



## United States Department of the Interior

BUREAU OF LAND MANAGEMENT  
Lander Field Office  
PO Box 589  
Lander, WY 82520-0589

In Reply,  
Refer To:  
4700

August 26, 2004

Dear Reader:

The Bureau of Land Management (BLM), Lander Field Office has prepared an environmental analysis (EA) for gathering of wild horses in the Antelope Hills/Cyclone Rim Wild Horse Herd Management Area. The EA provides the detail about this gather. This EA is posted on the Wyoming BLM website at [www.wy.blm.gov/nepa/LFOdocs/Antelopehills](http://www.wy.blm.gov/nepa/LFOdocs/Antelopehills). You may also obtain a hard copy of the EA by contacting the Lander Field Office at the address or phone number below. **Please respond with your written comments by September 27, 2004.** Send written comments to:

Bureau of Land Management  
Lander Field Office  
P.O. Box 589  
Lander, Wyoming 82520  
307-332-8400

Written comments, including the names and addresses of respondents, will be available for public review at the BLM Lander Field Office during regular business hours (7:45A.M. - 4:30 P.M.), Monday through Friday (except Federal holidays) after the comment period closes and may be published as part of the environmental process. Individual respondents may request confidentiality. If you wish to withhold your name and/or address from public review or from disclosure under the Freedom of Information Act, you must state this prominently at the beginning of your written comment. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials or organizations or businesses, will be made available for public inspection in their entirety. If you have any questions you may contact the BLM at the above address or contact Roy Packer at 307-332-8400.

Sincerely,

/s/ Jack Kelly  
Lander Field Manager



**U.S. Department of the Interior**

Bureau of Land Management

Wyoming State Office

Lander Field Office

August 2004



**ENVIRONMENTAL ASSESSMENT**  
**Antelope Hills/Cyclone Rim Horse**  
**Management Area Capture/Removal and**  
**Fertility Control**

EA No. WY-050-EA4-060



**MISSION STATEMENT**

It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

**BLM/WY/PL-04/037+1060**

WY-050-EA4-060

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## ABBREVIATIONS

AML	Appropriate Management Level
AUM	Animal Unit Month
BLM	U.S. Department of Interior, Bureau of Land Management
CFR	Code of Federal Regulations
EA	Environmental Assessment
HMA <sub>s</sub>	Wild Horse Herd Management Areas
LFO	Bureau of Land Management, Lander Field Office
WSA	Wilderness Study Area
DR	Decision Record
RMP	Resource Management Plan
IMP	Interim Management Plan
EIS	Environmental Impact Statement
PMA	Population Management Action
NPO	National Program Office
PZP	Porcine Zona Pellucida
PMP	Population Management Plan

**Antelope Hills/Cyclone Rim Herd Management Area**  
Capture/Removal and Fertility Control  
Lander Field Office

Environmental Assessment  
WY-050-EA4-060

**I. Background Information**

**A. Introduction**

With passage of the Wild Free-Roaming Horse and Burro Act of 1971 (Public Law 92-195), Congress found that: “Wild free-roaming horses and burros are living symbols of the historic and pioneer spirit of the West”. The Act states that wild free-roaming horses are to be considered in the area where presently found, as an integral part of the natural ecosystem of the public lands. The Secretary of the Interior was ordered to “manage wild free-roaming horses and burros in a manner that is designed to achieve and maintain a thriving natural ecological balance on the public lands”. From the passage of the Act, through present day, the Bureau of Land Management (BLM), Lander Field Office (LFO) has endeavored to meet the requirements of the Act. The procedures and policies implemented to accomplish this mandate have been constantly evolving over the years.

Throughout this period, BLM experience has grown, and the knowledge of the effects of current and past management on wild horses and burros has increased. For example, wild horses have been shown to be capable of 18 to 25% increases in numbers annually. This can result in a doubling of the wild horse population about every 3 years. Field Offices have learned more about individual herds through vegetation studies, census, seasonal distribution flights, and gather activities. At the same time, nationwide awareness and attention has grown. As these factors have come together, the emphasis of the wild horse and burro program has shifted. The Program’s goals have expanded beyond simply establishing a “thriving natural ecological balance” by setting an appropriate management level (AML) for individual herds to include achieving and maintaining viable, vigorous, and stable populations.

The National Wild Horse and Burro Strategy involved establishing and achieving AML on all herd management areas (HMA’s) managed by the BLM, and to achieve and maintain AML on all HMA’s following a four-year gather cycle. The numbers of animals projected to be removed, based on this four year rotation, were estimated based on the use of the wild horse population model developed by Dr. Stephen Jenkins of the University of Nevada Reno. Those numbers by state and year were first proposed through the Presidents 2001 budget request as the Strategy to Achieve Healthy Lands and

Viable Herds, The Restoration of Threatened Watersheds Initiative, which was later funded by Congress.

This Environmental Assessment and Gather Plan for the Antelope Hills/Cyclone Rim HMA will analyze the impacts associated with the Proposed Action and four Alternatives, including the No Action Alternative.

## **B. Purpose and Need for Action**

The purpose of the action is to achieve and maintain the AML for wild horses in the Antelope Hills/Cyclone Rim HMA, collect information on herd characteristics, and determine herd health. By achieving and maintaining AML in the Antelope Hills/Cyclone Rim/Cyclone Rim HMA, the following objectives will be achieved:

- *Manage the Antelope Hills/Cyclone Rim HMA to achieve and maintain a thriving natural ecological balance, and multiple-use relationship.*
- *Manage the Antelope Hills/Cyclone Rim HMA population to preserve and enhance the historic physical and biological characteristics of the herd.*
- *Maintain sex ratios and age structures, which will allow for the continued physical, reproductive and genetic health of the Antelope Hills/Cyclone Rim HMA.*
- *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 Antelope Hills/Cyclone Rim HMA 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 Antelope Hills/Cyclone Rim HMA in 2001. At completion of the gather, the population was estimated to be 70 wild horses. Since that time the population has grown to an estimated 205 wild horses (post foaling 2004), which exceeds the low end of the AML by 145 head. The action is needed to reduce the wild horse population to the low AML of 60 adult animals established by the Record of Decision/Final Environmental Impact Statement (EIS) for the Great Divide Resource Area Wild Horse Herd Management Area Evaluation Environmental Analysis and Capture plan and the associated Environmental Analysis (EA's) WY-037-EA4-122, and WY-037-EA4-121. (see Table 1.). Removal of excess wild horses would lead to achieving and maintaining a thriving natural ecological balance and multiple-use relationship in the Antelope Hills/Cyclone Rim HMA.

