United States
Department of the Interior
Bureau of Land Management

Environmental Assessment WY-030-2009-0258-EA

Wild Horse Gathering for the
Red Desert Complex Wild Horse Herd Management Areas
(Lost Creek, Stewart Creek, Green Mountain, Crooks Mountain, Antelope Hills)

Location: **Rawlins & Lander, Wyoming**
Applicant/Address: **Bureau of Land Management**
1300 North Third Street, P.O. Box 2407
Rawlins, Wyoming 82301

Bureau of Land Management
1335 Main Street, P. O. Box 589
Lander, Wyoming 82520

U.S. Department of the Interior
Bureau of Land Management
Rawlins & Lander Field Offices

Rawlins, Wyoming 82301
Lander, Wyoming 82520
Phone: (307) 328-4200
Phone: (307) 332-8400
FAX: (307) 328-4224
FAX: (307) 332-8444

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Acronyms

AML	**Appropriate Management Level**
BLM	**Bureau of Land Management**
CEQ	**Council on Environmental Quality**
CFR	**Code of Federal Regulations**
EA	**Environmental Assessment**
EIS	**Environmental Impact Statement**
HMAP	**Herd Management Area Plan**
HMA	**Herd Management Area**
HSUS	**Humane Society of the United States**
IBLA	**Interior Board of Land Appeals**
MVP	**Minimum Viable Population**
PZP	**Porcine Zonae Pullicida**
RMP	**Resource Management Plan**
S&G	**Standards and Guides (for Rangeland Health)**
WH&B	**Wild horse and Burro**
WHBA	**Wild Horse and Burro Act, 1971**
WHHMA	**Wild Horse Herd Management Area**
WSA	**Wilderness Study Area**

1.0 Purpose and Need

1.1 Introduction

This Environmental Assessment (EA) has been prepared to disclose and analyze the environmental consequences of gathering excess wild horses in the Red Desert Wild Horse Herd Management Area (HMA) Complex. The HMAs included in this complex are Lost Creek, Stewart Creek, Green Mountain, Crooks Mountain and Antelope Hills. The EA is a site-specific analysis of potential impacts that could result with the implementation of a proposed action or alternatives to the proposed action. The EA 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 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 for the project. If the decision maker determines that this project does not have "significant" impacts following the analysis, then an EA would be prepared for the project. A Decision Record may be signed for the EA approving one of the alternatives presented in the EA.

1.2 Background

The Bureau of Land Management (BLM) Rawlins and Lander Field Offices propose to gather excess wild horses via helicopter and implement fertility treatment on captured mares that are turned back to the range. The gather is expected to begin in early November of 2009 and will last approximately ten to fifteen days.

The purpose of this environmental assessment (EA) is to analyze the impacts associated with the BLM's proposal to gather, and remove excess wild horses from the Red Desert HMA Complex (Lost Creek, Stewart Creek, Green Mountain, Crooks Mountain and Antelope Hills) and use fertility treatment in the fall of 2009, or as soon as possible thereafter.

The implementation of the gather is necessary to remove excess wild horses so that the remaining population levels are consistent with the appropriate management level (AML) for the herd management areas (HMAs) as well as to achieve a thriving natural ecological balance and a multiple use relationship with other resources within the project area. Implementing fertility control measures as part of the proposed action would slow the growth rate of the population that is returned to the HMA's. In the event that weather or other factors prevent a gather at this time, the operation would be conducted as scheduling permitted in 2010 or 2011.

The BLM also anticipates the implementation of the proposed action will meet RMP objectives and remain in compliance with the State of Wyoming Consent Decree Agreement.

1.3 Need for the Proposal

The purpose of the proposed action is to achieve and maintain the AML for wild horses in the Red Desert HMA Complex, collect information on herd characteristics, and determine herd health. By achieving and maintaining AML in the Red Desert HMA Complex, the BLM will also meet its objectives within the various HMA's. These objectives include:

- *Manage the Red Desert HMA Complex to achieve and maintain a thriving natural ecological balance, and multiple-use relationship.*
- *Manage the Red Desert HMA Complex population to preserve and enhance the historic physical and biological characteristics of the herd. (Including noted Spanish characteristics.)*
- *Maintain sex ratios and age structures, which will allow for the continued physical, reproductive and genetic health of the Red Desert HMA Complex.*
- *Preserve and maintain a healthy and viable wild horse population that will survive and be successful within the HMA 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 Red Desert HMA Complex wild horse herd as a self-sustaining population of healthy animals in balance with other uses and the productive capacity of their habitat.*

Wild horses were last gathered in the Red Desert HMA Complex in 2006. At completion of the gather, the population was estimated to be approximately 550 wild horses. Since that time the population has grown to an estimated 950 adult wild horses which exceeds the low end of the AML by nearly 500 head. In addition to the 950 adult horses it is expected that there will be an additional 250 foals of the year. Approximately 10% of the foals will be returned to the Complex in order to maintain age class distribution. The remaining foals (approximately 225) will be removed in addition to the excess adult wild horses. The action is needed to reduce the wild horse population to the low end of AML of 480 head established by the Record of Decision/ Lander Resource Area Wild Horse Herd Management Plan, Lander Herd Management Area Evaluation /Capture Plan, the associated Environmental Analyses (EAs) WY-036-EA3-010 and WY-036-EA3-013 and the Great Divide Resource Area Wild Horse Herd Management Area Evaluation EA/ Capture Plan and the associated Environmental Analyses (EAs) WY-037-EA4-122 and WY037-EA4-121 and the Record of Decision and Approved Rawlins Resource Management Plan, (see Table 1).

The need for management of wild, free roaming horses is to maintain a thriving natural ecological balance and to preserve the multiple use relationship that exists in the areas affected by wild horses. Management of wild horse populations is also needed to maintain the health of the public rangelands that wild horses and other animals depend on.

A variety of monitoring data has been collected since the AML was established, including vegetative trend, utilization and use pattern mapping, livestock actual use, professional observations and precipitation. In general, forage utilization levels vary from year to year based upon climatic conditions, vegetative production, and the number of horses, livestock and wildlife present in the HMAs.

While wild horse numbers have been maintained within AML the trend data collected for the Stewart Creek HMA has generally shown an upward trend in vegetative cover and increased species composition. There has also been a noted reduction in undesirable plant species such as

halogeton and prickly pear. The riparian areas have shown a similar pattern while wild horse numbers have not exceeded the established AML. In the 1990's and early 2000's wild horse numbers were greatly 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, greatly exceeding the high AML, have been listed as a contributing factor to riparian areas within the Lost Creek and Stewart HMAs not passing the riparian standards for rangeland health.

For the Lander Field Office, when the wild horse population is at the lower range of the AML, most of the HMA's receive slight to light use on upland areas (less than 40% utilization of current year's production). As the wild horse population approaches the upper range and exceeds the AML, the preferred horse use concentration areas begin to receive moderate to heavy use (41% to 80% utilization of current year's production), while other areas continue to receive slight to light use. This is primarily due to wild horse distribution and herd space requirements. This upland forage utilization is attributed primarily to wild horses, with minor wildlife use, since nearly all domestic livestock grazing within the HMA's has only been permitted at 40 to 60 percent of the normal permitted use in attempts to balance use within the HMA's during the drought period.

In addition, the Lander Field Office has been subjected to severe drought conditions since 2000. The three HMA's encompassing the Northern portion of the Red Desert HMA Complex has only received normal or above normal precipitation in two of the past ten years. According to BLM precipitation monitoring data, the Northern portion of the Red Desert HMA Complex received approximately 79% of normal precipitation from 2000 through 2009 (BLM Rain Gauge data). Forage production in the HMA's since 2000 has been well below normal. Forage availability for wild horses since the drought began has declined each year, as well as the health and vigor of the key forage plant species. Residual forage levels in most of the HMA's are below average, impacting not only wild horses, but degrading wildlife habitat and watershed conditions. As the wild horse population increases, horses begin increasing their range in search of forage, water, and space. Livestock actual use levels have also declined as permittee's and BLM have tried to manage the rangelands within the HMA's to maintain an ecological balance between use and available forage.

The proposed capture and removal of wild horses is necessary to remove the excess animals in order to achieve a thriving natural ecological balance between wild horse populations, wildlife, livestock and vegetation, and to protect the range from the deterioration associated with overpopulation of wild horses as authorized under Section 3(b) (2) of the 1971 Free-Roaming Wild Horses and Burros Act (1971 Act) and section 302(b) of the Federal Land Policy and Management Act of 1976.

The proposed management actions are also needed to be in conformance with the August 2003 Consent Decree upheld by the United States District Court of Wyoming. The Consent Decree is an out of court settlement agreement between the State of Wyoming and United States Department of the Interior, Bureau of Land Management. This agreement specifies that when information is gathered that indicates an HMA within the State of Wyoming is determined to be over the established AML, the BLM has one year from discovery to remove wild horses to the low range of AML.

1.4 Conformance with Existing Land Use Plans (LUPs)

The proposed action is in conformance with the land use plans terms and conditions as required by (43 CFR 1610.5-3(a)). Any action in the Rawlins and Lander Field Offices are subject to requirements established by the Rawlins and Lander Resource Management Plans, approved December 12, 2008 and June 9, 1987 respectively. 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 and removal conforms to the land use decisions and resource management goals and objectives of the Rawlins and Lander Resource Management Plans.

1.5 Relationship to Statutes, Regulations or Other Plans

Gathering excess wild horses is in compliance with Public Law 92-195 (Wild Free-Roaming Horses and Burros Act of 1971) as amended by Public Law 94-579 (Federal Land Policy and Management Act of 1976), and Public Law 95-514 (Public Rangelands Improvement Act of 1978). Public law 92-195, as amended, requires the protection, management, and control of wild free-roaming horses and burros on public lands. The preparation and transport of wild horses will be conducted in conformance with all applicable state statutes.

The Proposed Action is in conformance with all applicable regulations at 43 Code of Federal Regulations (CFR) 4700 and policies. The following are excerpts from 43 CFR relating to the protection, management, and control of wild horses under the administration of the BLM.

> 43 CFR 4700.0-2 One of the objectives regarding wild horse management is to manage wild horses "as an integral part of the natural system of the public lands under the principle of multiple use . . ."
>
> 43 CFR 4700.0-6(a-c) Requires that BLM manage wild horses "…as self-sustaining populations of healthy animals in balance with other uses and the productive capacity of their habitat … considered comparably with other resource values …" while at the same time "…maintaining free-roaming behavior."
>
> 43 CFR 4700.0-6 (e): Healthy excess wild horses for which an adoption demand by qualified individuals exists shall be made available at adoption centers for private maintenance and care.
>
> 43 CFR 4710.3-1 "HMA's shall be established [through the land use planning process] for maintenance of wild horse and burro herds."
>
> 43 CFR 4710.4 "Management of wild horses and burros shall be undertaken with the objective of limiting the animals' distribution to herd areas. Management of wild horses shall be at the minimum level necessary to attain the objectives identified in approved land use plans and herd management area 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 exists, the authorized officer shall remove the excess animals immediately."

Under 43 CFR 4180 it is required that all BLM management actions achieve or maintain healthy rangelands.

All federal actions must be reviewed to determine their probable effect on threatened and endangered plants and animals (the Endangered Species Act).

Federal actions must also be reviewed to determine their probable effect on cultural and historic properties. This process is termed section 106 consultation (Section 106 of the Historic Preservation Act).

Executive Order 13212 directs the BLM to consider the President's National Energy Policy and adverse impacts the alternatives may have on energy development. The action would also be in conformance with the Great Divide Resource Area Wild Horse Herd Management Area Evaluation EA/ Capture Plan and the associated Environmental Analyses (EAs) WY-037-EA4-122 and WY037-EA4-121 and the Record of Decision and Approved Rawlins Resource Management Plan as well as, the Lander Resource Area Wild Horse Herd Management Plan, Lander Herd Management Area Evaluation / Capture Plan and the associated Environmental Analyses (EAs) WY-036-EA3-010 and WY-036-EA3-013. Recommendations from these evaluations and documents were the basis for establishing the AML. These documents contain specific management prescriptions for the HMA's, as well as information on the existing environment and environmental impacts of the management actions. The decisions were affirmed by the Interior Board of Land Appeals in Animal Protection Institute of America et. al.(IBLA 93-308, 94-14). Rangeland conditions have changed significantly since 1993 with the inception of the drought in 2000. Changes to HMA boundaries or AMLs are beyond the scope of this analysis and will not be discussed further. The proposed action is consistent with all other federal, state, and local plans. The gather will assist in maintaining the health of the public lands within the HMA. The "*Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the State of Wyoming"* is available at http://www.wy.blm.gov/range/sandgs.htm.

The carrying capacity for livestock and wild horses, multiple use management objectives, and the Terms and Conditions for livestock grazing for the Cyclone Rim, Stewart Creek, Green Mountain Common and Whiskey Peak Common Allotment's were established in conformance with the Rawlins RMP, Lander RMP, BLM policy, and the Wyoming Standards and Guidelines. See Appendix 6 for permitted livestock AUM's.

An AML is the maximum number of wild horses to be managed in the HMAs. The Great Divide Resource Area Wild Horse Herd Management Area Evaluation EA/ Capture Plan and the associated Environmental Analyses (EAs) WY-037-EA4-122 and WY037-EA4-121, the Lander Herd Management Area Evaluation / Capture Plan and the associated Environmental Analyses (EAs) WY-036-EA3-010 and WY-036-EA3-013 states that wild horses; "will be managed in a range from 480 to 724 wild horses". Table 1. lists the AML for wild horses in the Red Desert HMA Complex by HMA and allotment.

Table 1. AML by Allotment and Decision Record Date

Allotment	HMA Name	AML	Decision Record - Date
Stewart Creek (#10102)	**Stewart Creek**	125-175	May 1994
Cyclone Rim (#10103)	**Lost Creek**	60-82	May 1994
Green Mountain Common (#32001), Cyclone Rim (#10103)	**Antelope Hills/Cyclone Rim**	60-82	May1994
Green Mountain Common (#32001)	**Crooks Mountain**	65-85	May 1994
Green Mountain Common (#32001), Whiskey Peak Common (#12003)	**Green Mountain**	170-300	February 1993
Total		480-724	

Environmental analyses (EA's) have been conducted in past years which analyzed the impacts of various gather methods on wild horses, and other critical elements of the human environment, to achieve AML. These documents include:

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

2. Adobe Town – Salt Wells Creek Herd Management Complex – Management Action and Environmental Assessment EA No. WY040-07-EA-37 January 4, 2007.

3. 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 August 8, 2006.

4. 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 August 8, 2006.

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

6. 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, May, 2001.

7. Wild Horse Gathering Inside and Outside of the Crooks Mountain Wild Horse Herd Management Area, EA Number WY-050-EA2-032, April 2002.

8. Wild Horse Gathering Inside of the Green Mountain Wild Horse Herd Management Area EA Number WY-050-EA2-031, April 2002.

9. North Lander HMA Complex (Conant Creek, Rock Creek Mountain, Dishpan Butte and Muskrat Basin) Capture/Removal and Fertility Control Lander Field Office EA Number WY-050-EA4-061, 2004.

10. Antelope Hills/Cyclone Rim Horse Management Area Capture/Removal and Fertility Control Lander Field Office, EA Number WY-050-EA4-060, 2004.

11. Green Mountain Horse Management Area Capture/Removal and Fertility Control Lander Field Office, EA Number WY-050-EA5-133, 2005.

12. Crooks Mountain Horse Management Area Capture/Removal and Fertility Control Lander Field Office, EA Number WY-050-EA06-129, 2006.

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 Number EA WY-050-EA08-95, 2008.

14. A Consent Decree (2003) between the BLM and the State of Wyoming expressed the State's desire for the Bureau of Land Management (BLM) to gather at the lower level of the AML (70), but to also maintain a healthy herd.

These documents are available for public review at the Rawlins and Lander Field Offices. No other permits or authorizing actions are required prior to implementing the Proposed Action.

2.0 Alternatives

This chapter describes the Proposed Action and alternatives, including any that were considered but eliminated from detailed analysis. Alternatives analyzed in detail include the following:

- Alternative 1 (Proposed Action) – Gather to Low Range AML (480 Horses) with fertility control
- Alternative 2 – Gather to Low Range AML (480 Horses) without fertility control
- Alternative 3 (No Action) – No Gather/Removal

Alternatives 1 and 2 were developed based on the need to remove excess animals in order to manage the range in a thriving natural ecological balance and multiple-use relationship and to prevent range deterioration. The removal of wild horses under these alternatives would ensure that the wild horses remaining within the HMA have adequate forage and water to survive and maintain satisfactory physical condition. Removal of excess wild horses would also help to sustain the long-term productivity of the rangeland resources on the public lands that wild horses depend on. Application of fertility control is also analyzed to determine whether or not its use would be cost effective and result in reducing reproduction rates in mares released back to the range and in reducing gather frequency and decreasing disturbance to herd social structure. Although Alternative 3 (No Action) does not comply with the 1971

Act, as amended, nor meet the purpose and need for this action, nor complies with the Consent Decree Agreement with the State of Wyoming, it is included as a basis for comparison with the two action alternatives.

2.1 Actions Common to Alternatives 1 and 2

The following actions are common to Alternatives 1 and 2:

Maintain an AML in the Red Desert HMA Complex of 480 to 724 wild horses, as shown in Table 2.

