulative impacts, which include the incremental impact of the action when added to other past actions, are disclosed in Section 4, and in a manner consistent with 43 CFR 46.115. |
| 34 | Environmental damage caused by other uses to the wild horse population for the last twenty years. | An EA is to provide an analysis to make a reasoned choice among alternatives and to determine whether or not a significant impact would occur. EA's are concise and summarize necessary data and research relevant to the direct and indirect effects of the proposed action and reasonable alternatives, and cumulative impacts. The EA summarizes information necessary to meet that requirement. Cumulative impacts, which include the incremental impact of the action when added to other past actions, are disclosed in Section 4, and in a manner consistent with 43 CFR 46.115. |
| 35 | Remove all BLM (grazing or other source) interior fencing to allow for free roaming behavior, and protect horses and other animals from wire; disclose fencing. | HMAs in this complex have limited number of fences inside the HMA. Some fences have been identified to be removed seasonally or let down to improve wild horse/wildlife movements, see Section 3.6. |
| 36 | Replace, remove or retrofit cattle guards within HMA boundaries with safety features so that horses could cross them safely. | Cattle guards are sometimes used on HMA boundaries fences only, where major roads and fences intersect. Wild horse have rarely been caught in cattle guards in this Complex. The use of cattle guards within an HMA is limited as the |

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| | | risk to animals, not just wild horses, is high. |
| 37 | Disclose and identify all beneficial range restorations, water enhancements and protections of spring heads to maximize habitat for wild horses and encourage utilization of entire range. | Range improvements are a valuable tool for the BLM management of the public lands. However the Proposed Action and the alternatives were designed specifically to address the need to remove excess wild horses to maintain the established AMLs and a thriving natural ecological balance. Please refer to Section 1.1 for the purpose and need for this action. Also, see Section 3.3, 3.4, and 3.6 for discussion on rangeland improvement discussions. |
| 38 | Fully disclose all data on the wild horse population for each HMA within the complex, including demographic information and migratory patterns and seasons. Conduct accurate census. | An EA is to provide an analysis to make a reasoned choice among alternatives and to determine whether or not a significant impact would occur. EA's are concise and summarize necessary data and research relevant to the direct and indirect effects of the proposed action and reasonable alternatives, and cumulative impacts. The EA summarizes information necessary to meet that requirement. Census completed in April 2015. See Appendix 6 for analysis memo. |
| 39 | Alternative for emergency situations including but not limited to temporary water hauling | An emergency situation does not currently exist within the complex. |
| 40 | Repatriate any wild horses removed to zeroed out HMAs. | Moving wild horses gathered in the Red Desert to another area not designated for long term wild horse management would be contrary to land use planning decisions and is outside the scope of this EA. |
| 41 | Ensure that BLM is in compliance with Section 106 of the National Historic Preservation Act, and that it is done in consultation with local tribes. | Consultation with the Wyoming State Historic Preservation Office was accomplished 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” (SHPO Protocol Appendix B-21). |