## **C. Conformance with Existing Land Use Plans and Relationship to Statutes, Regulations, Policies, Plans, or Other Environmental Analyses**



The proposed action and alternatives are in conformance with the Wild Free-Roaming Horse and Burro Act of 1971 (PL 92-195 as amended); all applicable regulations at 43 CFR 4700 and policies; the Strategic Plan for the Management of Wild Horses and Burros on the Public Lands; and the Wyoming BLM Revised Tactical Plan – Wild Free-Roaming Horses and Burros, Ensuring the Legend Lives Free.

The proposed action conforms to the land use plan terms and conditions as required by 43 CFR 1610.5-3. Any action in the Lander Field Office is subject to the Lander Resource Management Plan, approved June 9, 1987.

This action is subject to the Great Divide Resource Management Plan (RMP), approved November 8, 1990. Actions proposed in this plan are in conformance with the Wild Horse Management Objective on page 41 of the RMP which states . . . to protect, maintain, and *control* a viable healthy herd of wild horses.

The action would also be in conformance with the Great Divide Herd Management Area Evaluation and the associated EA (WY-037-EA4-122). Recommendations from this evaluation were used to establish the AML and adjust HMA boundaries. Monitoring indicates that rangeland conditions have not changed significantly since 1994. The proposed action is consistent with all other federal, state, and local plans.

These documents contain specific management prescriptions for the HMA, as well as information on the existing environment and environmental impacts of the management actions. Changes to HMA boundaries or AMLs are beyond the scope of this analysis and will not be discussed further. The proposed action has been reviewed for conformance with Wyoming’s *Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management*. The proposed action will assist in maintaining the health of the public lands within the HMA. (See Appendix 3)

The carrying capacity for livestock and wild horses, multiple use management objectives, and the Terms and Conditions for livestock grazing for the Green Mountain Common and Cyclone Rim Allotment’s were established in conformance with the Lander RMP, Great Divide RMP, BLM policy, and the Wyoming Standards and Guidelines.

The AML is the maximum number of wild horses to be managed in the HMA. The Great Divide Herd Management Area Evaluation and the associated EA (WY-037-EA4-122). states that wild horses in the Antelope Hills/Cyclone Rim HMA; “will be managed in a range from 60 to 82 adult wild horses”.

Table1 lists the AML for wild horses in the Antelope Hills/Cyclone Rim HMA by allotment.

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

Allotment	HMA Name	AML	Decision Record Date
<b>Green Mountain Common Allotment #32001</b>	<b>Antelope Hills/Cyclone Rim</b>	60 – 82 AML is for portions of both allotments	May 1994
<b>Cyclone Rim Allotment #10103</b>	<b>Antelope Hills/Cyclone Rim</b>	AML is for portions of both allotments	
Total		60 - 82	

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. 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.
2. 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.
3. Wild Horse Gathering Inside and Outside of the Crooks Mountain Wild Horse Herd Management Area, EA Number WY-050-EA2-032, April 2002.
4. Wild Horse Gathering Inside of the Green Mountain Wild Horse Herd Management Area EA Number WY-050-EA2-031. April 2002.
5. Removal of strayed horses from areas outside of the Adobe Town HMA. EA Number WY-030-EA9-156, 1999.
6. Maintaining Viable Populations of Wild Horses in Herd Management Areas of The Rawlins Field Office. EA Number WY030-EA0-037, 1999.
7. Wild Horse Gathering in I 80 N., EA WY030-EA0-038, 1999.

These documents are available for public review at the Lander Field Office.

## **II. Alternatives Including the Proposed Action**

Four alternatives including the Proposed Action and the No Action Alternative will be analyzed within this document, and impacts identified. The description of all of the alternatives is given below.

### **Actions common to all alternatives except the No Action Alternative**

The proposed gather would be scheduled to start no earlier than September 30, 2004. Regardless of which alternative is selected, the LFO Wild Horse and Burro (WH&B) Specialist would determine sex, age and color, assess herd health (pregnancy/parasite loading/physical condition/etc), sort individuals as to age, size, sex, temperament and/or physical condition, and select animals to be returned to the range. Data would be collected, including biological samples, for analysis and inclusion into future planning documents. Excess wild horses would be transported to a BLM adoption preparation/holding facility.

#### **A. HMA Objectives**

The following HMA objectives would be common to all alternatives, except the No Action Alternative.

1. Maintain an AML in the Antelope Hills/Cyclone Rim HMA of 60 to 82 adult wild horses, as shown in Table 2.

**Table 2. Management Range for Wild Horses**

<b>HMA Name</b>	<b>Management Range</b>
<b>Antelope Hills/Cyclone Rim</b>	<b>60 – 82 (adult horses)</b>
<b>Totals</b>	<b>60 - 82</b>

Wild horse movements within the Antelope Hills/Cyclone Rim HMA Complex are apparent through trails and seasonal variation in distribution. It is recognized that individually, the AML for wild horses within the Antelope Hills/Cyclone Rim is not a genetically viable population. However, these horses interact with horses from the Crooks Mountain, Lost Creek, and Divide Basin HMA's. This interaction should ensure genetic viability.