Table 2. Management Range for Wild Horses in the Red Desert HMA Complex

HMA Name	Management Range
Stewart Creek	**125 – 175**
Lost Creek	**60 - 82**
Antelope Hills	**60 - 82**
Crooks Mountain	**65 - 85**
Green Mountain	**170-300**
Totals	**480-724**

Wild horse movements among the five herd areas in the Red Desert HMA Complex are apparent through trails and seasonal variation in distribution. It is recognized that individually, the AML for wild horses in three of the herd areas (Lost Creek, Antelope Hills, and Crooks Mountain) may not be a genetically diverse population. However, as indicated, these horses interact with each other between herd areas, and the interaction should ensure genetic variability. The sum total of the management range of all five herd areas in the Red Desert HMA Complex will be the AML.

- Gather operations would be conducted in accordance with the Standard BLM Operating Procedures for Wild Horse Removal (Appendix 1). The helicopter drive method would be used for this gather, and may include multiple gather sites. To the extent possible gather sites (traps) would be located in previously disturbed areas. Post-gather, every effort would be made to return released horses to the same general area from which they were gathered.

- An Animal and Plant Inspection Service (APHIS) veterinarian may be on-site, as needed, to examine animals and make recommendations to BLM for care and treatment of wild horses. All euthanasia will be in accordance with Washington Office Instruction Memorandum (IM) 2009-041.

- Animals would be removed using a selective removal strategy (Gather Policy and Selective Removal Criteria for Wild Horses, Washington Office IM 2005-206). Selective removal criteria for this gather would include:

a. Age Class Four Years and Younger: Wild horses four years of age and younger would be the highest priority for removal and placement into the national adoption program.

b. Age Class Ten Years and Older: Wild horses ten years of age and older may be removed and placed into long-term holding, if necessary to reach AML.

Any animals within this age class that are in the Henneke category of 2 or less and have no chance of timely improvement would be evaluated for euthanasia. Any euthanasia would be in accordance with Washington Office Instruction Memorandum 2009-041. Older horses that, in the opinion of the Authorized Officer, may survive if released but probably would not tolerate the stress of removal, preparation, and holding would be evaluated for return to the HMA.

c. Age Class Five to Nine Years: Wild horses aged five to nine years old would be removed last and only if the HMA cannot achieve AML without their removal.

The National selective removal criteria would be followed to the extent possible. Exceptional animals that represent historic colors, size and/or confirmation may be chosen for release outside of the selective removal priorities. An emphasis will be placed on returning horses displaying Spanish Colonial traits in accordance with the Rawlins RMP. Weak, unhealthy and unthrifty animals would not be selected for release back onto the HMA.

To enhance the selection process, more animals than required by the Proposed Action or Alternatives would initially be separated for release, and then a final sorting completed to select the exact animals for release, based on traits and ages of all of the animals initially selected for release. Additionally, in the case that a certain number of wild horses evade capture, and have been confirmed by the BLM WH&B Specialist, the total number of animals released may be reduced by this number.

- Data on the captured horses would be collected, including sex and age distribution, condition class information (using the Henneke rating system), color and size, along with the disposition of that animal (removed or released).

- Hair samples will be collected from horses in the Lost Creek HMA for genetic analysis as well as the Stewart Creek HMA as recommended by Dr. Gus Cothran.

- All areas outside of the HMA would be considered total removal areas.

2.2 Proposed Action and Alternatives

2.2.1 – Alternative 1 (Proposed Action) – Gather to Low Range AML (480 Horses) with Fertility Control

Alternative 1 would continue implementation of a population management strategy for the Red Desert Complex of HMA's in which adult wild horses would be managed in a range from 480 to 724 adult wild horses. Part of this alternative would involve capturing about 806 adult wild horses, returning about 338 adult animals to the HMAs, and removing the remainder of the horses. As previously stated it is estimated that in addition to the adult population there will also be

approximately 250 foals of the year. Approximately 10% of these foals will be returned to the Complex in order to maintain age class distribution. The remaining foals (approximately 225) will be removed in addition to the excess adult wild horses. It is assumed that approximately 85 percent of the horses could be rounded up and that approximately 142 adult horses would remain on the range. The 338 adult horses returned and the 142 adult horses that remained would approximate the low range of the AML (480 horses). The BLM would also assess sex, age, color, and herd health. Individual animals would be sorted as to age, size, sex, temperament, unique physical traits representing Spanish Colonial heritage and/or physical condition. Selected animals would then be returned to the range. Excess wild horses would be sent to Bureau facilities for adoption or long term holding.

Also under Alternative 1, immuno-contraceptive treatments would be conducted, with the results monitored as appropriate. Breeding age mares selected for release back to the range would be treated with Porcine Zona Pellucida (PZP) vaccine which would inhibit reproduction of the treated mares for two breeding seasons. The Fertility Control vaccine would be administered according to national protocols found in Appendix 6 of this document.

2.2.2 – Alternative 2 – Gather to Low Range AML (480 Horses) without fertility Control

Under this alternative, BLM would continue to implement a population management strategy for the Red Desert complex of HMA's in which wild horses would be managed in a range from 480 to 724 mature horses.

This alternative would involve capturing about 806 adult wild horses, returning about 338 adult animals to the HMA, and removing the remainder of the horses. As previously stated it is estimated that in addition to the adult population there will also be approximately 250 foals of the year. Approximately 10% of these foals will be returned to the Complex in order to maintain age class distribution. The remaining foals (approximately 225) will be removed in addition to the excess adult wild horses. It is assumed that BLM would only be able to capture 85% of the herds which would leave approximately 142 adult horses on the range. The 338 adult horses returned to the range and the 142 adult horses left on the range would approximate the low range of the AML (480). The BLM would also assess sex, age and color, and herd health. Individual animals would be sorted as to age, size, sex, temperament, unique physical traits representing Spanish Colonial heritage and/or physical condition. Selected animals would then be returned to the range, while excess wild horses would be sent to Bureau facilities for adoption or long term holding.

2.2.3 – Alternative 3 (No Action) – No Gather/Removal

Under the No Action Alternative, no gathering would take place. The herd would be allowed to increase until it reached levels where predation and environmental factors, coupled with density-dependant adjustments in reproductive rates, stabilized the populations. Considering the drought conditions experienced over the last eight years in the Red Desert HMA complex, it is anticipated that selection of this alternative could result in a rapid decline in the physical condition of the wild horses in the near future from increasing competition for available forage and water. This alternative would not be in conformance with the 1971 Act, the Rawlins or Lander RMP or the consent decree agreement with the State of Wyoming.

2.3 Alternatives Considered But Eliminated From Further Analysis

These alternatives were eliminated from further analysis because they either do not accomplish the management objectives are not consistent with the RMP, regulation, and/or policy, and/or pose a health and safety issue for horses and personnel.

Alternative Gathering Methods:

Hay and water trapping methods require that these resources be scarce. In the Red Desert HMA complex, adequate forage, except during severe winters with substantial snow cover, makes hay trapping impractical. When conditions might allow some limited success, drifting snow and road conditions limit access. Adequate water supplies and occasional rain showers make water trapping impractical.

Fertility Control Only:

One alternative considered was using fertility control measures only to regulate wild horse populations. Periodic capture operations would be required to administer PZP vaccine to mares, or suitable remote delivery methods would need to be developed. This alternative was eliminated from further analysis since the vaccine has not been formally approved by the Food and Drug Administration for management-based applications. Even with formal approval, an effective remote delivery methodology (aerial or water based) has not been developed for current formulations. Also, this alternative would not reduce wild horse numbers to a level that current rangeland conditions within the HMA can support.

3.0 Environmental Impacts

This chapter will assess the environmental impacts (either positive or negative) on the components of the human environment either affected or potentially affected by the Proposed Action and Alternatives. Direct impacts are those that result from the actual gather and removal of wild horses in the Red Desert HMA Complex. Indirect impacts are those impacts that exist once the excess animals are removed. 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 actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The numbers, age, and sex of animals proposed for removal are derived from WinEquus (Wild Horse Population Model) Version 1.40 developed by Dr. Stephen H. Jenkins, Associate Professor, Department of Biology, University of Nevada, Reno. See the attached Appendix C – Population Modeling, which establishes the parameters used for the HMAs population modeling runs.

Critical elements of the human environment (USDI-BLM 1988) and their potential to be affected by the Proposed Action and Alternatives must be considered. These critical elements are listed below in Table 2. The elements that are determined to be not affected will not be analyzed or discussed further in this document.

Table 2 – Critical Elements Checklist

Critical Element	Present	Affected
Air Quality	Yes	No
Areas of Environmental Concern (ACECs)	Yes	No
Cultural Resources	Yes	No
Environmental Justice	No	No
Floodplains	No	No
Invasive, Non-native Species	Yes	Yes
Native American Religious Concerns	Yes	No
Prime or Unique Farmlands	No	No
Special Status Species	Yes	No
Wastes, Hazardous or Solid	No	No
Water Quality (Surface and Ground)	Yes	No
Wetlands and Riparian Zones	Yes	Yes
Wild and Scenic Rivers	No	No
Wilderness	No	No
Threatened or Endangered Species	Yes	No
Vegetation	Yes	Yes
Wildlife	Yes	Yes
Soils	Yes	Yes
Wild Horses	Yes	Yes

3.1 Wild Horses

A. Wild Horses

1. HMA Description

The Rawlins and Lander Field Offices areas of jurisdiction 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 Red Desert Complex (Lost Creek, Stewart Creek, Antelope Hills, Crooks Mountain and Green Mountain HMA) are located in the Sweetwater, Carbon, Fremont and Natrona Counties west and south of Wyoming highway 789/287 (See map in Appendix 2). The Red Desert Complex of HMA's encompass about 753,000 acres of land. About 49,500 acres within the HMAs (about 6 percent) is privately or state owned. The HMA are characterized by gently rolling to steep mountainous terrain around Green Mountain and Crooks Mountain. 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 the precipitation received in these areas is from winter snows. This general discussion tiers to the affected environment that is discussed in the Great Divide Resource Area Wild Horse Herd Management Area Evaluation EA/ Capture Plan and the associated Environmental Analyses (EAs) WY-037-EA4-122 and WY037-EA4-121 and the Lander Herd Management Area Evaluation / Capture plan and the associated Environmental Analyses (EAs) WY-036-EA3-010, WY-036-EA3-013.

2. Gather History and Population Characteristics

Gathers were conducted in the Red Desert HMA Complex in 1986, 1987, 1988, 1989, 1995, 1997, 1998, 2001, 2002, 2003, and 2006. The 1986 through 1995 and 2001, 2002 and 2003 gathers were a gate cut (all gathered horses removed), while the 1998, and 2006 gathers utilized a selective removal criteria. Gathers were conducted in the Green Mountain HMA in 1980, 1984, 1993, 1995, 1996, 1997, 2002 and 2003. All of these gathers were a gate cut (all gathered horses removed) except 1993, 1995, and 1997. These gathers returned studs over five back to the herd area. The gather conducted in 2005 used selective removal criteria with fertility control. Gathers were conducted in the Antelope Hills/Cyclone Rim HMA in 1986, 1987, 1988, 1989, 2000, and 2001. All of these gathers were a gate cut (all gathered horses removed). These gathers were conducted on the entire HMA. The gather in 2004 used selective removal criteria with fertility control. Gathers were conducted in the Crooks Mountain HMA in 1985, 1996, 1998, and 2002 All of these gathers were a gate cut (all gathered horses removed) except 1996 and1998. These gathers returned studs over five years of age back to the herd area. These gathers were conducted on the entire HMA. The gather in 2006 used selective removal criteria with fertility control utilized on Antelope Hills and Green Mountain HMAs. Table 4 shows the number of wild horses that were gathered and the number removed during the gathers by year.

Table 4. Number of Wild Horses Gathered and Removed

Lost Creek and Stewart Creek HMA's

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
	TOTALS:	**2,238**	**2,051**

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
	Totals	**856**	**806**

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
	Totals	**1,560**	**1,424**

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
	Totals	**2,192**	**1,919**

Sex ratios, based upon gather data, was 47% females and 53% males in 2006. The sex ratio of the current population is expected to be approximately the same.

Table 5 shows the inventory of May 2009 population by HMA within the Red Desert Complex.

Table 5. Inventory Population

HMA Name	Inventory Population 2009
Stewart Creek	185
Lost Creek	235

Antelope Hills	125
Crooks Mountain	87
Green Mountain	316
TOTALS	**948**

- Post foaling population is approximately 1185 horses. (@25% growth rate 948 x .25=237 foals)

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). The samples were analyzed by Dr. E. Gus Cothran, Equine Genetics Laboratory, Texas A&M University. His conclusions and recommendations regarding genetic diversity in the Red Desert Complex of HMA's herd are summarized as follows:

Summary of the Lost Creek HMA
"Genetic variability of this herd is high. The values related to allelic diversity in particular suggest a herd with highly mixed ancestry. This view is consistent with the similarity values seen and the heterozygosity measures. The herd ancestry likely includes some Spanish component based upon this data and the 2001 data."

Recommendations for the Lost Creek HMA
Although current variability levels are good, this herd should be monitored because the AML is below the population size required to maintain genetic diversity. Re-sampling of the herd should be done by 2011 to check for changes in variation."

Summary of the Stewart Creek HMA
"Genetic variability is low but not at the critical level. *He* is higher than *Ho* and allelic diversity is fairly high. The pattern of variation observed suggests some level of inbreeding within the herd. The herd appears to be of mixed origins with clear evidence of Arab horse input and likely some Spanish horse influence as well but the strongest influence is North American derived breeds. The variation suggests that the population has been relatively stable for some time and is near genetic equilibrium."

Recommendations for the Stewart Creek HMA
"No action is needed at this time. Diversity levels are high enough that heterozygosity could increase by natural processes. Genetic variation should be rechecked in about five years to see if *Ho* has decreased. Population size for this herd is about right for minimal genetic drift, assuming no major loss of individuals. If there is further loss of genetic variation in the future, introductions of horses from neighboring herds would provide new variability."

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 HMA's

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 HMA's (Green Mountain, Antelope Hills/Cyclone Rim, Stewart Creek and Lost Creek) and this helps to diversify these gene pools and contribute to herd heterozygosity.

Based upon Dr. Cothran's recommendations, further genetic testing is planned in the HMA's within the complex for the proposed wild horse removal in the fall of 2009. Genetic tests would be based upon hair samples instead of blood samples, to ensure that the genetic variation within the wild horse herd remains within acceptable levels and that the Spanish Colonial components are maintained.

At this time, there is little evidence to indicate that the Red Desert HMA Complex suffers from reduced genetic fitness. The immediate proximity of the different herds to each other allows for the constant exchange of genetic material as for the majority of the year only open space separates the HMA's from each other.

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, 2000).
- 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, 2000).

- 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 as an estimate for Ne 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:

- The current estimated population for the Red Desert HMA complex is 948 head (pre 2009 foaling).

- Ne (genetic effective population size) for Red Desert HMA Complex has not been established. Current knowledge is limiting for application of these concepts to wild horse herds managed by the BLM. As more research is completed, and knowledge becomes available, it will be applied to the HMA managed by the RFO and LFO.

Environmental Impacts

The following table provides a summary of the population modeling results for each alternative, as derived from the wild horse population model, WinEquus (Appendix C). A total of 100 trials were run for 10 years, to assess the potential results of each possible management scenario. The results shown in Table 6, below, represent the median trial for each alternative.

Table 6 – Population Modeling Summary

Alternative	Population Size (0 to 20+ age horses)				Number of Horses Gathered, Removed, and Treated			Growth Rate
	Lowest Minimum	Minimum	Average	Maximum	Horses Gathered	Horses Removed	Horses Treated	
(1) Gather to 480 Horses with Fertility Control (Proposed Action)	393	556	811	1436	806	468	169	15.9%
(2) Gather to 480 Horses	485	649	949	1510	806	468	0	21.3%
(3) No Removal (No Action)	1202	1456	4224	8942`	0	0	0	19.7%

Population modeling projects that the minimum, average, and maximum population size would be lowest under Alternative 1 and 2. The lowest minimum population size under Alternative 1which would utilize fertility control would be within the parameters specified by Dr. Cothran for maintaining a genetically viable herd. The next lowest minimum population size under Alternative 2, which would only involve gathering, would still be above the level at which Dr. Cothran indicated that important genetic variation could be lost. The overall population growth rate would be lowest under Alternative I and would be progressively higher in the succeeding alternatives.

The population modeling also indicated that at least three removals would be required in the next 10 years, beginning with the proposed removal in the fall of 2009, to maintain the population within the limits of the AML under Alternative 2. Under Alternative 1, a second removal would most likely be required in 2013.

Under Alternative 3, the No Action Alternative, the wild horse population within the Red Desert Complex of HMA's would grow to a level that would exceed the carrying capacity of the range.

Impacts Common to Alternatives 1 and 2

The Wild Free-Roaming Horse and Burro Act of 1971 (Public Law 92-195 as amended) states that all management activities shall be at the minimum feasible level. The minimum feasible level of management would require that removals and other management actions that directly impact the population, such as aerial census, occur as infrequently as possible (3 to 5 years). To the extent practical, these alternatives would allow maintenance of a self sustaining population, as well as maintaining a thriving natural ecological balance.