2. Selective Removal Criteria

Determination of which horses would be returned to the range would be based on an analysis of existing population characteristics and HMA objectives. Wild horses would be selected and released back into the HMA, based on the historic

characteristics (color pattern, sex ratio) of the Antelope Hills/Cyclone Rim HMA. Objectives for the herd were detailed previously under the Purpose of and Need for Action section, and historic population characteristics are described in Chapter III, Affected Environment. Wild horses selected for release back into the HMA would adhere to the National Selective Removal Policy to the extent possible, in accordance with the Gather Policy and Selective Removal Criteria for Wild Horses, which details the priorities to be followed as:

- a. Age Class Four Years and Younger:** Wild horses four years of age and younger may be removed and placed 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.

Any animals within this age class that are in the Henneke category of 2 or less condition class and have no chance of timely improvement would be evaluated for euthanasia. Any euthanasia would be in accordance with Washington Office Instruction Memorandum 2001-165. 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 should 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, however population modeling estimated that only 31 wild horses (20 mares and 11 studs) would fall into the of 5-9 year old age categories. Therefore, it is anticipated that additional animals from the younger and/or older categories would need to be released to meet the objective of the proposed action or alternatives. Animals older than 9 years of age would be preferred for several reasons that include decreased adoption demand for older animals, and horses older than 9 years old are currently placed in long-term holding facilities. Exceptional animals that represent historic colors, size and/or confirmation may be chosen for release outside of the selective removal priorities. 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 gather, and have been confirmed by the LFO WH&B Specialist, the total number of animals released may be reduced by this number.

## B. Gather Operations

The gather would be conducted through use of the National Wild Horse and Burro Gather Contract and/or WY BLM Gather Crews. Multiple gather sites (traps) may be used to gather wild horses from the HMA. To the maximum extent possible, gather sites would be located in previously disturbed areas. All gather and handling activities (including gather site selections) would be conducted in accordance with the Standard Operating Procedures (SOPs) described in Appendix 1. The helicopter drive trap gather technique would be utilized for this gather. It is estimated that four or five trap sites would be required to complete the gather. When animals are released, every effort would be made to release them back into the same general area from which they were gathered.

As needed, an APHIS Veterinarian may be on-site during gather operations to examine animals and make recommendations to the LFO WH&B Specialists for care and treatment of the wild horses. Consultation with a veterinarian would take place prior to euthanasia in accordance with Washington Office Instruction Memorandum 2001-165.

## C. Data Collection

The following data would be collected during the gather, to assure an adequate database to prepare a Population Management Plan (PMP):

1. **Blood Samples.** Blood samples would be collected from release animals and analyzed to establish genetic baseline data (genetic diversity, historical origins of the herd, unique markers, plus norms for the herd) for the HMA in accordance with the current Gather Policy and Selective Removal Criteria for Wild Horses. The minimum sample size is 25 per cent of the upper end of the management range (43 samples for the Antelope Hills/Cyclone Rim HMA) or a minimum of 25 samples and not more than 100 per population. Blood would be drawn from both mares and studs in a ratio similar to the sex ratio released. The blood sample analysis would provide a comparison with domestic breeds and other wild populations that have been tested. A Veterinarian or other trained personnel would collect the blood samples.
2. **Sex ratio/Age Structure.** The sex, age, and disposition (remove or release) for each animal gathered would be recorded. This data would be used to develop a pre-gather and release sex ratio/age structure summary for the HMA. The pre-gather sex ratio/age structure would be developed by combining the release sex ratio/age structure data collected at the gather, with sex ratio/age structure data collected at the adoption preparation/holding facility receiving the removed animals.
3. **Reproduction and Survival.** Information on reproduction and survival would be collected to the extent possible, through documentation of the wild horses gathered, and the age of those released following the gather.
4. **Characteristics.** Color and size of the animals would be recorded. The type of horse

would be noted if it can be determined, or a general impression of the type of horses gathered within the HMA. Incidence of albinism, parrot mouth, club feet, severely crooked legs or any other negative trait believed to be genetic, would be recorded along with the disposition of that animal.

5. **Condition Class.** Condition class would be recorded using the Henneke System for those animals that are exceptions to average, such as noticeably thin, or fat wild horses.
6. **Other data.** All other data believed to be essential to the Population Management Planning effort would be collected during the gather. This may include parasite load, disease (from blood samples), percentage and age of pregnant mares, or other data.

## **Proposed Action**

### **Removal to the Lower Limit of the AML with Fertility Control**

The proposed action is to gather approximately 185 wild horses (90% of HMA pop.) and remove approximately 145 of those wild horses from the Antelope Hills/Cyclone Rim HMA. The proposed action also includes implementing an immunocontraceptive research project on 100% of the mares released (approximately 20 mares) and monitoring results as appropriate.

Approximately 40 wild horses (20 mares and 20 studs) would be returned to the HMA; together with un-captured animals this would represent the lower end of the AML.

Gathering operations would be conducted as described in the Wild Horse Capture Plan (Appendix 1), and would start around the middle of October, 2004, requiring approximately one week for completion. In the event that weather or other factors prevent a gather at this time, the operation would be conducted as scheduling permitted later in the fall or early winter of 2004. If some unforeseen factors prevent a gather in the fall of 2004, the operation would be conducted at about the same time in 2005 or 2006.

The field trials will provide three years of contraception to treated mares. Following three of contraception, treated mares will be allowed to return to normal reproductive function. Their fecundity rates, behavior, and harem social structure will be observed for a minimum of two years post-treatment, to assure that normal fertility is resumed. The treated mares will be individually marked and/or be individually recognizable without error. The treated mares must be left on the range for the duration of the research, and are not likely to be treated again.

Wild mares treated with Porcine Zona Pellucidae (PZP)/and Freund's Complete Adjuvant (FCA) will be freeze-marked for identification purposes. The Lander Field Office will assure that these animals do not enter the adoption market for three years following treatment. A field data sheet will be forwarded to the field from National Program Office (NPO) prior to treatment. This form will be used to record all pertinent data relating to identification of the mare (including photo when possible), date of treatment, type of treatment (1yr, 2yr- and Adjuvant used) Herd Management Area (HMA), etc. The form and any photos will be maintained at the field office

and a copy of the completed form will be sent to the National Program Office (NPO), Reno NV.

A tracking system will be maintained by NPO detailing the quantity of PZP issued, the quantity used, the disposition of any unused PZP, and the number of treated mares by HMA, FO and State along with the freeze-mark applied by HMA. In the vast majority of cases, the released mares will never be gathered sooner than the mandatory three- year holding period. In those rare instances when, due to unforeseen circumstances, a treated mare(s) are removed from an HMA they will be maintained either in a BLM facility or a contracted Long Term Holding Facility until the expiration of the three-year holding period. In the event that it is necessary to remove treated mares, their removal and disposition will be coordinated through NPO. After expiration of the three-year holding period, the animal may be placed in the adoption system.

All of the mares to be released back to the HMA would be treated with an immunocontraceptive vaccine, (PZP), administered by researchers connected with the National Fertility Control Field Trial Plan, or trained BLM personnel. The inoculation of mares would consist of a liquid dose of PZP vaccine and a time released portion of the drug in the form of pellets. The approach incorporates the PZP into a non-toxic, bio-degradable material which can be formed into small pellets. The pellets are injected with the liquid and are designed to release PZP at several points in time much the way time-release cold pills work. This formulation would be delivered as an intramuscular injection by a jabstick syringe, while mares are restrained in the working chute. Upon impact the liquid in the chamber would be propelled into the muscle along with the pellets. This delivery method has been used previously to deliver immuno-contraception vaccine with acceptable results. Such a vaccine would permit a single injection to cause up to three years of contraception at approximately 94% effectiveness in year one, 82% effectiveness in year two and 68% effectiveness in year three.

All treated mares would be identified and freezemarked with a Wyoming State approved identification (such as a letter or a number) on the left hip to enable positive identification for future tracking and data collection. At a minimum, monitoring of reproductive rates using helicopter fly-overs would be conducted in years 2 and 4 by locating treated mares and checking for presence/absence of foals. The flight scheduled for year 4 would also assist in determining the percentage of mares that have returned to fertility. In addition, field monitoring would be routinely conducted as part of other regular ground based monitoring activities.

### **ALTERNATIVE I:**

#### **Removal to the Lower Limit of the AML without Fertility Control**

Alternative I is to gather approximately 185 wild horses (90% of HMA pop.) and remove approximately 145 of those wild horses from the Antelope Hills/Cyclone Rim HMA. Approximately 40 wild horses (20 mares and 20 studs) would be returned to the HMA, which together with un-captured horses would maintain the lower limit of the AML. The population of the HMA would be reduced to the lower end of the AML which is 60 adult horses. A fertility control research project would not be implemented.

## **ALTERNATIVE II:**

### **Removal to the Middle Limit of the AML with Fertility Control**

Alternative II is to gather approximately 185 wild horses and remove approximately 135 wild horses from the Antelope Hills/Cyclone Rim HMA. The Alternative II action also includes implementing an immunocontraceptive research project on 100% of the mares released, (approximately 25 mares) and monitoring results as appropriate. Approximately 50 wild horses (25 mares and 25 studs) would be returned to the HMA, which together with the un-captured wild horses would maintain the middle limit of the management range. Delivery of the immunocontraceptive vaccine would be as described under the Proposed Action.

## **ALTERNATIVE III:**

### **Removal to Middle Limit of the AML without Fertility Control**

Alternative III is to gather approximately 185 wild horses and remove approximately 135 of those wild horses from the Antelope Hills/Cyclone Rim HMA. Approximately 50 wild horses (25 mares and 25 studs) would be returned to the HMA, which together with the un-captured wild horses would maintain the middle level of the management range (AML). A fertility control research project would not be implemented.

## **ALTERNATIVE IV - No Action:**

This alternative consists of no direct (i.e. passive) management of the wild horse population in the Antelope Hills/Cyclone Rim HMA. The wild horse population would be allowed to reach equilibrium by regulating their numbers through periodic elevated mortality rates caused by drought, insufficient forage, water and/or space availability, disease, predation, or a combination of these factors.

## **III. Affected Environment**

Table 3 lists the critical elements of the human environment whose review is mandated by law, regulation, or executive order. Others have been added because of their importance in assessing impacts. Those marked as not affected will not be impacted by the proposed action or alternatives, or are not present in the area. Elements not affected by the proposed action would receive no further consideration.



**Table 3. Critical Elements Checklist**

<b>Critical Element</b>	<b>Present</b>	<b>Affected</b>
Air Quality	Yes	No
Areas of Environmental Concern (ACECs)	Yes	No
Cultural Resources	Yes	Yes
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

**A. Wild Horses**

**1. HMA Description**

The Lander Field Office area of jurisdiction is located in central Wyoming, covering Fremont County and portions of Sweetwater, Carbon, Hot Springs and Natrona Counties. The Antelope Hills/Cyclone Rim HMA is located in the South central portion of Fremont County, south of Wyoming highway 789/287 and southeast of Wyoming highway 28 (See map in appendix 2). The HMA encompasses about 110,000 acres of land. About 10,000 acres within the HMA (about 9 percent) is privately or state owned. The HMA is characterized by rolling terrain with broken topography. Annual precipitation ranges from 5 to 14 inches per year, with an average of around 10 inches per year. Approximately half of the precipitation falls during the growing season of April through June, with the remainder coming in high intensity summer thunderstorms or as early winter snows. This general discussion tiers to the affected environment that is discussed in the Lander Herd Management Area Evaluation / Capture plan and the associated Environmental Analyses (EAs) WY-036-EA3-010 and WY-036-EA3-013.

**2. Gather History and Population Characteristics**

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. 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**

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

Sex ratios, based upon gather data, was 49% females and 51% males in 2001. The sex ratio of the current population is expected to be approximately the same.