Reducing the wild horse population in the Red Desert Complex of HMA's to 480 horses would meet the intent of the Wild Free Roaming Horse and Burro Act that all management actions shall be at the minimum feasible level. The following positive impacts for wild horses and their habitat would occur:

- A thriving natural ecological balance would be achieved and maintained by reducing the population to the lower limit of the management range.
- The wild horses remaining on the range would experience decreased competition and stress for available resources.
- Ensure a viable population of wild horses that would 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.
- Annual gathers would not be required which would allow for a greater level of herd stability and band integrity.
- Gathers would only occur when the population approaches or exceeds the upper limit of the management range, anticipated to be every 4 years.
- The wild horse population would be subjected to the stresses associated with gathering and handling as infrequently as possible.

If a management range is not maintained in the Red Desert HMA Complex, the intent of the Wild Free Roaming Horse and Burro Act (that all management actions shall be at the minimum feasible level) would not be met. The following negative impacts would occur:

- Annual gathers would be required to remove the annual increase in population each year, approximately 115 to 155 horses.
- A thriving natural ecological balance would not be maintained if yearly gathers to remove the annual increase do not take place. Resource degradation would begin occurring the year following the last gather and increase for each year that a gather is postponed.
- Annual gathers would have more severe impacts to herd stability and band integrity.

The wild horse population would be subjected to the stress associated with gathering and handling annually. There would be a greater likelihood that more horses would be injured or killed.

To the extent practical, the lower limit of the management range should allow maintenance of a self sustaining population, and the upper limit of the management range must be consistent with the objective of maintaining a thriving natural ecological balance. Population modeling (Appendix 5) conducted for the Proposed Action and Alternative II (Removal to the lower limit of the AML, with and without fertility control) indicate that the lower level of the management range should allow for maintenance of a self sustaining population. For the Proposed Action, the average population size in 10 years found that the lowest number of 0-20+ year old horses ever obtained was 393 head, with an average median trial population of 811 head. For Alternative II, the average population size in 10 years found that the lowest number of 0-20+ year old horses ever obtained was 485 head, with an average median trial population of 949 head.

The Herd Management Area Evaluation, Environmental Assessment and Decision Record for the herd areas in the Red Desert HMA Complex established the level of horses that would result in maintaining a thriving natural ecological balance.

Maintenance of the AML in the herd areas within the Red Desert HMA Complex would meet the intent of the Wild Free Roaming Horse and Burro Act that all management actions shall be at the minimum feasible level. The following positive impacts for wild horses and their habitat would occur:

Selective Removal Criteria

Direct impacts associated with Alternatives 1 and 2 would consist of selecting wild horses for release that possess the historic characteristics (color pattern, sex ratio, Spanish phenotype) and age structure that are typical of the herd demographics of the Red Desert Complex of HMA's. The National Selective Removal Policy (described in Section 2.1) would be followed to the extent possible. Animals selected for release would be the most capable of surviving environmental extremes, thus ensuring a viable population is present in the HMA's. Utilizing the selective removal criteria would result in a positive impact for the long term health and stability of the population.

The effect of removal of horses from the population is not expected to have significant impact on herd population dynamics, age structure or sex ratio, as long as the selection criteria for the removal maintains the social structure and breeding integrity of the herd. The selective removal strategy for the Red Desert complex HMA would maintain the age structure (of critical breeding age animals), the sex ratio and the historic range of characteristics currently within the herd. This flexible procedure would allow for the correction of any existing discrepancies in herd dynamics, which could predispose a population to increased chances for catastrophic impacts.

Potential negative impacts to the long term health and stability of the population could occur from exercising poor selection criteria not based on herd demographics and age structure. These negative impacts would include modification of age or sex ratios to favor a particular class of animal. Effects resulting from successive removals causing shifts in sex ratios away from normal ranges are fairly self evident. If the selective removal criteria favor studs over mares, it would be expected to result in decreased band size, increased competition for mares, and an increase in the size and number of bachelor bands. If the selective removal criteria favor mares over studs, it

would be expected to result in fewer and smaller bachelor bands, decreased competition for mares, and a likelihood of larger band sizes.

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

Gather Operations

These direct impacts include: handling stress associated with the gathering, processing, and transportation of animals from gather sites to temporary holding facilities, and from the temporary holding facilities to an adoption preparation facility. The intensity of these impacts varies by individual, and is indicated by behaviors ranging from nervous agitation to physical distress. Mortality does occur during a gather however it is infrequent and typically is no more than one-half to one percent of the total animals gathered.

Impacts which may occur after the initial stress of herding and capture include: spontaneous abortion in mares, increased social displacement, and conflict with studs and mares. Spontaneous abortion following capture is rare, depending on the time of year gathered. Traumatic injuries that may occur typically involve biting and/or kicking which results in bruises and minor swelling but normally does not break the skin. These impacts occur intermittently and the frequency of occurrence varies with the individuals.

Population wide impacts may occur during or immediately following the implementation of Alternatives 1 or 2. They include the displacement of bands during capture and the associated re-dispersal, temporary separation of members from individual bands of horses, re-establishment of bands following release, and the removal of animals from the population. With the exception of the changes to herd demographics, direct wide population impacts have proven to be temporary in nature with most if not all impacts disappearing within hours to several days of release. No observable effects associated with these impacts would be expected within one month of release except for a heightened shyness toward human contact. Observations of animals following release have shown horses relocate themselves back to their home ranges within 12 to 24 hours of release.

All activities would be carried out in accordance with current BLM policy, with the intent of conducting as safe and humane a gather as possible. Recommended actions incorporate proven Standard Operating Procedures (Appendix 1) which have been developed over time. These SOPs represent the best methods for reducing impacts associated with gathering, handling, transporting and collecting herd data.

Data Collection

Direct impacts associated with data collection involve increased stress levels to the animals as they are restrained in the portable aging chute. Once the animal is released from the chute, stress levels decrease rapidly. The collection of data is a positive impact to the long term management of the population. This data would be used to develop population specific objectives that would help to

ensure the long term viability of the population. This procedure is within the intent of the Act, as it relates to managing populations at the minimum feasible level.

Alternative 1: Proposed Action - Gather to Low Range AML (480 Horses) with Fertility Control

The direct impacts of Alternative 1 would include capturing about 806 adult wild horses, releasing 338 adult horses back to the HMA, and removing the remainder of the horses with the exception of the aforementioned foals of the year. Direct impacts associated with this alternative include potential changes to herd demographics, and stress associated with gathering. The effect on herd demographics was discussed in the Selective Removal Criteria section, and the stress associated with gathering was discussed under Gather Operations (refer to Section 3.1). Of the animals released back to the range, about 169 breeding age mares would be treated with two-year immunocontraceptive (PZP) vaccine. This vaccine has shown effectiveness of 94% in year one, 82% in year two and 68% in year 3.

Each mare to be released would receive a single-dose of the two-year PZP contraceptive vaccine, as described in Section II. When injected, PZP (antigen) causes the mare's immune system to produce antibodies that bind to her eggs, effectively blocking sperm penetration and fertilization (ZooMontana, 2000). PZP is relatively inexpensive, meets BLM requirements for safety to mares and the environment, and could be administered in the field. Also, among mares, PZP contraception appears to be completely reversible, and to have no ill effects on ovarian function if the mare is not contracepted for more than 3 consecutive years. PZP would not affect normal development of the fetus, hormone health of the mare or behavioral responses to stallions, should the mare already be pregnant when vaccinated (Kirkpatrick, 1995). Turner (1997) also found that the vaccine has proven to have no apparent affects on pregnancies in progress, the health of offspring, or the behavior of treated mares. Inoculated mares would foal normally in 2010, and the contraceptive would limit foal production in 2011 and 2012. Near normal foaling rates would be expected to resume in 2013.

Mares receiving the vaccine would experience slightly increased stress levels from additional handling while being inoculated and freeze marked. There may be some swelling at the injection site following the administration of the fertility control vaccine, but this would be a temporary, short term impact. Injection site injury associated with fertility control treatments is extremely rare in treated mares, and may be related to experience of the person administering the vaccine. Injection of the vaccine would be controlled, handled and administered by a trained BLM employee, researcher or veterinarian. Any direct impacts associated with fertility control are expected to be minor in nature and of short duration. The mares would quickly recover once released back to the HMA.

Alternative 2: Gather to Low Range AML (480 Horses) without fertility control

The direct impacts of the Proposed Action would include capturing approximately 806 adult wild horses, returning approximately 338 adult horses to the HMA's, and removing the remainder of the horses with the exception of the aforementioned foals of the year. Direct impacts associated with the Proposed Action also include potential changes to herd demographics, and stress associated with gathering. The effect on herd demographics was discussed in the Selective Removal Criteria section, and the stress associated with gathering was discussed under Gather Operations (refer to Section 3.1).

Implementation of the Proposed Action would prevent the population from increasing beyond the upper limit of the management range until the third or fourth year, 2012 or 2013. Gathering to the lower limit of the management range (480 horses) would allow the wild horse population to increase over time to the upper limit of the management range (724 horses). When this level is exceeded, another gather would be scheduled. Because the HMA's would be gathered again when the upper limit of the management range is exceeded, resource degradation associated with wild horses would be minimized. Under the Proposed Action, horses left on the range would have adequate forage, water and space. A thriving natural ecological balance would exist within the HMA and adjacent to it. Reducing the population to 480 horses would benefit the remaining horses by improving the quality and quantity of forage. This would ensure a vigorous and viable breeding population, reduce stress on vegetative communities and wildlife, and be in compliance with the Wild Free Roaming Horse and Burro Act, and the Rawlins and Lander Resource Management Plans. Reducing the wild horse population to 480 horses would also maintain the wild horse population at a level that Dr. Cothran indicated would preserve the genetic diversity of the Red Desert Complex of HMA's wild horse herd.

Alternative 3: No Action - No Removal of Wild Horses

Under this alternative, horses would not experience the stress associated with gathering, removal or adoption. The current population of wild horses would continue to increase, and exceed the carrying capacity of the range. According to population modeling, the population size could approach 4,224 (from the average median trial) horses within the next 10 years, which is well above the carrying capacity for wild horses in the Red Desert Complex of HMA's. Though it may require many years for the population to reach catastrophic levels, by exceeding the upper limit of the management range, this alternative poses the greatest risk to the long-term health and viability of the Red Desert Complex of HMA wild horse population, wildlife populations, and the vegetative resource.

The population of wild horses would compete for the available water and forage resources. The areas closest to water would experience severe utilization and degradation of the rangeland resources. Over the course of time, the animals condition would deteriorate as a result of declining forage availability and the increasing distance traveled between forage and water sources. The mares and foals would be affected most severely. The continued increase in population would eventually lead to catastrophic losses to the herd, which would be a function of the available forage and water and the degradation of the habitat. A point would be reached where the herd reaches the ecological carrying capacity and both the habitat and the wild horse population would be critically unhealthy.

Ecological carrying capacity of a population is a scientific term, which refers to the level at which density-dependant population regulatory mechanisms would take effect within the herd. At this level, the herd would show obvious signs of ill fitness, including poor individual animal condition, low birth rates, and high mortality rates in all age classes due to disease and/or increased vulnerability to predation (Coates-Markle, 2000). In addition, irreparable damage would occur to the habitat through overgrazing, which is not only depended upon by wild horses but by wildlife (which include sensitive species), and permitted livestock. All multiple uses of the area would be impacted. Significant losses of wild horses in the Red Desert Complex of HMA's due to starvation and disease would have obvious consequences to the long-term viability of the herd. Irreparable damage to the resources, which would include primarily vegetative, soil and watershed resources, would have obvious impacts to the future of the Red Desert Complex of HMA's and all other uses of the resources, which depend upon them for survival.

This alternative would not be acceptable to the BLM nor most members of the public. The BLM realizes that some members of the public advocate "letting nature take its course", however allowing horses to die of dehydration and starvation would be inhumane treatment and would clearly indicate that an overpopulation of wild horses existed in the HMA. The Wild Free-Roaming Horse and Burro Act of 1971, as amended, mandates the Bureau to "*prevent the range from deterioration associated with overpopulation*", and "*remove excess horses in order to preserve and maintain a thriving natural ecological balance and multiple use relationships in that area*". Additionally, Promulgated Federal Regulations at Title 43 CFR 4700.0-6 (a) state "*Wild horses shall be managed as self-sustaining populations of healthy animals in balance with other uses and the productive capacity of their habitat*".

3.2 Soils, Vegetation, Riparian Areas and Watershed

Existing Situation

Soils are quite varied throughout the HMA's. Due to the arid climate, many soils in this area generally lack high vegetative cover. The existing vegetative cover needs to remain in place to continue the geologic process of soil development. This cover prevents raindrops from directly impacting the soil surface, slows runoff and water and wind erosion.

Lost Creek/Stewart Creek HMA

Soils in the Stewart Creek and Lost Creek HMA are generally sandy loams to sandy clay loams, becoming clay loams to silty clays in flats, drainage bottoms and lakebeds in the Separation Flats area. Depth of soils ranges from very shallow on rims, to moderately deep to deep in most locations. Soils in the Separation Flats area and in other areas where water collects have high sodium (pH) levels. Vegetation is predominantly sagebrush with mixed grass and forb species. Wyoming big sagebrush is the principle sage species, but this gives way to basin big sagebrush on deep soils along drainages, black sagebrush on shallow rocky sites, and mountain big sagebrush at elevations above 7000 feet.

Other common species occurring in these communities include rabbitbrushes, winterfat, Indian ricegrass, needleandthread, bluebunch and western wheatgrass, mutton and little bluegrass, bottlebrush squirreltail, basin wildrye, Junegrass, threadleaf sedge, Hood's phlox, Hooker sandwort, buckwheat, buttercup, Indian paintbrush, mountain pea, bluebells, deathcamas, groundsel, bearded-tongue, various locoweeds and lupines. In Separation Flats there are extensive saline habitats dominated by greasewood, saltbush, and birdsfoot sagebrush. Grass species are similar to those already mentioned that are saline tolerant. There are fewer forbs species including biscuitroot, onions, kochia, glasswort and annuals. Prickly-pear cactus is common but not abundant, except on sandy fans adjacent to Bulls Creek and similar locations to the north that were used historically as lambing grounds in the spring.

There are a few scattered limber pines found on the lee side of Lost Soldier and Stratton Rims, with a few remnant aspen still present along upper Lost Soldier Creek. Riparian habitats occur along Lost Soldier Creek, Laundry Draw, Little Camp Creek, Stewart Creek, A & M Reservoir, Bulls Creek, Chicken Springs, Lost Soldier Creek, Laundry Draw, Kinch-McKinney Spring, Olson and Olson Reservoir, Battle Springs Flat, Lost Creek and Niland-Mud Springs. Common species

encountered in these areas include Nebraska and beaked sedge, tufted hairgrass, Kentucky bluegrass, redtop, Baltic rush, meadow barley, inland saltgrass, plantain, arrowgrass and potentilla.

Antelope Hills/Cyclone Rim HMA

Major vegetation types within the area include sagebrush-grasslands, grasslands, greasewood flats, and saltbush flats. Major vegetative species include thickspike wheatgrass, bluebunch wheatgrass, bottlebrush squirreltail, Indian ricegrass, needle and thread, prairie junegrasss, threadleaf sedge, Sandberg bluegrass, aster, phlox, milkvetch, buckwheat, Indian paintbrush, big sagebrush, black sagebrush, Gardner saltbush, winterfat, rubber rabbitbrush, green rabbitbrush, shadscale, black greasewood, and spiny hopsage. Wild horses generally prefer perennial grass species including Sandberg bluegrass, needle and thread, and Indian ricegrass, as forage. Shrubs, including saltbush, black sagebrush, and winterfat are more important during winter conditions. There are invasive plants (weeds) in the HMA, most of them occurring in disturbed areas associated with mineral development and roads and pipelines. Invasive weeds seem to be increasing in variety. Canada thistle can be found infrequently along stream riparian areas as well as in wet meadows. Black henbane occurs along road ditches, but its does not invade undisturbed ground. There is great potential for the spread of white-top, hoary cress, Russian knapweed, leafy spurge, and tamarisk with increased traffic in the area.

Soils and vegetation are quite varied throughout the HMA. The Great Divide Basin is in a 7 to 9 inch annual precipitation zone. The remaining northern parts of the HMA lie in a 10 to 14 inch annual precipitation zone. There are different vegetation ground cover potentials between the two precipitation zones, with higher natural/geologic erosion rates, due to lower ground cover, in the Great Divide Basin.

Starting at the northern end of the HMA, in a narrow band nearest the Sweetwater River and in the Antelope Hills/Cyclone Rim, soils formed in alluvium derived primarily from metasedimanetary rocks (i.e., schists, metagraywacke, iron formation, and andesite). Many soils here are shallow (<20 inches deep) and moderately deep (20 to 40 inches). There are also many springs and seeps associated with this geology. These medium textured soils usually contain quite a high percentage of angular coarse fragments. They are the highest altitude soils of the HMA with the highest precipitation, coldest annual soil temperatures, and the shortest growing season. Over the ages, they have accumulated the highest organic matter percentages in their top-soils compared to other soils in the HMA. They commonly support 10 to 14 inch precipitation zone gravelly, shallow loamy and loamy range sites.