Table 5 shows the inventory of February and March 2004 population within the Antelope Hills/Cyclone Rim HMA.

**Table 5. Inventory Population**

HMA Name	Inventory Population 2004
Antelope Hills/Cyclone Rim	166 Pre foaling
TOTALS	166 Pre foaling

### 3. Genetic Diversity and Viability

Blood samples will be collected from release animals during the gather to develop genetic baseline data (e.g. genetic diversity, historical origins of the herd, unique markers). The samples will be analyzed by a geneticist to develop a genetic frequency for the herd. This data will be incorporated into a Population Management Plan within two years of the proposed gather. At this time, there is no evidence to indicate that the Antelope Hills/Cyclone Rim HMA suffers from reduced genetic fitness. 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 inbreeding or population extinction (Singer, 2000).
- Genetic effective population size ( $N_e$ ) 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  $N_e$  or loss of genetic resources currently exists for wild horse herds. A goal of  $N_e=50$  is currently being applied as an estimate for  $N_e$  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 Antelope Hills/Cyclone Rim HMA as it pertains to genetic diversity:

- The current estimated population for the Antelope Hills/Cyclone Rim HMA is 205 head (post 2004 foaling).
- $N_e$  (genetic effective population size) for Antelope Hills/Cyclone Rim 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 HMAs managed by the LFO.

## **B. Cultural Resources**

Only a fraction of the land surface within the Antelope Hills/Cyclone Rim HMA has been inventoried for cultural resources. Prehistoric sites known to exist within the HMA include open camps, lithic scatters and rock cairn alignments. 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. Cultural Resource Program support for the wild horse capture would consist of field (class III) inventories, and, if necessary, mitigation of impacts at the locations of the horse traps 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.

**C. 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 occurring in the project area.

T&E Section 7 Consultation

Project Name: Wild Horse Gathering  
 Reviewed by: Connie Breckenridge

Case/Project Number: WY-050-EA4-060

Date: May 24, 2004

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/MA Y	Y/N	Y/N	
<i>Haliaeetus leucophalus</i> Bald eagle (E)	Y	NO			Roundups will not occur during the nesting season.
<i>Lynx canadensis</i> Canada lynx (T)	N				No suitable forested habitat present.
<i>Mustela nigripes</i> Black-footed ferret (E)	Y	NO			No structures will be built nor will horses be herded through prairie dog towns.
<i>Penstemon haydenii</i> Blowout Penstemon (E)	Y	NO			No structures will be built nor will horses be herded through sand dunes.
<i>Spiranthes diluvialis</i> Ute ladies= tresses (T)	Y	NO			No structures will be built nor will horses be herded through riparian meadows.
<i>Ursus arctos</i> Grizzly bear (T)	N				No suitable habitat present.
<i>Yermo xanthocephalus</i> Desert yellowhead (T)	N				No suitable habitat present.
Critical Habitat <i>Yermo xanthocephalus</i>	N				Critical Habitat is not present.
Platte River water depletion species (T&E)	Y	NO			No water depletions will occur.
Listed, Non-essential, Experimental Population	Present in project?	Affect?	Likely to jeopardize population		Rationale
	Y/N/UNK	NO/MA Y	Y/N		
<i>Canis lupus irremotus</i> Gray wolf	N				No suitable habitat present.

The bald eagle was listed as endangered in 1978 in all of the conterminous United States with the exception of Minnesota, Wisconsin, Michigan, Oregon and Washington, where it was classified as threatened. On July 12, 1995, USFWS reclassified the bald eagle from

endangered to threatened throughout its range in the lower 48 states. The bald eagle is a large, long-lived bird of prey. They typically nest in forested areas adjacent to large bodies of water. Nests are most often constructed in the tops of trees but can be built on cliffs or the ground in treeless areas. No bald eagle nests are known to be located within the Antelope Hills/Cyclone Rim HMA

Naturally occurring and functioning wetland habitat communities in the Platte River Basin are believed to be 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 water depletions from anywhere in the Platte River Basin have direct and indirect effects on, least tern, piping plover, pallid sturgeon and in Nebraska.

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 west Texas plains, and from east of the 100<sup>th</sup>, Meridian to Utah and Arizona. Prairie dogs may be found within the area of the proposed action.

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 Antelope Hills/Cyclone Rim HMA, no populations have been found.

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. Range-wide, it grows primarily on moist, sub-irrigated 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 Lander Field Office.

The BLM Wyoming Sensitive Species List for 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.

#### **D. Wetlands and Riparian Zones**

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. 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.

#### **E. Wildlife**

Wildlife is an integral part of the environment in the area. The LFO is home to several hundred species of wildlife, including big game, fur bearers, neotropical (migratory) birds, amphibians, rabbits, rodents and reptiles. Some species are not affected by this action since they occupy habitats that the action would not occur in or 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 neotropical birds (raptors, greater sage-grouse and song birds).

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 HMAs consist 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 this area have been increasing and elk are now occupying the HMAs year round in numbers great enough to support some harvest by hunting.

Neotropical 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. Neotropical birds migrate to warmer climates and are not present in this area in the winter.

#### **F. Vegetation and Soils**

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 junegrass, 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 it 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 metasedimentary 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 variegated 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.

The soils formed in Quarternary alluvium deposits about five to eight miles to the south, between Red Creek and John Hay Reservoir. These soils are typically very deep and medium textured. They commonly support sandy, loamy, and clayey range sites.

#### **IV. Environmental Consequences**

The following elements of the human environment are present and may be affected by the Proposed Action or Alternatives.

##### **A. Wild Horses**

###### **Actions common to all alternatives except the No Action Alternative**

###### **1. HMA Objectives**

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 helicopter census, occur as infrequently as possible (3 to 5 years). 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 I (Removal to the lower limit of the management range, 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 minimum population size in 11 years found that the lowest number of 0-20+ year old horses ever obtained was 23 head, with a median trial population of 96 head. The average population size in 11 years found that the lowest trial had 56 head, with a median trial population of 96 head. For Alternative I, the minimum population size in 11 years found that the lowest number of 0-20+ year old horses ever obtained was 14 head, with a median trial population of 81 head. The average population size in 11 years found that the lowest trial had 43 head, with a median trial population of 81 head.