Continuing south, roughly to Cyclone Rim, an east to west band of Miocene rock, a soft white tuffaceous sandstone, serves as a parent material source for these soils. These medium textured soils range from shallow to very deep (>60 inches). Often their surfaces are covered with gravel or angular fragments of sandstone or siltstone. They typically support 10 to 14 inch precipitation zone shallow sandy and sandy range sites.

Farther to the south, in the northern part of the Great Divide Basin, along Cyclone Rim, soils are derived from sedimentary rock of Wasatch Formation origin. Here the Wasatch Formation is comprised of varigated claystone and lenticular sandstone, which can be conglomeratic near the western side of the HMA. Here soils are typically medium textured, but can get heavy with clay in some locations. There are also some outcrops of badland. Most soils though are very deep and medium textured and support sandy range sites. They commonly support 7 to 9 inch precipitation zone sandy, shallow sandy, and shallow loamy range sites. Some soils are also sodium affected, supporting either saline upland or saline lowland range sites.

Crooks Mountain HMA

Major vegetation types within the area include sagebrush-grasslands, grasslands, greasewood flats, and saltbush flats. Major vegetative species include thickspike wheatgrass, bluebunch wheatgrass, bottlebrush squirreltail, Indian ricegrass, needle and thread, prairie junegrasss, threadleaf sedge, Sandberg bluegrass, aster, phlox, milkvetch, buckwheat, Indian paintbrush, big sagebrush, black sagebrush, Gardner saltbush, winterfat, rubber rabbitbrush, green rabbitbrush, shadscale, black greasewood, and spiny hopsage. Wild horses generally prefer perennial grass species including Sandberg bluegrass, needle and thread, and Indian ricegrass, as forage. Shrubs, including saltbush, black sagebrush, and winterfat are more important during winter conditions. There are invasive plants (weeds) in the HMA, most of them occurring in disturbed areas associated with mineral development and roads and pipelines. Invasive weeds seem to be increasing in variety. Canada thistle can be found infrequently along stream riparian areas as well as in wet meadows. Just to the north of the Crooks Mountain HMA, along the Sweetwater River, can be found spotted, diffuse, and Russian knapweeds; leafy spurge also occurs in the Split Rock area. Black henbane in connection with oilfield disturbances and travel routes like the Happy Springs Road. The State Highway 287 right-of-way contains all three of the above mentioned knapweeds. This highway carries quite a bit of tourist traffic in the summer months and is a likely path for new weed infestations.

There are invasive plants (weeds) in the HMA, most of them occurring in disturbed areas associated with mineral development and roads and pipelines. The State Highway 287 right-of-way contains all of the knapweed species. This highway carries quite a bit of tourist traffic in the summer months and is a likely path for new weed infestations.

The Crooks Mountain HMA contains diverse kinds of soil that range from cold, sub-humid mountain soils to semiarid warm and semiarid cool soils.

In the 10 to 14 inch precipitation zone, roughly at elevations below 8,000 feet north of Crooks Mountain, the soils formed in the Split Rock Formation's sandy, gravelly, and calcareous parent materials under a semiarid cool desert climate on fan aprons, fan piedmonts, and terraces. These soils can possess medium to coarse textures and possibly high percentages (>35%) of coarse fragments (gravel and cobble). These soils are well developed, usually deep, well drained, and typically have slopes of less than 15 percent. The coarse textures in many of these soils makes for low available water holding capacities. Surface water runoff is typically slow. Though water erosion can pose a

threat to some of these soils, most of them are very susceptible to wind erosion.

Crooks Mountain is covered by a thick layer of giant boulder conglomerate. As a result, many of the soils here possess a large percentage of coarse fragments (i.e., gravels, cobbles, stones, and boulders). Elevations range from 7,500 to about 9,000 feet. Slopes typically vary from nearly level to very steep (0 to 75 percent slope). Soils here are well drained, but can be poorly drained in the less sloping areas on top of the mountain where a perched water table is commonly found under the lodgepole pine trees. Poorly drained soils also can be found along the creeks that originate on the mountain. Textures vary from loamy and cobbly, loamy, or loamy and gravelly. Water erosion is the dominant form of erosion on Crooks Mountain. Annual precipitation is 18 to 22 inches and the frost-free period is 40 to 60 days.

Green Mountain HMA

Major vegetation types within the area include sagebrush-grasslands, grasslands, woodland, and riparian types. Major vegetative species include thickspike wheatgrass, bluebunch wheatgrass, bottlebrush squirreltail, Indian ricegrass, needle and thread, prairie junegrasss, threadleaf sedge, Sandberg bluegrass, aster, phlox, milkvetch, buckwheat, Indian paintbrush, big sagebrush, black sagebrush, green rabbitbrush, winterfat, rubber rabbitbrush, green rabbitbrush, shadscale, and spiny hopsage. Wild horses generally prefer perennial grass species including Sandberg bluegrass, needle and thread, and Indian ricegrass, as forage. Shrubs, including saltbush, black sagebrush, and winterfat are more important during winter conditions. There are invasive plants (weeds) in the HMA, most of them occurring in disturbed areas associated with mineral development and roads and pipelines. Invasive weeds seem to be increasing in variety. Diffuse and possibly spotted knapweed occur along Willow Creek and on the slopes of Green Mountain. Canada thistle can be found infrequently along stream riparian areas as well as in wet meadows. The State Highway 287 right-of-way contains all of the knapweed species. This highway carries quite a bit of tourist traffic in the summer months and is a likely path for new weed infestations.

The Green Mountain HMA contains diverse kinds of soil that range from cold, sub-humid mountain soils to semi-arid warm and semi-arid cool soils and sand dunes. In the 10 – 14 inch precipitation zone, roughly at elevations below 8,000 feet north of Green Mountain and Whiskey Peak, the soils formed in the Split Rock formation's sandy, gravelly, and calcareous parent materials under a semi-arid cool desert climate on fan aprons, fan piedmonts and terraces. These soils can possess medium to coarse textures and possibly high percentages (>35%) of coarse fragments (gravel and cobble). These soils are well developed, usually deep, well drained, and typically have slopes of less the 15 percent. The coarse textures in many of these soils make for low available water holding capacities. Surface water runoff is typically slow. Water erosion can pose a threat to some of these soils and most of them are very susceptible to wind erosion.

The Owl Hills are located adjacent to the northeast flank of Green Mountain. Soils here are typically moderately deep (20 to 40 inches) or shallow (<20 inches) and an significant

percentage of the area is granitic rock outcrop. These soils formed in residuum and slope alluvium derive dominantly from granite, gneiss, and schist. The soils are well drained, medium textured and contain significant amounts of course fragments (channers) typically in excess of 50 percent throughout their profiles. Permeability rates of the soils here are moderate (0.6 to 2.0 inches/hour), runoff is medium and available water holding capacities are low. The hazard of erosion by wind is slight and the hazard or erosion by water is severe.

Green Mountain and Whiskey Peak are covered by a thick layer of giant boulder conglomerate. As a result, many of the soils here possess a large percentage of coarse fragments (i.e., gravels cobbles, stones, and boulders). Elevations range from 7,500 feet to 9000 feet. Slopes typically vary from nearly level to very steep (0 to 75 percent slope). Soils here are well drained, but can be poorly drained in the less sloping areas on top of Breen Mountain where a perched water table is commonly found under the lodgepole pine trees. Poorly drained soils also can be found along the creeks that originate on the mountains. Textures vary from loamy and cobbly, loamy, or loamy and gravelly. Water erosion is the dominate form of erosion of the Green Mountains.

To the south of the Green Mountains the Battle Spring formation gives rise to well drained loamy, gravelly, and sandy textured soils that range in depth from shallow (<20 inches) to very deep. They occur on nearly level to steep and very steep slopes. These soils formed on terraces, toe slopes, fan aprons, hills, ridges, and sand dunes. Wind erosion is the dominant form of erosion in the dune areas. West of the dunes both wind and water are important agents of erosion. Elevations in this area generally range from 5,700 to 8,000 feet. The annual precipitation for this part of the allotment is about 10 – 14 inches. A portion of this area lies in the 7 to 9 inch precipitation zone of the Great Divide Basin.

Wetlands and Riparian Zones

Lost Creek

Riparian vegetation is not extensive within the HMA however it is a highly important resource for wildlife, wild horses, and livestock. Grazing management considerations often emphasize these areas as the most productive sites in the region. The Lost Creek HMA did not pass the riparian/wetland standards due primarily to the poor condition of springs and seeps caused by livestock and wild horse use. A large percentage of the riparian areas within the HMA are located on privately controlled lands. Several springs within the HMA have been fenced recently to exclude livestock and wild horse use. In most of these situations outside water sources have been provided for livestock, wildlife and wild horse use. A very important water source for wild horses is the Lost Creek riparian area. Lost Creek is an intermittent stream with a sandy stream bottom concealing a subterranean flow of water that often times persists through the summer months. There are also multiple wells providing watering opportunities during the summer months. Recently the Eagles Nest well has been fitted with solar panels to enable the well to run through the summer months. The well is located approximately 1 mile from the Lost Creek drainage and although it has been running for two summers the horses have not yet been watering there in large numbers. In addition, there are also a few reservoirs scattered throughout the HMA that hold limited water supplies. Very few of these support any riparian vegetation. An exception to this

would be the Niland Springs riparian area. This is a unique and large spring system that is not heavily utilized by wild horses. The water present is highly saline forcing the riparian plants to be extremely saline tolerant.

Stewart Creek

Much of the riparian present within the Stewart Creek HMA has been fenced to exclude wild horse use due to the area not passing the riparian/wetland standards. These riparian pastures have been built to exclude wild horse use and only allow livestock grazing under more stringent regulations. The fencing is "wildlife friendly" allowing for Pronghorn Antelope to pass more easily as well as other large wildlife species. It is uncommon to find wild horses in these areas as the fencing limits their access. In most cases where the riparian pastures have been built, man-made watering facilities have been installed in the general proximity and are usually in operation through-out the summer months. The one perennial stream that remains unfenced within the Stewart Creek HMA is the Lost Soldier Creek. Lost Soldier Creek has had water augmentation since 1990 transforming it from an intermittent stream to a perennial stream. In addition to this, there are multiple reservoirs scattered throughout the HMA that hold limited water supplies. Along Bull Springs Rim there are several reservoirs that provide reliable water for wild horses, livestock and wildlife. Very few of the reservoirs support riparian vegetation.

Antelope Hills/Cyclone Rim

Riparian vegetation is not extensive within the HMA, however, it is a highly important resource for wildlife, wild horses, and livestock. Grazing management considerations often emphasize these areas as the most productive sites in the region. It is estimated that there is less than 500 acres of riparian area and roughly 5 - 10 miles of stream side vegetation within the HMA. The springs and riparian vegetation within the area known as the "Granite Rocks" is highly important to both livestock and wild horses. There are also numerous springs and seeps found throughout the area. Severe resource degradation caused by livestock grazing and wild horses is currently occurring at some springs within the HMA.

Crooks Mountain

Riparian vegetation is limited within the HMA, however, it is a highly important resource for wildlife, wild horses, and livestock. Grazing management considerations often emphasize these areas as the most productive sites in the region. It is estimated that there is less than 300 acres of riparian area and roughly 4 - 7 miles of stream side vegetation within the HMA. There are also numerous springs and seeps found throughout the area. Severe resource degradation caused by livestock grazing and wild horses is currently occurring at some springs within the HMA.

Green Mountain

Riparian vegetation is not extensive within the HMA, however, it is a highly important resource for wildlife, wild horses, and livestock. Grazing management considerations often emphasize these areas as the most productive sites in the region. It is estimated that

there is less than 2000 acres of riparian area and roughly 40 - 50 miles of stream side vegetation within the HMA. There are also numerous springs and seeps found throughout the area. Severe resource degradation caused by livestock grazing and wild horses is currently occurring at some springs within the HMA.

Environmental Impacts

Alternatives 1 and 2 - The removal of excess wild horses from the herd area would avoid potential over-utilization of forage and reduction in vegetative ground cover. Vegetation composition, cover, and vigor would improve or be maintained, especially near water sources. Potential competition for forage and water between wild horses, wildlife and livestock, and surface disturbing activity in and around water sources would be reduced. Quantity of forage would be increased. The increased vegetative cover would protect soils and reduce erosion of the surface soil layer.

Physical surface disturbance would occur at the trap sites due to the erection of the traps, trampling by horses, and vehicle traffic. When the horses are herded some vegetation would be disturbed. Extreme surface disturbance occurs within the paddocks of the trap due to the milling about by the horses; however, the total impacted area would be less than one quarter acre per trap site. The vegetation in these areas should recover quickly. Vehicles would damage vegetation, but staying on existing roads and trails minimizes the impact.

Maintaining wild horse populations at the established AML would produce no adverse cumulative impacts to vegetation, soils and watersheds.

Alternative 3 - Increased use over the entire HMA would adversely impact soils and vegetation health, especially around the water locations. As native plant health deteriorates and plants are lost, soil erosion would increase. The shallow desert topsoil cannot tolerate much loss without losing productivity and thus the ability to establish native vegetation. Invasive non-native plant species would increase and invade new areas following increased soil disturbance and reduced native plant vigor and abundance. This would lead to both a shift in plant composition towards weedy species and an irreplaceable topsoil and productivity loss from erosion. These impacts would be cumulative over time. There would also be increased impacts to areas outside the HMA as horses move out in search of better forage.

3.3 Endangered, Threatened, Proposed, Candidate and BLM Wyoming Sensitive Species

The following table shows the U.S. Fish and Wildlife Service (FWS) designated endangered, threatened, proposed, and candidate species potentially occurring in the Rawlins and Lander Field Offices. T&E consultation has occurred with the FWS and the Lander and Rawlins FO (T&E Section 7 Consultation Project Name: Wild Horse Gathering Case/Project Number: DOI-BLM-WY-030-2009-0258-EA Date: August 13, 2009 Reviewed by: Griff Morgan & Mary Read)

Lander Field Office *Listed Species*	*Present or habitat in project*	*Affect?*	*May affect, not likely to adversely affect*	*May affect, likely to adversely affect*	*Rationale*
	Y/N/UNK	*NO/MAY*	*Y/N*	*Y/N*	
Lynx canadensis *Canada lynx (T)*	*N*	*NO*			*No suitable forested habitat present.*
Mustela nigripes *Black-footed ferret (E)*	*Y*	*NO*			*Insufficient prey base within the project area (see discussion).*
Penstemon haydenii *Blowout Penstemon (E)*	*Y*	*NO*			*No structures will be built nor will horses be herded through sand dunes.*
Spiranthes diluvialis *Ute ladies- tresses (T)*	*Y*	*NO*			*No structures will be built nor will horses be herded through riparian meadows.*
Yermo xanthocephalus *Desert yellowhead (T)*	*Y*	*NO*			*No structures will be built nor will horses be herded through the desert yellowhead site.*
Critical Habitat *Yermo xanthocephalus*	*N*	*NO*			*No population in the project area.*
Platte River water depletion species (T&E)	*Y*	*NO*			*No water depletions will occur.*

Lander Field Office *Listed, Non-essential, Experimental Population*	*Present in project?*	*Affect?*	*Likely to jeopardize population*	*Rationale*
	Y/N/UNK	*NO/MAY*	*Y/N*	
Canis lupus irremotus *Gray wolf*	*UNK*	*NO*		*No established populations in project area.*

Rawlins Field Office *Listed Species*	*Present or habitat in project*	*Affect?*	*May affect, not likely to adversely affect*	*May affect, likely to adversely affect*	*Rationale*
	Y/N/UNK	*NO/MAY*	*Y/N*	*Y/N*	
Lynx canadensis *Canada lynx (T)*	*N*	*NO*			*No suitable forested habitat present; migrate using riparian corridors. No structures will be built nor will horses be herded through riparian meadows.*
Mustela nigripes *Black-footed ferret (E)*	*Y*	*NO*			*No structures will be built nor will horses be herded through prairie dog towns.*
Penstemon haydenii *Blowout Penstemon (E)*	*N*	*NO*			*Habitat not present; no structures will be built nor will horses be herded through sand dunes.*
Spiranthes diluvialis *Ute ladies- tresses (T)*	*Y*	*NO*			*No structures will be built nor will horses be herded through riparian meadows.*
Gaura neomexicana coloradensis *Colorado butterfly plant*	*N*	*NO*			*Habitat not present; no structures will be built nor will horses be herded through riparian meadows.*
Gaura neomexicana coloradensis *Colorado butterfly plant* *Critical Habitat*	*N*	*NO*			*Habitat not present; no structures will be built nor will horses be herded through riparian meadows.*

Platte River water depletion species (T&E)	***Y***	***NO***			***No water depletions will occur.***
Colorado River water depletion species (T&E)	***N***	***NO***			***Habitat not present.***
Coccyzus americanus ***Yellow-billed cuckoo***	***N***	***NO***			***Habitat not present; no structures will be built nor will horses be herded through cottonwood/willow riparian habitat.***
Bufo baxteri ***Wyoming toad***	***N***	***NO***			***Habitat not present; distribution restricted to within 30 miles of Laramie, Wyoming.***

Rawlins Field Office ***Listed, Non-essential, Experimental Population***	***Present in project?***	***Affect?***	***Likely to jeopardize population***	***Rationale***
	Y/N/UNK	***NO/MAY***	***Y/N***	
Mustela nigripes ***Black-footed ferret (E)*** ***Shirley Basin/Medicine Bow***	***N***	***NO***	***NO***	***No established populations in project area.***

Environmental Impacts

Alternatives 1 and 2 - The black-footed ferret is considered one of the rarest and most endangered mammals in North America and receives full protection under the Endangered Species Act (ESA) of 1973 (P.L. 93-205). The close association of black-footed ferrets and prairie dogs is well documented. The ferrets rely on prairie dogs for both food and shelter. The original range of the black-footed ferret corresponded closely with the prairie dog, extending over the Great Plains area from southern Canada to the west Texas plains, and from east of the 100th. Meridian west to Utah and Arizona. Although prairie dogs may be found within the project area, the black-footed ferret requires large prairie dog colonies for survival. There are currently no colonies of sufficient size within the project area to support a ferret population. Consequently, there will be **no effect** to this species in the Lander Field Office. The Rawlins Field Office contains the Shamrock Hills Black-footed Ferret Complex; however, no structures will be built nor will horses be herded through prairie dog towns. Therefore, there will be **no effect** to this species as a result of implementing this project in the Rawlins Field Office.

The blowout penstemon is a member of the figwort family (Scrophulariaceae). The plant is a hairless perennial herb that grows one to two feet high. The blowout was listed as endangered under the Endangered Species Act on October 1, 1987. The blowout penstemon's habitat consists of sparsely vegetated, early successional, shifting sand dunes and blowout depressions created by wind. In Wyoming, it is often found on the lower half of steep, sandy slopes, deposited at the bases of sedimentary or granite mountains or ridges. Blowout penstemon is found most frequently in microsites that are zones of sand accumulation. The plant is a primary invader that does not persist when a blowout becomes completely vegetated. Wyoming populations occur at an elevation between 6660 and 7430 feet. Although there is some potential habitat for blowout penstemon in the Red Desert HMA, no populations have been found. Since no structures or activities associated with the proposed gather will occur in potential blowout penstemon habitat, there will be **no effect** to this species in the Lander and Rawlins Field Offices.

Due to its apparent global rarity and documented habitat loss, Ute ladies tresses was listed as threatened in 1992. In 1993, the first population of Ute ladies tresses was discovered in Wyoming. Over the next four years, three additional populations were found in Wyoming and new populations were discovered in Idaho, Montana, Nebraska and Washington. This plant is in the orchid family and is a perennial. Rangewide, it grows primarily on moist, subirrigated or seasonally flooded soils in valley bottoms, gravel bars, old oxbows, or floodplains bordering springs, lakes, rivers, or perennial streams at elevations between 1800-6800 feet. No populations of Ute ladies tresses are known to occur in Rawlins or Lander Field Offices. Since no structures or activities associated with the proposed gather will occur in Ute ladies' tresses habitat, there will be **no effect** to this species in the Lander and Rawlins Field Offices.

Desert yellowhead is a plant which was proposed for listing as threatened in December 1998. A final rule listing the desert yellowhead as threatened was published in the Federal Register on March 14, 2002. A member of the Asteraceae (sunflower) family, it is the only species in the Yermo genus, meaning it seems to have no close relatives. Discovered in 1990, it inhabits about six acres in the Beaver Rim area. Searches have failed to yield more populations, making this the only known location of desert yellowhead in the world. Its population size seems fairly stable at 11,000-12,000 plants. In March 2004, 360 acres of critical habitat was designated for desert yellowhead. No populations of Desert Yellowhead are known to exist in the project area, hence there will be no effect to this species or its habitat.

Naturally occurring and functioning wetland habitat communities in the Platte River Basin are important to a number of the federally listed threatened, endangered and candidate species which are known to occur within this region. Likewise, many other fish and wildlife species also are dependent upon these same wetland habitat communities for some or all of their life cycles. Historical reductions in the number of and area of wetland habitat communities within and outside of the Platte River Basin have contributed to declines in the diversity and abundance of wetland dependent fish and wildlife species. The US Fish

and Wildlife Service (FWS) has determined that significant water depletions from anywhere in the Platte River Basin have direct and indirect effects on, interior least tern, piping plover, pallid sturgeon, Eskimo curlew and western prairie fringed orchid in Nebraska. No water depletions are associated with the proposed action. Consequently there will be **no effect** to any federally-listed species downstream in the Lander and Rawlins Field Offices. The BLM Wyoming Sensitive Species List for RFO and LFO shows the species that are likely to be present in the project area (see Appendix 4). No further discussion will occur for those species or their habitats not present in the project area.

In the Rawlins Field Office, the project will not be located within the Shirley Basin/Medicine Bow Non-Essential Experimental Population. No suitable forested habitat is present for the Canada lynx and although lynx are known to use riparian corridors as migration habitat, no structures will be built nor will horses be herded through riparian habitat. Habitat is not present for the Colorado butterfly plant or it's designated Critical Habitat and no structures will be built nor will horses be herded through riparian habitats. Habitat is not present for the yellow-billed cuckoo and no structures will be built nor will horses be herded through cottonwood/willow riparian habitat. Habitat not present for the Wyoming toad and its' distribution is restricted to within 30 miles of Laramie, Wyoming. There will be no water depletions from the Colorado River system for the proposed project. Therefore, there will be **no effect** to these species as a result of implementing this project in the Rawlins Field Office.

Alternative 3 – Wild horse populations have few natural predators to limit their growth. If left unmanaged, their numbers will increase to the point of causing significant ecological damage in the project area. Although herbivory of listed plant species by animals such as wild horses is not usually considered a problem when sufficient forage is otherwise available, this could become an adverse impact if horse populations increase to the near the carrying capacity of their environment. Likewise, population growth of prairie dogs may also be limited by forage competition with wild horses and preclude the possibility of providing sufficient prey base for black-footed ferrets.

3.4 Wildlife

Existing Situation

Wildlife is an integral part of the environment in the area. The RFO and LFO are home to several hundred species of wildlife, including big game, fur bearers, birds (both migratory and year-round resident), amphibians, reptiles, and small mammals. Some species are not affected by this action since they occupy habitats that the action would avoid, such as riparian areas or cliff/steep slopes. Species in these types of habitats will not be addressed further in this document. Some species that are of special interest that could potentially be impacted by the proposed action or the no action alternative include big game (pronghorn antelope, mule deer and elk), and various birds species (raptors, greater sage-grouse, and neotropical migrants).

Mule deer, pronghorn antelope and elk all have some degree of dietary overlap with wild horses (Stephenson 1982 and Meeker 1982), with competition greatest with elk. Wild horses also compete with these big game species for water resources and space. The HMA's consists of yearlong, winter-yearlong, and crucial winter range for both mule deer and pronghorn antelope. There is also some spring-summer-fall habitat for pronghorn in the HMAs. Elk habitat is officially classified by the Wyoming Game and Fish Department as "out", meaning "these areas, while a part of a herd unit, do not contain enough animals to be important habitat, or the habitats are of limited importance to the species." However, in recent years elk numbers in the Lost Creek, Stewart Creek and Antelope Hills/ Cyclone Rim areas have been increasing and elk are now occupying the HMA's year round in numbers great enough to support harvest by hunting. In the Green Mountain HMA and the Crooks Mountain HMA, there is an Area of Critical

Environmental Concern (ACEC) for winter and crucial winter-yearlong elk habitat and spring-summer-fall and winter-yearlong moose habitat.

Neo-tropical birds include species such as ferruginous hawks, mountain plover, sage thrasher, northern shrike, etc. Some of these species are on the BLM Wyoming Sensitive Species List (See Appendix, 4). Habitat requirements vary by species. Neo-tropical birds migrate to warmer climates and are not present in this area in the winter.

There are primarily 6 priority vegetative habitat types within the HMA's that comprise the bulk of the wildlife use and needs. Upland sagebrush stands, upland grasslands, floodplain shrub stands, saline uplands and riparian areas. The preferred upland sagebrush stands are typically $\geq$10% canopy cover sagebrush with a healthy understory composition of herbaceous and forb species. These stands are particularly important to wintering big game and wintering and nesting sage grouse, as well as numerous other sagebrush obligate passerines like the sage thrasher, sage sparrow, and Brewer's sparrow. The upland grasslands typically comprise $\leq$10% sagebrush canopy cover with the predominant vegetation being grasses with some component of forbs. These sites can be important foraging areas for mule deer, pronghorn, and sage grouse, particularly in the spring and summer when diets shift from shrubs to grasses and forbs. Sage grouse depend on these more open grasslands during brood rearing when they are foraging on both forbs and insects. Like the sagebrush stands, a complex diversity of plant species in the grasslands is advantageous because it provides for an extended green-up period, and this equates to an increase in protein intake. The floodplain shrub stands provide mule deer both valuable cover and forage. Rabbitbrush, greasewood, sagebrush, as well as some cottonwood and willow are valuable forage species, particularly in the fall and winter. These shrub stands also provide much needed forbs in the spring and early summer.

Other vegetative communities provided within the HMA that are important to wildlife species are the saline upland sites, and riparian areas associated with reservoirs and seeps. The saline uplands provide nesting and foraging habitat for mountain plover. The saltbush component of these sites can be important forage for pronghorn and mule deer at times. Riparian areas and their associated aquatic and wetland vegetation provide forage and cover to waterfowl and some passerines. These wet areas with succulent vegetation and abundant insects are also important foraging areas for sage grouse broods, particularly during late brood rearing when most other upland sites have dried up and vegetation has cured out.

All of the above habitat types can be vulnerable to improper grazing management, by both wild horses and livestock. If grazing is managed with the objectives of maintaining or improving species composition, structural diversity, and plant vigor, the valuable components of these vegetative habitats should remain sustainable for the wildlife species that depend upon them. Communities most valuable and most at risk in terms of importance to wildlife are the upland sagebrush stands and the floodplain shrub stands. Over-utilization of either the sagebrush canopy or the grass/forb understory would decrease both production and diversity of the entire community.

Environmental Impacts

Alternatives 1 and 2 – Under these alternatives, the horses left on the range would have adequate forage, water, and space. Wildlife species would be able to live in a natural ecological balance within the HMA and adjacent to it. Improved quality and increased quantity of forage would help to obtain or maintain objective wildlife populations as defined by the Wyoming Game and Fish Department.

Wildlife populations in areas where excess wild horses are gathered could be disrupted for a short time during the gathering operations. Once gathering operations cease, these effects would stop. The short-term effects are a result of human presence and the noise of the helicopter which may cause wildlife to seek cover in areas away from gathering routes. However, large game species should return to the area within a few days. Capture activities would not cause abandonment of normal habitat areas. There would be no long-term adverse effect on wildlife.

BLM data and past experience show that removal of excess horses from areas of wild horse concentration would improve habitat conditions for wildlife. This effect would be most pronounced around water sources and would benefit both game and non-game wildlife. Maintaining wild horse populations at AML through the removal of excess wild horses enables wildlife populations to utilize the forage that would otherwise be used by the excess wild horses. No adverse cumulative impacts to wildlife are anticipated.

Alternative 3 – Unmanaged populations of wild horses might eventually stabilize at very high numbers near what is known as their food-limited ecological carrying capacity. At these levels, range conditions would deteriorate significantly. Due to the lack of large predators to limit population growth in the HMA, wild horse numbers would eventually exceed the carrying capacity of the HMA and adjacent areas. Competition for water sources and forage resources would increase between wildlife species, specifically pronghorn and mule deer. Inter specific competition over time could affect pronghorn and mule deer, especially in crucial winter ranges. Large game species may be displaced over time and population levels and overall health of the herds would diminish.

Under this alternative, sage grouse may be impacted from deteriorated range condition if vegetation required for nesting, specifically residual grasses within and adjacent to sagebrush pockets, becomes depleted. Under this alternative, raptors would not be impacted by wild horses and implementation of management practices. The impacts described above would be cumulative over time.

3.5 *Heritage Resources*

Existing Situation

Only a small fraction of the land surface within the Red Desert HMA Complex has been inventoried for cultural resources. Prehistoric sites known to exist within the HMAs include open camps and lithic scatters. Many more of these are expected to be found as inventories continue to be done. Historic sites known to exist include trash dumps, trails, roads, and structures associated with early settlement and commerce, or with the local ranching industry. Many more historic sites are also expected to be found as inventories continue to be done. Additionally, stone circle sites, rock alignments, rock art and other sites potentially sensitive to Native American Tribes may occur in the area. Cultural Resource Program support for the wild horse capture would consist of file search (Class I) and/or intensive field (Class III) inventories, and, if necessary, mitigation of impacts at the locations of the horse trap prior to horse capture. Support includes consultation with the Wyoming State Historic Preservation Office according to the Wyoming State Protocol agreement of the BLM's National Cultural Resources Programmatic Agreement.

Environmental Impacts

Alternatives 1 and 2 – Direct or indirect impacts to cultural resources are not anticipated to occur from implementation of Alternative 1 or 2. All gather sites and temporary holding facilities would be surveyed at the Class III level for cultural resources prior to construction. The RFO and

LFO archeologists would review all proposed and previously used gather sites and temporary holding facility locations to determine if these have had a Class III cultural resources inventory, and/or if a new inventory is required. If cultural resources are encountered at proposed gather sites or temporary holding facilities, those locations would not be utilized unless they could be modified to avoid or mitigate adverse impacts to significant cultural resource site(s).

Within the HMA, **w**here Class III inventories have not been or would not be conducted, impacts to historic properties are limited to trampling. Naturally, fewer horses would result in lesser potential impacts to historic properties.

Alternative 3 – At the present time, a determination of no action would not adversely affect historic properties. However, a substantial increase in the number of horses over time may adversely affect historic properties by trampling.

3.6 Energy Development

Existing Situation

At the present time, the Continental Divide Creston Environmental Impact Statement (EIS) for future gas and oil development is being prepared. This EIS includes a portion of the Lost Creek HMA. There has also been a fair amount of exploratory gas drilling in areas not included in the CDC EIS. Other gas and oil development is occurring around the Hay Reservoir within the Lost Creek HMA. This development was analyzed under the Hay Reservoir EIS. Uranium exploration has recently seen heightened interest within the Lost Creek and Stewart Creek HMAs also. The northern portions of the complex all have applications for wind energy development from several wind energy companies. This affects the Green Mountain, Crooks Mountain and Antelope Hills/Cyclone Rim HMA's.

Environmental Impacts

Alternatives 1, 2 and 3 – Alternatives 1, 2 and 3 are in compliance with Executive Order 13212, which directs the BLM to consider the President's National Energy Policy and adverse impacts the alternatives may have on energy development. It is difficult to analyze the impacts of the wind energy development impacts to the HMA's at this time as the applications at this point are for study of the development of wind energy. Therefore this will not be analyzed at this time.

There is no impact to energy development anticipated under these alternatives: to the extent that wild horse populations consume forage, additional impacts by wild horses and other animals (livestock and wildlife) would tend to make reclamation more difficult. The drought has already made reclamation of soil disturbing activities more difficult. The impact to vegetation as well as soil and water discussed above would also impact reclamation. Thus, Alternative 1, in which the population would grow more slowly, would have less of an impact than Alternative 2, which would have less impact than Alternative 3.

3.7 Cumulative Impacts

Cumulative impacts are impacts on the environment, which 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 other actions. Cumulative impacts can

result from individually minor but collectively major or problematic actions taking place over a period of time.

The area affected by the Proposed Action and Alternatives is the Red Desert HMA Complex. Please refer to the Red Desert HMA Complex Map (Appendix 2) which displays the HMA boundaries. Past, proposed and reasonably foreseeable actions that may have similar effects to the Red Desert HMA Complex wild horse population would include past wild horse gathers and future wild horse gathers. Numerous gathers have been completed in the past, and future gathers would be scheduled according to a 3-4 year gather cycle. Over time, as wild horse population levels are maintained within an acceptable management range, a thriving natural ecological balance would be achieved and maintained. Cumulative effects that may result would include continued improvement of the range condition and riparian-wetland condition. Cumulative beneficial effects from implementation of the Proposed Action or Alternatives II, to wildlife, the wild horse population and domestic livestock would occur as forage availability and quality is maintained and improved. Water quality and riparian habitat would also continually improve. The opportunity for cumulative beneficial effects decreases for each successive alternative.

Adverse cumulative impacts on natural resources would occur depending on which alternative is selected (Alternative II). In general, adverse cumulative impacts increase for each successive alternative, from Alternative I through Alternative III, since the wild horse population is higher for each alternative. Adverse cumulative impacts would include periodic over utilization of vegetative resources, which would result in decreased vegetative density, plant vigor, seed production, seedling establishment, and forage production. This may result in periodic decreases of the ecological status of plant communities.

Adverse cumulative impacts on natural resources for Alternative III, No Action, would include continued over utilization of vegetative resources which would result in decreased vegetative density, plant vigor, seed production, seedling establishment, forage production, and a potential increase of non-native species to new areas in the HMA. Continued over use of the vegetative community would result in a loss of ecological status of the plant communities which may take decades to restore. Decreased vegetative density would result in an increase of bare ground, which may lead to increased erosion, increased negative impacts to stream banks and riparian habitat condition. A petition has been filed with the U.S. Fish and Wildlife Service to list sage-grouse as an endangered species. With continued over use on upland sage-grouse habitat, a negative adverse cumulative impact to this species would occur. Wildlife, migratory birds, and wild horses would all be negatively affected by these adverse cumulative impacts to natural resources.

Based upon these considerations, the effects of other existing and reasonably foreseeable future activities including the Proposed Action and Alternatives II, would not cause a major affect to the environment. Alternative III, No Action, may cause a major impact to the environment.