The Herd Management Area Evaluation, Environmental Assessment and Decision Record for the Antelope Hills/Cyclone Rim HMA (1994) established the level of horses that would result in maintaining a thriving natural ecological balance.



Maintenance of the AML in the Antelope Hills/Cyclone Rim HMA 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, following a standardized gather cycle.
- Ensure a viable population of wild horses that will survive, and be successful during poor years when elements of the habitat are limiting due to severe winter conditions, drought or other uncontrollable and unforeseeable environmental influences to the herd.
- 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.
- 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 Antelope Hills/Cyclone Rim HMA, 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 12 to 20 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.

## **2. Selective Removal Criteria**

Direct impacts associated with the Proposed Action and Alternatives I, II, or III, would consist of selecting wild horses for release that possess the historic characteristics (color pattern, sex ratio), and age structure that are typical of the herd demographics of the Antelope Hills/Cyclone Rim HMA. The National Selective Removal Policy 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. As a result of the age selective removal in 1997, there will be horses in the five years and younger age class and the age class ten years and older selected for release which will ensure a more normal age structure population than may result from strict adherence to the National Selective Removal Policy. 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 Antelope Hills/Cyclone Rim 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 selection criteria favors studs over mares, band size would be expected to decrease, competition for mares would be expected to increase and, the size and number of bachelor bands would be expected to increase. On the other hand, a selection criteria which favors mares over studs would be expected to result in fewer and smaller bachelor bands, competition for mares may decrease, and there is a likelihood for 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.

### **3. Gather Operations**

The direct impacts associated with gather operations 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 in studs. 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 individual.

Population wide impacts can occur during or immediately following implementation of the Proposed Action or Alternatives I, II, or III. 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 Operation 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.

#### **4. Data Collection**

Direct impacts associated with data collection involve increased stress levels to the animals as they are restrained in the portable aging chute. Those animals selected for blood sampling may become very agitated as the samples are drawn. 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 will be used to develop population specific objectives that will help to ensure the long term viability of the population. This procedure is within the intent of Public Law 92-195, as amended, as it relates to managing populations at the minimum feasible level.

#### **Proposed Action and Alternatives**

Population modeling was completed for the Proposed Action and Alternatives. One of the objectives of the modeling was to identify if any of the alternatives “crash” the population or cause extremely low population numbers or growth rates. Population modeling does not indicate that a crash is likely to occur to the population under the Proposed Action or Alternatives. Minimum population levels and growth rates were found to be within reasonable levels, and adverse impacts to the population are not likely. It is expected that

implementation of the Proposed Action or Alternatives would not significantly impact the genetic viability or genetic health of the Antelope Hills/Cyclone Rim HMA. At this time, there is no evidence to indicate that the Antelope Hills/Cyclone Rim HMA suffers from reduced genetic fitness in any way.

Table 6 displays the basic differences between the Proposed Action and Alternatives I, II, III, and IV identified through population modeling. This table shows the average population size for the median trial in 11 years and average growth rate for the median trial in 11 years, following a gather, under the different alternatives. Refer to Appendix 5, Population Modeling, for a complete summary of data and accompanying tables obtained from the Population Modeling.

**Table 6. Population Modeling: Average Population and Growth Rates**

<b>Alternative</b>	<b>Average Population Size</b>	<b>Average Growth Rate - %</b>
<b>Proposed Action</b> (Lower Limit of the management range with fertility control)	70	-0.2%
<b>Alternative I</b> (Lower Limit of the management range without fertility control)	96	6.1%
<b>Alternative II</b> (Midpoint of the management range with fertility control)	75	0.2%
<b>Alternative III</b> (Midpoint of the management range without fertility control)	110	6.8%
<b>Alternative IV – No Action</b>	316	6.5%

### **Proposed Action**

Direct impacts associated with the proposed action include potential changes to herd demographics and stress associated with gathering, and the effects from implementing an immunocontraceptive fertility control research project. The effect on herd demographics was discussed in the Selective Removal Criteria section and the stress associated with gathering would be the same as those discussed under Gather Operations.

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 can easily 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 will 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. The PZP vaccine has proven 90% effectiveness for up to two years if mares are inoculated during the winter months. Inoculated mares would foal normally in 2005, and the contraceptive would limit foal production in 2006 and 2007. Near normal foaling rates would be expected to resume in 2008.

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.

Population wide indirect impacts would not appear immediately as a tangible effect and are more difficult to quantify. Impacts involve reductions in short term fecundity of initially a large percentage of mares in a population, increasing herd health as AML is achieved, and potential genetic issues regarding controlling contributions of mares to the gene pool, especially in small populations. The implementation of fertility control would result in an opportunity to allow increased fitness and condition of the mares released following the gather. The potential reprieve from foaling would greatly increase the overall health and fitness of mares.

Direct impacts associated with the proposed action 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 would be the same as those discussed under Gather Operations.

Population modeling found that the average population size for the proposed action was less than all of the Alternatives (removals and fertility control is more effective).

The use of fertility control is not expected to have any long term significant impacts (direct or indirect) to the Antelope Hills/Cyclone Rim HMA genetic health, long term viability or future reproductive success of mares within the herd. Implementation of fertility control is expected to improve the health of the mares within the HMA, and improved health of the foals born to those mares in the future. Improved condition of the mares and foals would aid in the long-term health and viability of the Antelope Hills/Cyclone Rim HMA wild horse population. Reduced growth rates that would occur with the implementation of fertility control would influence herd size at any one point in time, reducing competition for resources and utilization levels of those resources. Reduced growth rates would increase the interval between gathers, having overall beneficial impacts to the entire wild horse population, wildlife, and domestic livestock, while contributing to the achievement and maintenance of a thriving natural ecological balance.