There would be no known adverse cumulative impacts to any of the resources analyzed in this document as a result of the Proposed Action or Alternative I. There would be minor adverse cumulative impacts from implementing Alternatives III, primarily to vegetation, soils and riparian habitat. Cumulative impacts would increase for each successive alternative. Adverse cumulative impacts to vegetation, soils and riparian habitat would occur as a result of selecting Alternative III, No Action.

The HMA contain a variety of resources and support a variety of uses. There are a number of other BLM conducted and authorized activities ongoing in and adjacent to the HMA. Any alternative course of wild horse management has the opportunity to affect and be affected by

those activities. Most of those activities depend in one way or another on the maintenance of a healthy landscape. The cumulative impacts of Alternatives 1 and 2 would be to maintain a thriving natural ecological balance and preserve the multiple use relationship among all resources within and surrounding the Red Desert HMA complex. The cumulative impacts of Alternative 3 would be that a thriving natural ecological balance would not be maintained, and the multiple use relationship within the Red Desert HMA complex would not be preserved. Cumulative impacts to the long-term viability of the horse herds would be monitored through genetic marker analysis in accordance with the Standard Operation Procedures (Appendix 1).

4.0 Consultation and Coordination

The Bureau of Land Management is responsible for obtaining public input on proposed actions within the wild horse program. Public input has been solicited for several actions proposed since the establishment of the Stewart Creek, Lost Creek, Antelope Hills, Crooks Mountain and Green Mountain HMA.

On June 12, 2009, the BLM issued a Scoping Statement for the proposed Red Desert Complex Wild Horse Herd Management Areas Population Management Action. This Scoping Statement was sent to all individuals and groups listed on the BLM local and national wild horse and burro interested party mailing lists, the Rawlins and Lander Field Offices interested party mailing list, neighboring livestock permittees, and various state and federal agencies. The Scoping Statement was also posted on the BLM Wyoming web page. The BLM received a total of ten comments on the proposed wild horse removal, from the Wyoming Game & Fish Department, the Wyoming Department of Agriculture, Sweetwater County Conservation District, the Animal Welfare Institute, Wyoming Wild Horse Coalition, The American Horse Defense Fund, Reinfree Foundation, Craig C. Downer from Minden, Nevada, Chuck Reed from Rawlins, Wyoming and Carl and Laura Pivonka from Billings, Montana. Three of the comment letters received were in support of the population management action. One of the comment letters was concerned for the horse's genetic make-up and volunteered to help. Six of the comment letters received were not in support of the proposed removal of excess wild horses from the Red Desert HMA Complex

In accordance with 43 CFR 4740.1(b), a formal statewide hearing regarding the use of helicopters for the roundup of wild horses in Wyoming is held each year. The public is provided an opportunity to discuss concerns and questions with BLM staff. Extensive public scoping was conducted prior to and during the preparation of the Evaluation of Wild Horse Herd Areas, Green Mountain Grazing EIS and the Rawlins and Lander RMPs, and the Consent Decree agreement with the State of Wyoming which established the current decisions regarding the management of these HMAs. Several public meetings were held in the Lander area. Numerous comments were received regarding these HMAs, and were incorporated in the Evaluations, RMPs and EIS.

5.0 List of Preparers

Following is a list of preparers and reviewers for this Environmental Assessment:

Rawlins Field Office
Melanie Gilbert, Wild Horse and Burro Specialist, BLM – Team Lead
Mike Calton, Rangeland Management Specialist, BLM
Andy Warren, Supervisory Rangeland Management Specialist, BLM
Mary Read, Wildlife Biologist, BLM
Patrick Walker, Archeologist, BLM
Susan Foley, Soil Scientist, BLM
Corey Loveland, Hydrologist, BLM
John Spehar, Planner/Environmental Coordinator, BLM
Rebecca Spurgin, Assistant Field Manager - Resources, BLM

Lander Field Office
Roy Packer, Rangeland Management Specialist, BLM – Team Lead
Griff Morgan, Wildlife Biologist, BLM
Krystal Hazen-McCreary, Archeologist, BLM
Greg Bautz, Soil Scientist, BLM
Kristin Yaonne, Planner/Environmental Coordinator, BLM
Rubel Vigil, Assistant Field Manager – Resources, BLM

Alan Shepherd, NV WH&B State Program Lead, National WH&B Research Coordinator

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Turner Jr , J.W., I.K.M. Lui, Rutberg, A., J.W., Kirkpatrick, (1997) Immunocontraception Limits Foal Production in Free Roaming Feral Horses in Wyoming, J. Wildl. Manage. 61 (3):873-880.

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APPENDIX 1

Standard Operating Procedures for Wild Horse Gathers

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

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

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

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

1. Helicopter Drive Trapping. This capture method involves utilizing a helicopter to herd wild horses into a temporary trap.
2. Helicopter Assisted Roping. This capture method involves utilizing a helicopter to herd wild horses or burros to ropers.
3. Bait Trapping. This capture method involves utilizing bait (e.g., water or feed) to lure wild horses into a temporary trap.

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

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

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

   All trap and holding facilities locations must be approved by the Contracting Officer's Representative (COR) and/or the Project Inspector (PI) prior to construction. The Contractor may also be required to change or move trap locations as determined by the COR/PI. All traps 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/PI who will consider terrain, physical barriers, weather, condition of the animals and other factors. Under normal circumstances this travel should not exceed 10 miles and may be much less dependent on existing conditions (i.e. ground conditions, animal health, extreme temperature (high and low), etc.).

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

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

    b. All loading chute sides shall be a minimum of 6 feet high and shall be fully covered, plywood, metal without holes larger than 2”x4”.

    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 or sliding gates.

4. No modification of existing fences will 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 trap or holding facility, the Contractor shall be required to wet down the ground with water.

6. Alternate pens, within the holding facility shall be furnished by the Contractor to separate mares or jennies with small foals, sick and injured animals, estrays or other animals the COR determines need to be housed in a separate pen from the other animals. Animals shall be sorted as to age, number, size, temperament, sex, and condition when in the holding facility so as to minimize, to the extent possible, injury due to fighting and trampling. Under normal conditions, the government will 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 will be provided by the government. Alternate pens shall be furnished by the Contractor to hold animals if the specific gathering requires that animals be released back into the capture area(s). In areas requiring one or more satellite traps, and where a centralized holding facility is utilized, the contractor may be required to provide additional holding pens to segregate animals transported from remote locations so they may be returned to their traditional ranges. Either segregation or temporary marking and later segregation will be at the discretion of the COR.

7. The Contractor shall provide animals held in the traps 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 traps 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 will supply certified weed free hay if required by State, County, and Federal regulation.

   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.

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

9. The Contractor shall restrain sick or injured animals if treatment is necessary. The COR/PI will 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.

10. Animals shall be transported to their final destination from temporary holding facilities as quickly as possible after capture 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 traps 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 capture area may need to be transported back to the original trap site. This determination will be at the discretion of the COR/PI or Field Office horse specialist.

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

1. Capture attempts may be accomplished by utilizing bait (feed, water, mineral licks) to lure animals into a temporary trap. If this capture 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 capture of animals.

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

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

   a. A minimum of two saddle-horses shall be immediately available at the trap 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. Capture 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 will 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 captured animals shall be in compliance with appropriate State and Federal laws and regulations applicable to the humane transportation of animals. The Contractor shall provide the COR/PI, 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 captured animals are transported without undue risk or injury.

3. Only tractor-trailers or stock trailers with a covered top shall be allowed for transporting animals from trap site(s) to temporary holding facilities, and from temporary holding facilities to final destination(s). Sides or stock racks of all trailers used for transporting animals shall be a minimum height of 6 feet 6 inches from the floor. Single deck tractor-trailers 40 feet or longer shall have 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 (.75 linear foot in an 8 foot wide trailer);
   4 square feet per burro foal (.50 linear feet in an 8 foot wide trailer).

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

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

D. Safety and Communications

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

   a. The proper operation, service and maintenance of all contractor furnished property 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 will be notified in writing to furnish replacement personnel or equipment within 48 hours of notification. All such replacements must be approved in advance of operation by the Contracting Officer or his/her representative.

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

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

2. Should the contractor choose to utilize a helicopter the following will 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.

G. Site Clearances

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.

Prior to setting up a trap or temporary holding facility, BLM will 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 trap or temporary holding facility may be set up. Said clearance shall be arranged for by the COR, PI, or other BLM employees.

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

H. Animal Characteristics and Behavior

Releases of wild horses would be near available water. 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.

I. Public Participation

Opportunities for public viewing (i.e. media, interested public) of gather operations will be made available to the extent possible; however, the primary considerations will 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 will

not be allowed to come into direct contact with wild horses or burros 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 anytime or for any reason during BLM operations.

J. Responsibility and Lines of Communication

Contracting Officer's Representative/Project Inspector
Fill in Field Specialist name

Contracting Officer's Representative/Project Inspector
Fill in State Lead name

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 (fill in Field Office name) Assistant Field Managers for Resources and (fill in Field Office name) Field Managers will take an active role to ensure the appropriate lines of communication are established between the field, Field Office, State Office, National Program Office, and BLM Holding Facility offices. All employees involved in the gathering operations will keep the best interests of the animals at the forefront at all times.

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

The COR will coordinate with the contractor and the BLM Corrals to ensure animals are being transported from the capture 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 capture of the animals. The specifications will be vigorously enforced.

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

14. Glossary

Appropriate Management Level - The number of wild horses and burro which can be sustained within a designated herd management area which achieves and maintains a thriving natural ecological balance keeping with the multiple use management concept for the area.
Authorized Officer - An employee of the BLM to whom has been delegated the authority to perform the duties described in these Standard Operating Procedures. See BLM Manual 1203 for explanation of delegation of authority.

Animal Unit Month (AUM) – A standardized unit of measurement of the amount of forage necessary for the sustenance of one animal unit for 1 month; also, a unit of measurement that represents the privilege of grazing one animal unit for 1 month.

Animal Unit (AU) – A standardized unit of measurement for range livestock or wildlife. Generally, one mature (1,000-pound) cow or its equivalent, based on an average daily forage consumption of 26 pounds of dry matter per day.

Census - The primary monitoring technique used to maintain a current inventory of wild horses and burros on given areas of the public lands. Census data are derived through direct visual counts of animals using a helicopter.

Contracting Officer (CO) - Is the individual responsible for an awarded contract who deals with claims, disputes, negotiations, modifications and payments. Appoints CORs and PIs.

Contacting Officers Representative (COR) - Acts as the technical representative for the CO on a contract. Ensures that all specifications and stipulations are met. Reviews the contractor's progress, advises the CO on progress, problems, costs, etc. Is responsible for review, approval, and acceptance of services.

Evaluation - A determination based on studies and other data that are available as to if habitat and population objectives are or are not being met and where an overpopulation of wild horses and burros exists and whether actions should be taken to remove excess animals.

Excess Wild Horses or Burros - Wild free-roaming horses or burros which have been removed from public lands or which must be removed to preserve and maintain a thriving ecological balance and multiple-use relationship.

Genetically Viable - Fitness of a population as represented by its ability to maintain the long-term reproductive capacity of healthy, genetically diverse members.

Health Assessment - Evaluation process based on best available studies data to determine the current condition of resources in relation to potential or desired conditions.

Healthy Resources - Resources that meet potential or desired conditions or are improving toward meeting those potential or desired conditions.

Herd Area - The geographical area identified as having been used by wild horse and burro populations in 1971, at the time of passage of the Wild Free-roaming Horse and Burro Act.

Herd Management Area - The geographical area as identified through the land use planning process established for the long-term management of wild horse and burro populations. The boundaries of the herd management area may not be greater than the area identified as having been used by wild horse and burro populations in 1971, at the time of passage of the Wild Free-roaming Horse and Burro Act.

Invasive Weeds - Introduced or noxious vegetative species which negatively impact the ecological balance of a geographical area and limit the areas potential to be utilized by authorized uses.

Metapopulation (complex) - A population of wild horses and burros comprised of two or more smaller, interrelated populations that are linked by movement or distribution within a defined geographical area.

Monitoring - Inventory of habitat and population data for wild horses and burros and associated resources and other authorized rangeland uses. The purpose of such inventories is to be used during evaluations to make determinations as to if habitat and population objectives are or are not being met and where an overpopulation of wild horses and burros exists and whether actions should be taken to remove excess animals.

Multiple Use Management - A combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including, but not limited to, recreation, range, timber, minerals watershed, domestic livestock, wild horses, wild burros, wildlife, and fish, along with natural, scenic, scientific, and historical values.

Project Inspector - Coordinates with the COR assigned to a contract to support his/her responsibility for review, approval, and acceptance of services.

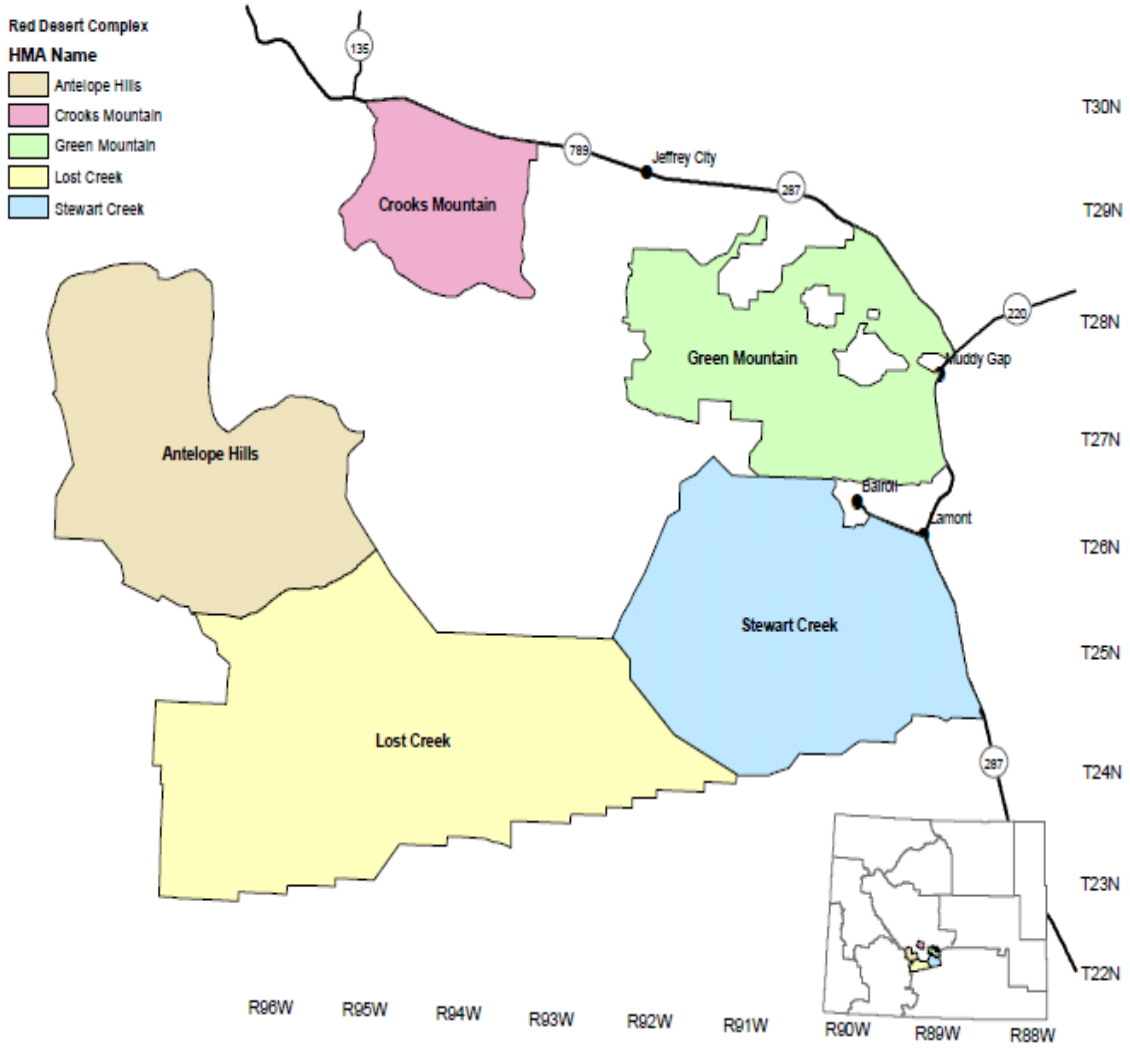
Research - Science based inquiry, investigation or experimentation aimed at increasing knowledge about wild horses and burros conducted by accredited universities or federal government research organizations with the active participation of BLM wild horse and burro professionals.

Science Based Decision Making - Issuance of decisions affecting wild horses and burros, associated resources and other authorized rangeland uses incorporating best available habitat and population data and in consultation with the public.

Studies - Science based investigation of specific aspects of wild horse and burro habitat or populations in supplement to established monitoring. These investigations would not be established following rigid experimental protocols and could include drawing blood on animals to study genetics, disease and general health issues and population dynamics such as reproduction and mortality rates and general behavior.

Thriving Natural Ecological Balance - An ecological balance requires that wild horses and burros and other associated animals be in good health and reproducing at a rate that sustains the population, the key vegetative species are able to maintain their composition, production and reproduction, the soil resources are being protected, maintained or improved, and a sufficient amount of good quality water is available to the animals.

Appendix 2: Wild Horse Herd Areas



Appendix 3
Standard Operating Procedures for Fertility Control Treatment

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

- The 22 month pelleted PZP vaccine would be administered by trained BLM personnel.
- The fertility control drug is administered with two separate injections: (1) a liquid dose of PZP is administered using an 18 gauge needle primarily by hand injection; (2) the pellets are preloaded into a 14 gauge needle. These are loaded on the end of a trocar (dry syringe with a metal rod) which is loaded into the jabstick which then pushes the pellets into the breeding mares being returned to the range. The pellets and liquid are designed to release the PZP over time similar to a time release cold capsule.
- Delivery of the vaccine would be as an intramuscular injection while the mares are restrained in a working chute. 0.5 cubic centimeters (cc) of the PZP vaccine would be emulsified with 0.5 cc of adjuvant (a compound that stimulates antibody production) and loaded into the delivery system. The pellets would be loaded into the jabstick for the second injection. With each injection, the liquid and pellets would be propelled into the left hind quarters of the mare, just below the imaginary line that connects the point of the hip and the point of the buttocks.
- All treated mares will be freeze-marked with two 3.5-inch letters on the left hip for treatment tracking purposes. The only exception to this requirement is that each treated mare can be clearly and specifically identified through photographs or markings. This step is to enable researchers to positively identify the animals during the research project as part of the data collection phase.
- At a minimum, estimation of population growth rates using helicopter or fixed wing surveys will be conducted the year preceding any subsequent gather. During these surveys it is not necessary to identify which foals were born to which mares, only an estimate of population growth is needed (i.e. # of foals to # of mares).
- Population growth rates of herds selected for intensive monitoring will be estimated every year post-treatment using helicopter or fixed wing surveys. During these surveys it is not necessary to identify which foals were born to which mares, only an estimate of population growth is needed (i.e. # of foals to # of mares). If during routine HMA field monitoring (on-the-ground), if data on mare to foal ratios can be collected, these data should also be shared with the NPO for possible analysis by the USGS.
- A PZP Application Data sheet will be used by the field applicators to record all the pertinent data relating to identification of the mare (including a photograph if the mares are not freeze-marked) and date of treatment. Each applicator will submit a PZP Application Report and accompanying narrative and data sheets will be forwarded to the NPO (Reno, Nevada). A copy of the form and data sheets and any photos taken will be maintained at the field office.

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

APPENDIX 4
BLM WYOMING STATE DIRECTOR'S SENSITIVE SPECIES LIST
(ANIMALS AND PLANTS) FOR LANDER & RAWLINS FIELD OFFICE

Species Common Name	Scientific Name	Habitat	May be present in project (Y/N)	Rationale
MAMMALS				
Shrew, Dwarf (Lander FO only)	*Sorex nanus*	Mountain foothill shrub, grasslands.	Y	No habitat conversions are expected to occur.
Myotis, Long-eared	*Myotis evotis*	Conifer and deciduous forests, caves and mines	Y	No habitat conversions are expected to occur.
Myotis, Fringed	*Myotis thysanodes*	Conifer forests, woodland chaparral, caves and mines	Y	No habitat conversions are expected to occur.
Bat, Spotted	*Euderma maculatum*	Cliffs over perennial water, basin-prairie shrub	Y	No habitat conversions are expected to occur.
Bat, Townsend's Big-eared	*Corynorhinus townsendii*	Forests, basin-prairie shrub, caves and mines	Y	No habitat conversions are expected to occur.
Wyoming Pocket Gopher	*Thomomys clusius*	Sidehills and ridgetops, cushion plant communities in otherwise sagebrush dominated habitat	Y	No habitat conversions are expected to occur.
Prairie Dog, White-tailed	*Cynomys leucurus*	Basin-prairie shrub, grasslands	Y	No habitat conversions are expected to occur. Capture pens and herding will not take place in prairie dog towns.
Prairie Dog, Black-tailed	*Cynomys ludovicianus*	Basin-prairie shrub, grasslands	N	No known or potential habitat.
Fox, Swift	*Vulpes velox*	Grasslands	Y	No habitat conversions are expected to occur.
Preble's Meadow Jumping Mouse (Rawlins FO only)	Zapus hudsonius preblei	Riparian habitat and upland hiburnaculae	N	No known or potential habitat.
Rabbit, Pygmy	*Brachylagus idahoensis*	Basin-prairie and riparian shrub	Y	No habitat conversions are expected to occur.
Bear, Grizzly (Lander FO only)	*Ursus arctos*	Forests with interspersed meadows and grasslands.	N	No known populations in project area.
BIRDS				
Eagle, Bald	*Haliaeetus leucocephalus*	Lakes, rivers and other large water bodies suitable for foraging with large trees for nesting and roosting.	N	No known populations in project area.
Ibis, White-faced	*Plegadis chihi*	Marshes, wet meadows	Y	Roundups will not occur during nesting season.
Plover, Mountain	*Charadrius montanus*	Shortgrass prairie/sparse vegetation	Y	Roundups will not occur during nesting season.
Swan, Trumpeter	*Cygnus buccinator*	Lakes, ponds, rivers	Y	Roundups will not occur during nesting season.
Goshawk, Northern	*Accipter gentilis*	Conifer and deciduous forests	Y	Roundups will not occur during nesting season.
Hawk, Ferruginous	*Buteo regalis*	Basin-prairie shrub, grassland, rock outcrops	Y	Inventory will be conducted prior to surface disturbing activity. Seasonal stipulation to protect nesting birds will be applied if necessary.
Falcon, Peregrine	*Falco peregrinus*	Tall cliffs	Y	Roundups will not occur during nesting season.

Species Common Name	Scientific Name	Habitat	May be present in project (Y/N)	Rationale
Sage-grouse, Greater	*Centrocercus urophasianus*	Basin-prairie shrub, mountain-foothill shrub	Y	Roundups will not occur during nesting season.
Sharp-tailed grouse, Columbian (Rawlins FO only)	*Tympanuchus phasianellus columbianus*	Grasslands	N	No known or potential habitat
Curlew, Long-billed	*Numenius americanus*	Grasslands, plains, foothills, wet meadows	Y	Roundups will not occur during nesting season.
Owl, Burrowing	*Athene cunicularia*	Grasslands, basin-prairie shrub	Y	No habitat conversions are expected to occur. Capture pens and herding will not take place in prairie dog towns.
Thrasher, Sage	*Oreoscoptes montanus*	Basin-prairie shrub, mountain-foothill shrub	Y	Roundups will not occur during nesting season.
Shrike, Loggerhead	*Lanius ludovicianus*	Basin-prairie shrub, mountain-foothill shrub	Y	Roundups will not occur during nesting season.
Sparrow, Brewer's	*Spizella breweri*	Basin-prairie shrub	Y	Roundups will not occur during nesting season.
Sparrow, Sage	*Amphispiza billineata*	Basin-prairie shrub, mountain-foothill shrub	Y	Roundups will not occur during nesting season.
Sparrow, Baird's	*Ammodramus bairdii*	Grasslands, weedy fields	Y	Roundups will not occur during nesting season.
FISH				
Trout, Yellowstone Cutthroat	*Oncorhynchus clarki bouvieri*	Yellowstone drainage, small mountain streams and large rivers	N	No suitable habitat present.
Roundtail Chub (Rawlins FO only)	*Gila robusta robusta*	Muddy Creek/Little Snake River	N	No suitable habitat present.
Flannelmouth Sucker (Rawlins FO only)	*Catostomus latipinnis*	Muddy Creek/Little Snake River	N	No suitable habitat present.
Bluehead Sucker (Rawlins FO only)	*Catostomus discobolus*	Muddy Creek/Little Snake River	N	No suitable habitat present.
Hornyhead Chub (Rawlins FO only)	*Nocomis biguttatus*	East flank of Laramie Range	N	No suitable habitat present.
REPTILES				
AMPHIBIANS				
Frog, Northern Leopard	*Rana pipiens*	Beaver ponds, permanent water in plains and foothills	Y	Capture pens will not be places in riparian areas.
Spadefoot, Great Basin	*Spea intermontana*	Spring seeps, permanent and temporary waters	Y	Capture pens will not be places in riparian areas.
Toad, Boreal (Northern Rocky Mountain population)	*Bufo boreas boreas*	Pond margins, wet meadows, riparian areas	Y	Capture pens will not be placed in riparian areas.
Frog, Spotted (Lander FO only)	*Ranus pretiosa (lutieventris)*	Ponds, sloughs, small streams	Y	Capture pens will not be places in riparian areas.
PLANTS				
Meadow Pussytoes (Lander FO only)	*Antennaria arcuata*	Moist, hummocky meadows, seeps or springs	Y	Capture pens will not be places in riparian areas. (Model shows no potential habitat on Rawlins FO side)

		surrounded by sage/grasslands 4,950-7,900’		
Porter’s Sagebrush (Lander FO only)	*Artemisia porteri*	Sparsely vegetated badlands of ashy or tufaceous mudstone & clay slopes 5,300-6,500’	Y	A survey for sensitive species will be conducted before locations for capture pens are approved. (Model shows no potential habitat on Rawlins FO side)
Dubois Milkvetch (Lander FO only)	*Astragalus gilviflorus var. purpureus*	Barren shale, badlands, limestone, & redbed slopes & ridges 6,900-8,800’	N	No suitable habitat present.

Nelson’s Milkvetch	*Astragalus nelsonianus* –or- *Astragalus pectinatus var. platyphyllus*	Alkaline clay flats, shale bluffs and gullies, pebbly slopes, and volcanic cinders in sparsely vegetated sagebrush, juniper, & cushion plant communities at 5200-7600’	Y	A survey for sensitive species will be conducted before locations for capture pens are approved. Model shows potential habitat present in project area.
Cedar Rim Thistle	*Cirsium aridum*	Barren, chalky hills, gravelly slopes, & fine textured, sandy-shaley draws 6,700-7,200'	Y	A survey for sensitive species will be conducted before locations for capture pens are approved. Model shows potential habitat present in project area.
Owl Creek Miner's Candle (Lander FO only)	*Cryptantha subcapitata*	Sandy-gravelly slopes & desert ridges on sandstones of the Winds River Formation 4,700-6,000'	N	No suitable habitat present.
Fremont Bladderpod (Lander FO only)	*Lesquerella fremontii*	Rocky limestone slopes & ridges 7,000-9,000'	Y	A survey for sensitive species will be conducted before locations for capture pens are approved. (Model shows no potential habitat on Rawlins FO side)
Beaver Rim Phlox (Lander FO only)	*Phlox pungens*	Sparsely vegetated slopes on sandstone, siltstone, or limestone substrates 6,000-7,400'	Y	A survey for sensitive species will be conducted before locations for capture pens are approved. (Model shows no potential habitat on Rawlins FO side)
Rocky Mountain Twinpod (Lander FO only)	*Physaria saximontana var. saximontana*	Sparsely vegetated rocky slopes of limestone, sandstone or clay 5,600-8,300'	Y	A survey for sensitive species will be conducted before locations for capture pens are approved. (Model shows no potential habitat on Rawlins FO side)
Persistent Sepal Yellowcress	*Rorippa calycina*	Riverbanks & shorelines, usually on sandy soils near high-H^2O line	Y	Model shows potential habitat, however capture pens will not be placed in riparian areas.
Shoshonea (Lander FO only)	*Shoshonea pulvinata*	Shallow, stony calcareous soils of exposed limestone outcrops, ridgetops, & talus slopes 5,900-9,200'	Y	A survey for sensitive species will be conducted before locations for capture pens are approved. (Model shows no potential habitat on Rawlins FO side)
Barneby's Clover (Lander FO only)	*Trifolium barnebyi*	Ledges, crevices, & seams on reddish-cream Nugget Sandstone outcrops 5,600-6,700'	Y	A survey for sensitive species will be conducted before locations for capture pens are approved. (Model shows no potential habitat on Rawlins FO side)
Many-stemmed Spider-flower	*Cleome multicaulis*	Semi-moist, open saline banks of shallow ponds, lakes with Baltic rush & bulrush 5,900 feet	N	Model shows no potential habitat present in project area.
Laramie columbine	*Aquilegia laramiensis*	Crevices of granite boulders & cliffs at 6,400-8,000 feet in elevation	N	Model shows no potential habitat present in project area.

Trelease's racemose milkvetch	*Astragalus racemosus var treleasei*	Barren hills and washes of clay, shale, limestone, or sandstone at 6,500-8,200 feet in elevation	N	Model shows no potential habitat present in project area.
Weber's scarlet gilia	*Ipomopsis aggregata spp. weberi*	Openings in coniferous forests & scrub oak woodlands at 8,500-9,600 feet in elevation	N	Model shows no potential habitat present in project area.
Gibbens' beardtongue	*Penstemon gibbensii*	Sparsely vegetated shale or sandy-clay slopes at 5,500-7,700 feet in elevation	N	Model shows no potential habitat present in project area.
Laramie False Sagebrush	*Sphaeromeria simplex*	Cushion plant communities on rocky limestone ridges & gentle slopes at 7,500 – 8,600 feet in elevation	N	Model shows no potential habitat present in project area.

APPENDIX 5: WILD HORSE POPULATION MODELING

Population Model Overview

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

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

The population model for wild horses was designed to help wild horse and burro specialists 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.

Descriptions/Definitions of terms used in the Population Model

Population Data: Age-Sex Distribution

An important point about the initial age-sex distribution is that it is NOT necessarily the starting population for each of the trials in a simulation. This is because the program assumes that the initial age-sex distribution supplied on this form or calculated from a population size that the

user enters is not an exact and complete count of the population. For example, if the user enters an initial population size of 100 based on an aerial survey, this is really an estimate of the population, not a census. Furthermore, it is likely to be an underestimate, because some horses will be missed in the survey. Therefore, the program uses an average sighting probability of approximately 90% (Garrott et al. 1991) to "scale-up" the initial population estimate to a starting population size for use in each trial. This is done by a random process, so the starting population sizes are different for all trials. An option does exist to consider the initial population size to be exact and bypass this scaling-up process.

Population Data: Survival Probabilities

A fundamental requirement for a population model such as this is data on annual survival probabilities of each age class. The program contains files of existing sets of survival, or it is possible to enter a new set of data in the table.

In most cases, Wild Horse and Burro Specialists don't have information on survival probabilities for their populations, so the sample data files provided with WinEquus are used and assume that average survival probabilities in the populations are similar. These data are more difficult to get than is often assumed, because they require keeping track of known individuals over time. A "snapshot" of a population, providing information on the age distribution at a single gather, can NOT be used to estimate survival probabilities without assuming a particular growth rate for the population (Jenkins1989). More data from long-term studies of marked horses are needed to develop estimates of survival in various habitats.

Population Data: Foaling Rates

Foaling rates are the proportions of females in each age class that produce a foal at that age. Files are available within the program that contains existing sets of foaling rates, or the user may enter a new set of data in the table. The user may also enter the sex ratio at birth, another necessary parameter for population simulation.

Environmental Stochasticity

For any natural population, mortality and reproduction vary from year to year due to unpredictable variation in weather and other environmental factors. This model mimics such environmental stochasticity by using a random process to increase or decrease survival probabilities and foaling rates from average values for each year of a simulation trial. Each trial uses a different sequence of random values, to give different results for population growth. Looking at the range of final population sizes in many such trials will give the user an indication of the range of possible outcomes of population growth in an uncertain environment.

How variable are annual survival probabilities and foaling rates for wild horses? The longest study reporting such data was done at Pryor Mountain, Montana by Garrott and Taylor (1990). Based on 11 years of data at this site, survival probability of foals and adults combined was greater than 98% in 6 years, between 90 and 98% in 3 years, 87% in 1 year, and only 49% in 1 year of severe winter weather. These values clearly aren't normally distributed, but can be approximated by a logistic distribution. This pattern of low mortality in most years but markedly higher mortality in occasional years of bad weather was also reported by Berger (1986) for a site

in northwestern Nevada. Therefore, environmental stochasticity in this model is simulated by drawing random values from logistic distributions. If desired, different values can be entered to change the scaling factors for environmental stochasticity.

Because year-to-year variation in weather is likely to affect foals and adults similarly, this model makes foal and adult survival perfectly correlated. This means that when survival probability of foals is high, so is survival probability of adults, and vice versa. By contrast, the correlation between survival probabilities and foaling rates can be adjusted to any value between -1 and +1. The default correlation is 0 based on the Pryor Mountain data and the assumption that most mortality occurs in winter and winter weather is not highly correlated with foaling-season weather.

The model includes another form of random variation, called demographic stochasticity. This means that mortality and reproduction are random processes even in a constant environment; i.e., a foaling rate of 40% means that each female has a 40% chance of having a foal. Because of demographic stochasticity, even if scaling factors for both survival probabilities and foaling rates were set equal to 0, different runs of the simulation would produce different results. However, variation in population growth due to demographic stochasticity will be small except at low population sizes.

Gathering Schedule

There are three choices for the gather schedule: gather at a regular interval, gather at a minimum interval (the default), or gather in specific years. Gathering at a minimum interval means that gathers will be conducted no more frequently than a prescribed interval (e.g., 3 years), but will not be conducted if the time interval has passed unless the population is above a threshold size that triggers a gather.

Gather interval

This is the number of years between gathers.