Implementation of the proposed action would prevent the population from increasing beyond the upper limit of the management range (82) until the sixth year, 2010. Gathering to the lower limit of the management range (60 head) would allow the wild horse population to increase over time to the upper limit of the management range (82 head). When this level is exceeded, a gather would be scheduled. Because the HMA would be gathered again when the upper limit of the management range is exceeded, resource degradation associated with wild horses would be minimized. More forage would be available to wild horses during drought or extreme winters than would be under Alternatives that gather to the mid point of the management range. 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, the Lander Resource Management Plan.

## **Alternative I**

### **Removal to the Lower Limit of the AML without Fertility Control**

Direct impacts associated with the proposed action 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 would be the same as those discussed under Gather Operations.

Population modeling found that Alternative I resulted in the second highest average population size.

Gathering to the lower limit of the management range (60 head) would allow the wild horse population to increase over time to the upper limit of the management range (82 head). When this level is exceeded, a gather would be scheduled. Because the HMA would be gathered again when the upper limit of the management range is exceeded, resource degradation associated with wild horses would be minimized. More forage would be available to wild horses during drought or extreme winters than would be under Alternatives that gather to the mid point of the management range. 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, the Lander Resource Management Plan.

## **Alternative II**

### **Removal to the Middle Limit of the AML with Fertility Control**

Direct impacts associated with Alternative II include potential changes to herd demographics, stress associated with gathering, and the effects from implementing an immunocontraceptive fertility control research project. The effect on herd demographics was discussed in the Selective Removal Criteria section. The stress associated with gathering would be the same as those discussed under Gather Operations and the impacts associated

with implementing an immunocontraceptive fertility control research project were discussed in Alternative I

Alternative II reflects the second lowest average growth rate. Gathers and fertility control are more effective in controlling long term growth rates of the population.

Alternative II involves gathering only to the mid point of the management range (72 head) and the upper limit of the management range will not be exceeded until 2009. Inoculated mares would foal normally in 2005, and the contraceptive would limit foal production in 2006 and 2007. Near normal foaling rates would be expected to resume in 2008. The population will increase only slightly each year (Alternative II to a lesser degree due to fertility control), until the next gather is scheduled in approximately four years. A thriving natural ecological balance would be maintained.

The outcome of Alternative II would ensure the Antelope Hills/Cyclone Rim HMA would be a successful self-sustaining population of healthy animals in balance with other uses and the productive capacity of the habitat

### **Alternative III**

#### **Removal to Middle Limit of the AML without Fertility Control**

Direct impacts associated with Alternative III 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 would be the same as those discussed under Gather Operations.

Alternative III has the second highest average population sizes in 11 years, and the second highest average growth rate as compared to the Proposed Action or Alternatives I, II, and IV.

Because Alternative III involves gathering only to the mid point of the management range (72 head), within one year, the upper limit of the management range will be exceeded and resource degradation will once again resume. The population will increase each year until the next gather is scheduled in approximately four years. A thriving natural ecological balance would not be maintained. Resource degradation would first be in the form of over utilization of the forage resources – both upland and riparian. Wild horses would also contribute to degradation of upland mule deer, pronghorn antelope, and sage-grouse forage species. Degradation to resources would increase as wild horse numbers increase. This degradation would be worsened during years affected by drought or other environmental extremes that cause additional stress to resources or shortages of resources to rangeland uses.

The outcome of Alternative III would not ensure the Antelope Hills/Cyclone Rim HMA would be a successful, self-sustaining population of healthy animals in balance with other uses and the productive capacity of the habitat. The herd would be at a higher risk of ill fitness and disease should elements of the habitat become limiting due to drought or winter

extremes.

### **Alternative IV – No Action**

The current population of 205 wild horses would continue to increase, and exceed the carrying capacity of the range. Though it may require many years for the population to reach catastrophic levels, by exceeding the upper limit of the management range, Alternative IV poses the greatest risk to the long-term health and viability of the Antelope Hills/Cyclone Rim 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 range resource. Over the course of time, the horse's health 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 loss of wild horses in the Antelope Hills/Cyclone Rim HMA 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 riparian resources, would have obvious impacts to the future of the Antelope Hills/Cyclone Rim HMA 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*". (emphasis added).



## **B. Cultural Resources**

Direct or indirect impacts to cultural resources are not anticipated to occur from implementation of the Proposed Action or Alternatives I, II or III. All gather sites and temporary holding facilities would be surveyed for cultural resources prior to construction. The LFO archeologist would review all proposed and previously used gather sites and temporary holding facility locations to determine if these have had a 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 impacts. The No Action Alternative would not adversely affect cultural resources in the short term. However, a substantial increase in the number of horses over time may adversely affect cultural resources by trampling.

## **C. Endangered, Threatened, Proposed, Candidate and BLM Wyoming Sensitive Species**

Direct impacts associated with the Proposed Action and Alternatives I, II, or III would consist primarily of disturbance by the low-flying helicopter. The Proposed Action or Alternatives I, II, or III, would not occur during the nesting season of listed and most sensitive birds. Impacts would be temporary, with a short duration, and minimal. Temporary gather site(s) and temporary holding facilities will be located appropriate distances from key sage grouse habitat, to avoid adverse impacts to habitat, in conformance with the Draft Management Guidelines for Sage Grouse and Sagebrush Ecosystems in Wyoming (2001). No bald eagle nests are known to occur with the Antelope Hills/Cyclone Rim HMA.

The use of saddle horses and helicopters for round-up practices would not impact either prairie dogs or black-footed ferrets. Riders would avoid prairie dog towns to avoid injury to their horses, themselves and to the wild horses. The presence of prairie dog towns at a potential trap site would make that site unsuitable for a trap location and a different site would be chosen. No habitat conversions, prairie dog control measures or water developments are being authorized by this action. Wild horse gathering would have no effect on black-footed ferrets or their habitat.