Gather for fertility treatment regardless of population size?

If this option is selected (the default), then gathers occur according to the gathering schedule specified regardless of whether or not the population exceeds a threshold population size. One effect of this is that a minimum-interval schedule really functions as a regular interval.

Continue gather after reduction to treat females?

Continuing a gather after a reduction to treat females (with fertility control management options) means that, if a gather for a removal has been triggered because the population has exceeded a threshold population size, then horses will continue to be processed even after enough have been removed to reduce the population to the target population size. As additional horses are processed, females, to be released back, will be treated with an immunocontraceptive according to the information specified in the Contraceptive Parameters form.

Threshold for gather

The threshold population size for triggering a gather is the actual population size in a particular year estimated by the program. This is NOT the same as the number of horses counted in an aerial census, but closer to an estimate of population size taking into account the fact that an aerial census typically underestimates population size.

Target population size

This is the goal for the population size following a gather and removal. Horses will be removed until this target is reached, although it may not be possible to achieve this goal, depending on the removal parameters (percentages of each age-sex class to be removed) and gathering efficiency.

Are foals included in AML?

In most HMA's, foals are counted as part of the appropriate management level (AML). The Rawlins RMP specifies that foals of the year are not counted as part of the AML.

Gathering efficiency

Typically, some horses will successfully resist being gathered, either by hiding in habitats where they can't be seen or moved by a helicopter, or following escape routes that make it dangerous or uneconomical for them to be herded from the air. These horses aren't available for removals or fertility treatment. The default gathering efficiency is 80%, meaning that the program assumes that 20% of the population will successfully resist being gathered. This value may be changed.

Note that the program assumes that horses of all age-sex classes are equally likely to be able to be gathered. This is an unrealistic assumption because bachelor males, for example, may be more likely to successfully avoid being gathered than females or foals or band stallions.

Sanctuary-bound horses

Age-selective removals typically target younger age classes such as 0 to 5-year-olds or 0 to 9-year-olds because these horses are more easily adopted. However, it may not be possible to reduce the population to a target size by restricting removals to these younger age classes, especially if age-selective removals have been conducted in the past. In this case, an option is available to remove older animals as well, who may be destined for permanent residence in a long term holding facility rather than for adoption. The minimum age of these long term holding facility horses is specified for this element. When older age classes as well as younger age classes are identified for removal on the Removal Parameters form, horses of these older age classes are selected along with younger age class horses as the population is reduced to the target value. If a minimum age for long term holding facility horses is specified, then older animals are only removed if the population can't be reduced to the target population size by removing the younger ones.

Percent Effectiveness of fertility control

These percentages represent the percentage of treated females that are in fact sterile for one year,

two years, etc. (i.e., the efficacy or effectiveness of fertility treatment). The default values are 90% efficacy for one year. However, the user may specify the effectiveness year by year, for up to five years.

Removal Parameters

This allows the user to determine the percentages of horses in each sex and age class to be removed during a gather. The program uses these percentages to determine the probabilities of removing each horse that is processed during a gather. If the percentage for an age-sex class is 100%, then all horses of that age-sex class that are processed will be removed until the target population size is reached. If the percentage for an age-sex class is 0%, then all horses of that age-sex class will be released. If the percentage for an age-sex class is greater than 0% but less than 100%, then the proportion of horses of that age-sex class removed will be approximately equal to the specified percentage.

Contraception Parameters

This allows the user to specify the percentage of released females of each age class that will be treated with an immunocontraceptive. The default values are 100% of each age class, but any or all of these may be changed.

Most Typical Trial

This is the trial that is most similar to each of the other trials in a simulation

Population Size Table

The default is both sexes and all age classes, but summary results may also be chosen for a subset of the population. The table identifies some key numbers such as the lowest minimum in all trials, the median minimum, and the highest minimum. Thinking about the distribution of minima for example, half of the trials have a minimum less than the median of the minima and half have a minimum greater than the median of the minima. If the user was concerned about applying a management strategy that kept the population above some level, because the population might be at risk of losing genetic diversity if it were below this level, then one might look at the 10th percentile of the minima, and argue that there was only a 10% probability that the population would fall below this size in x years, given the assumptions about population data, environmental stochasticity, and management that were used in the simulation.

Gather Table

The default is both sexes and all age classes, but summary results may be for a subset of the population. The table shows key values from the distribution of the minimum total number of horses gathered, removed, and (if one elected to display data for both sexes or just for females) treated with a contraceptive across all trials. This output is probably the most important representation of the results of the program in terms of assessing the effects of your management strategy because it shows not only expected average results but also extreme results that might be possible. For example, only 10% of the trials would have entailed gathering fewer animals than shown in the row of the table labeled "10th percentile", while 10% of the trials would have

entailed gathering more than shown in the row labeled "90th percentile". In other words, 80% of the time one could expect to gather a number of horses between these 2 values, given the assumptions about survival probabilities, foaling rates, initial age-sex distribution, and management options made for a particular simulation

Growth Rate

This table shows the distribution of the average population growth rate. The direct effects of removals are not counted in computing average annual growth rates, although a selective removal may change the average foaling rate or survival rate of individuals in the population (e.g., because the age structure of the population includes a higher percentage of older animals), which may indirectly affect the population growth rate. Fertility control clearly should be reflected in a reduction of population growth rate.

Population Modeling – Red Desert HMA Complex

To complete the population modeling for the Red Desert HMA 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

Initial age structure for the 2009 herd was developed from age structure data collected during the 2006 HMA complex gather. The following table shows the proposed age structure that was utilized in the population model for the Proposed Action and Alternatives:

Initial Age Structure

Age Class	Females	Males
Foal	106	106
1	75	66
2	77	80
3	64	70
4	62	60
5	28	26
6	29	23
7	26	22
8	30	22
9	27	29
10-14	72	110
15-19	25	57
20+	6	34
Total	**627**	**705**

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 I:

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	100%	100%
15-19	100%	100%
20+	100%	100%

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

Contraception Criteria
(Alternative I)

Age	Percentages for Fertility Treatment
Foal	100%
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 the Proposed Action, and all alternatives:

- Starting Year: 2009
- Initial gather year: 2009
- Gather interval: regular interval of three years
- Gather for fertility treatment regardless of population size: No
- Continue to gather after reduction to treat females: Yes
- Sex ratio at birth: 53% males
- Percent of the population that can be gathered: 85%
- 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 I Proposed Action (Remove to Low Limit of Management Range & Fertility Control)	Alternative II (Remove to Lower Limit of Management Range & No Fertility Control)	Alternative III No Action (No Removal & No Fertility Control)
Management by removal and fertility control	Yes	No	N/A
Management by removal only	No	Yes	N/A
Threshold Population Size for Gathers	724	724	N/A
Target Population Size Following Gathers	480	480	N/A
Gather for fertility control regardless of population size	No	No	N/A
Gathers continue after removals to treat additional females	Yes	No	N/A
Effectiveness of Fertility Control: year 1	94%	N/A	N/A
Effectiveness of Fertility Control: year 2	82%	N/A	N/A
Effectiveness of Fertility Control: year 3	68%	N/A	N/A

Results of WinEquus Population Modeling

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

To date, one herd has been studied using the 2-year PZP vaccine. The Clan Alpine study, in Nevada, was started in January 2000 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 population of 948 wild horses in the Red Desert HMA complex was based on a May 2009 census, and was used in the population modeling. Year one is the baseline starting

point for the model, and reflects wild horse numbers immediately prior to the gather action and also reflects a slightly skewed sex ratio which favors males. A sex ratio of 53:47 was entered into the model for the post gather action population. In this population modeling, year one would be 2009. 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 2019. 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 2009 was structured by the WinEquus Population Model using data from the horses gathered and released during the 2006 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 724 horses in the HMA
2. foals are not included in AML
3. percent to gather 85
4. three years between gathers
5. number of trials 100
6. number of years 10
7. initial calendar year 2009
8. initial population size 948
9. population size after gather 480
10. implement selective removal criteria
11. fertility control Yes for Proposed Action(Alternative 1) and No for Alternative 2

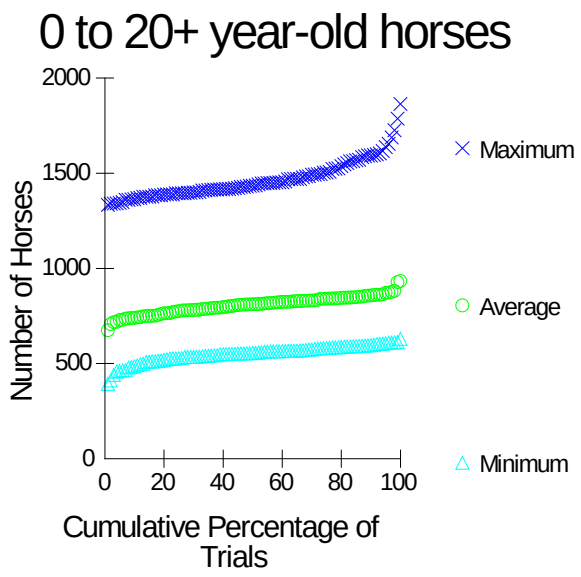
<u>Results – Proposed Action – Removal to 480 with Fertility Control</u>

The parameters for the population modeling were:

1-10. The same as parameters listed above.

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

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

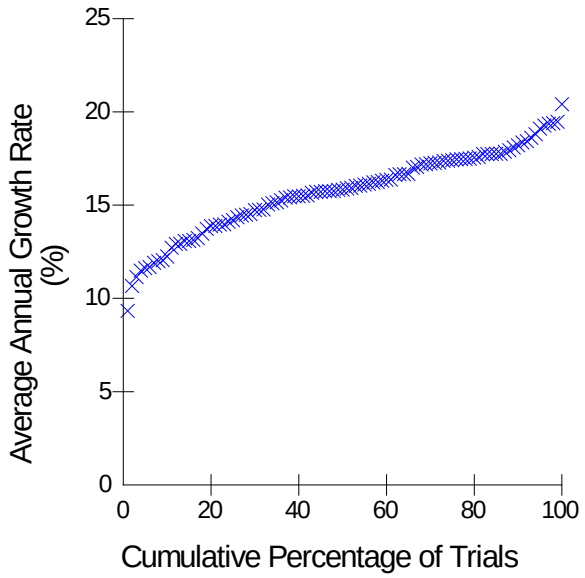


Population Sizes in 11 Years

	Minimum	Average	Maximum
Lowest Trial	393	675	1334
10th Percentile	488	741	1366
25th Percentile	528	776	1395
Median Trial	556	811	1436
75th Percentile	582	841	1506
90th Percentile	598	859	1594
Highest Trial	630	934	1864

* 0 to 20+ year-old horses

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



Average Growth Rate in 10 Years

Lowest Trial	9.3
10th Percentile	12.5
25th Percentile	14.3
Median Trial	15.9
75th Percentile	17.4
90th Percentile	18.3
Highest Trial	20.4

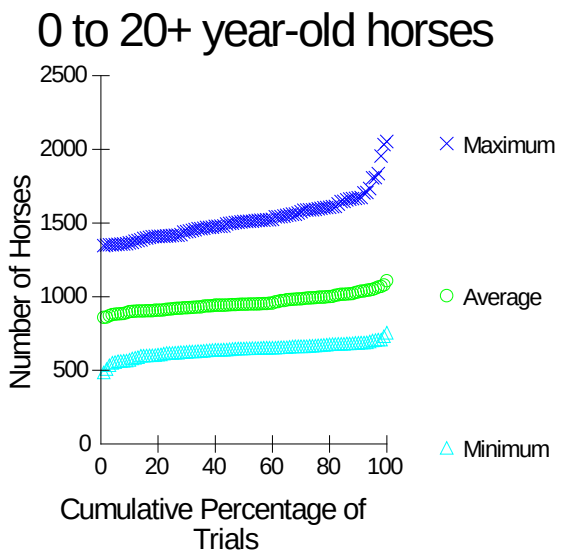
<u>Results – Alternative 2 – Removal to 480 with No Fertility Control</u>

The parameters for the population modeling were:

1-10. same as parameters listed above.

11. No, do not treat mares released with fertility control.

Population Size and Modeling Graph and Table (Gather Only)

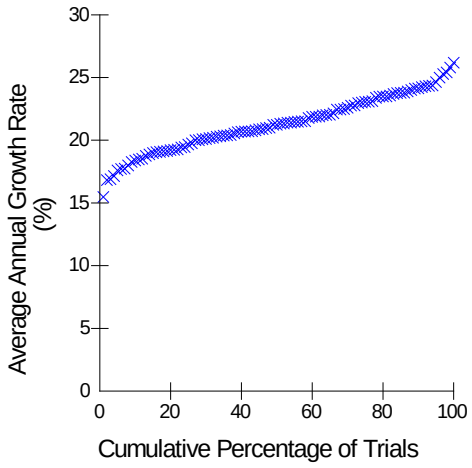


Population Sizes in 11 Years

	Minimum	Average	Maximum
Lowest Trial	485	860	1347
10th Percentile	576	899	1366
25th Percentile	618	918	1416
Median Trial	649	949	1510
75th Percentile	668	994	1594
90th Percentile	687	1034	1672
Highest Trial	755	1108	2053

* 0 to 20+ year-old horses

Growth Rate Modeling Graph and Table (Gather Only)



Average Growth Rate in 10 Years

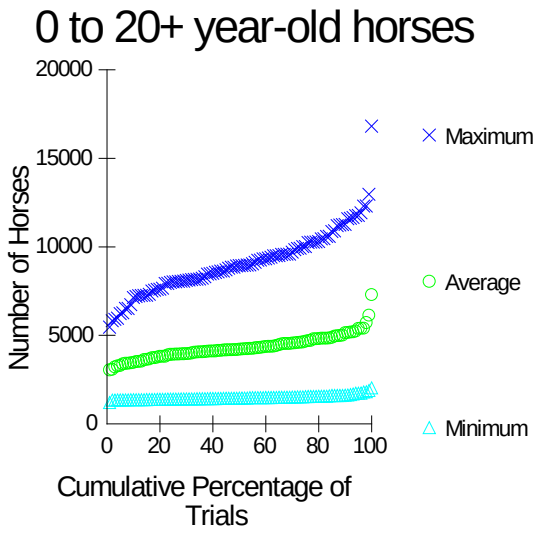
Lowest Trial	15.5
10th Percentile	18.4
25th Percentile	19.7
Median Trial	21.3
75th Percentile	23.1
90th Percentile	24.2
Highest Trial	26.2

<u>Results – No Action</u>

The parameters for the population modeling were:

1. do not gather in 2009
2. foals are not included in AML
3. percent to gather 0

Population Size Modeling Graph and Table (No Action)

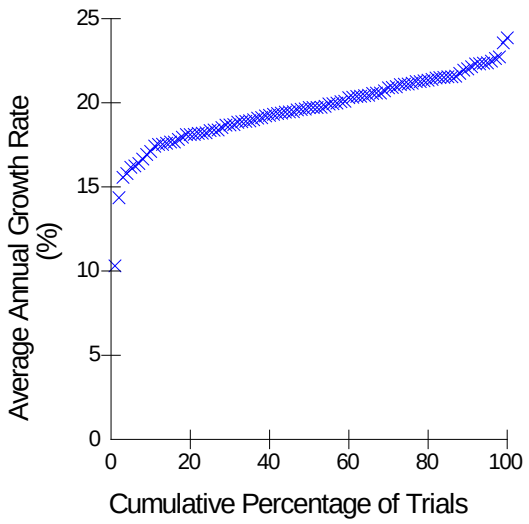


Population Sizes in 11 Years*

	Minimum	Average	Maximum
Lowest Trial	1202	3050	5465
10th Percentile	1364	3493	7170
25th Percentile	1397	3934	8024
Median Trial	1456	4224	8942
75th Percentile	1540	4685	10130
90th Percentile	1625	5155	11430
Highest Trial	2028	7298	16815

* 0 to 20+ year-old horses

Growth Rate Modeling Graph and Table (No Action)



Average Growth Rate in 10 Years

Lowest Trial	10.3
10th Percentile	17.3
25th Percentile	18.4
Median Trial	19.7
75th Percentile	21.1
90th Percentile	22.1
Highest Trial	23.9

This table compares the projected population growth for the proposed action and the alternatives at the end of the ten-year simulation. The population averages are from the median trial.

Modeling Statistic Red Desert HMA Complex	**Proposed Action**	**Alternative 2 – No Fertility Control**	**No Action**
Population in Year One	480	480	948
Median Growth Rate	15.9%	21.3%	19.7%
Average Population	811	949	4224
Lowest Average Population	675	860	3050
Highest Average Population	934	1108	7298

APPENDIX 6

Summary of Permitted Livestock AUMS's by Allotment by HMA

Table1. Allotment and Permitted Livestock Animal Unit Months (AUM)

Allotment Name	Permitted Cattle AUM	Permitted Sheep AUM
Stewart Creek	8,432	0
Cyclone Rim	15,553	11,739
Green Mountain	35,910	11,451
Whiskey Peak	5,451	2,294
Total Permitted AUM:	65,346	25,484

An AUM is defined by the Rawlins RMP as a standardized unit of measurement of the amount of forage necessary for the sustenance of one animal unit for 1 month. An animal unit month being defined as generally one mature (1,000-pound) cow or its equivalent, based on an average daily forage consumption of 26 pounds of dry matter per day.

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