Wild horse gathering would have no effect on endangered, threatened or candidate species in the Platte River Basin. No water depletions or developments are being authorized by this action.

Blowout penstemon and Utes ladies tresses would not be impacted by wild horse gathers. No gathering facilities would be located in sand dunes or riparian areas. Surveys for T&E and sensitive species would be done at proposed capture facilities before these locations are approved. No populations of blowout penstemon or Utes ladies tresses are known to occur in the Lander Field Office.

Appendix 4 shows the mitigation that has been built into the project, which results in no

adverse impacts to any of the sensitive species from gathering excess or stray horses. No capture facilities would be located in or near riparian areas. No habitat conversions are expected to occur.

Indirect impacts would be related to wild horse population size. Reduction of the current wild horse population provides the opportunity for vegetative communities to progress toward achieving a thriving natural ecological balance. On an overall basis, implementation of the Proposed Action or Alternatives I, II, or III would result in a positive impact to special status species by creating a diverse vegetative structure through improvement and maintenance of healthy populations of native perennial plants. Implementation of the Proposed Action would provide the greatest opportunity for the improvement of vegetative communities. The opportunity for improvement decreases for each successive alternative. Implementation of Alternative IV (No Action) would allow impacts to vegetative communities to increase each year that a gather is postponed, which would be a potential negative impact to special status species.

#### **D. Wetlands and Riparian Zones**

The proposed action or alternatives would not directly impact wetlands, riparian zones or water quality within the project area, with the exception of some wild horses crossing streams or springs as they are herded to temporary gather sites. This impact would be temporary and relatively short term in nature. Gather sites and temporary holding facilities would not be constructed on wetlands or riparian zones.

Indirect impacts would be related to population size. The maintenance of wild horse populations within AML would benefit the limited riparian areas. Competition for water, space and forage between grazing animals is often intense in riparian areas. Population modeling completed for the Proposed Action and Alternatives found that the average median population size generally increased from the Proposed Action (3rd lowest number) thru Alternative IV (highest number). Reduction of the population from current levels would decrease competition for available water sources, which should lead to a reduction in hoof action around unimproved springs, improvement in stream bank stability, and improved riparian habitat condition. Implementation of the Proposed Action would provide the opportunity for the improvement of riparian habitats and water quality. The opportunity for improvement decreases for each successive alternative. Implementation of Alternative IV (No Action) would allow impacts to riparian habitats and water quality to increase each year that a gather is postponed.

#### **E. Wildlife**

Direct impacts associated with the Proposed Action and Alternatives I, II, or III would consist primarily of disturbance to wildlife by the low-flying helicopter. Typically, the natural survival instinct to this type of disturbance results in fleeing from the perceived danger. Some mammals, reptiles, and birds may be temporarily displaced by the construction and use of the temporary gather site(s) and holding facilities. These impacts

would be temporary, with a short duration, and minimal. A slight possibility exists that non-mobile or site-specific animals would be trampled.

Indirect impacts would be related to population size. Population modeling completed for the Proposed Action and Alternatives found that the average median population size in 11 years progressively increased from the Proposed Action (lowest number) thru Alternative IV, No Action (highest number). A reduction in the number of wild horses from current levels would decrease competition for available cover, space, forage, and water sources, which should lead to a reduction in utilization levels and a reduction in hoof action around unimproved springs, improvement in stream bank stability, and improved riparian habitat condition. Reduced utilization levels should allow for increased plant vigor, seed production, and seedling establishment thereby improving the ecological health of the habitat. Implementation of the Proposed Action would provide the opportunity for the greatest improvement of habitat, and reduced competition for cover, space, forage, and water, which would positively affect wildlife. The opportunity for habitat improvement and reduced competition for cover, space, forage and water decreases for each successive alternative. Implementation of Alternative IV (No Action) would allow impacts to habitat and, competition for cover, space, forage, and water to increase each year that a gather is postponed, which would negatively impact wildlife.

The removal of wild horses would have minor short term impacts to wildlife in general, and the relationship a particular species has with wild horses and their shared habitats would determine whether the impacts were negative or positive. Fewer wild horses would mean less competition with some species for food, water and space, at least until the wild horse population again exceeds the AML. Wild horses would be gathered in late summer when big game young-of-the-year would be old enough to withstand and escape any pressures put on them by round-up activities.

Neotropical birds could be impacted either positively or negatively by the removal of wild horses. Some species, like mountain plover, prefer a short grass habitat for nesting that might be produced by heavy grazing of an area. Others, like greater sage-grouse, require forbs and other herbaceous/woody cover for nesting, brood rearing, foraging and wintering needs, and do not compete well with heavy use by wild horses and other grazer/browsers. Ground nesters, like ferruginous hawks, sage-grouse and mountain plover, also risk having nests, eggs and young trampled by large hooved feet. The gathering of wild horses would take place in late summer after most species have fledged to minimize the impacts of the gather itself.

## **F. Vegetation and Soils**

Direct impacts associated with the Proposed Action and Alternatives I, II, or III, would consist of disturbance to vegetation and soils immediately in and around the temporary gather site(s) and holding facilities. Impacts would be created by vehicle traffic; hoof action as a result of concentrating horses, and could be locally severe in the immediate vicinity of

the gather site(s) and holding facilities. Generally, these sites would be small (less than one half acre) in size. Any impacts would remain site specific and isolated in nature. In addition, most gather sites and holding facilities would be selected to enable easy access by transportation vehicles and logistical support equipment. Normally, they are located near or on roads, pullouts, water haul sites or other flat areas, which have been previously disturbed. These common practices would minimize the cumulative effects of these impacts.

Indirect impacts would differ among the alternatives. Implementation of the Proposed Action or Alternatives I, II, or III would reduce the current wild horse population and provide the opportunity for the vegetative communities to improve. Reduced concentrations of wild horses would contribute to the recovery of the vegetative resource. Utilization levels by wild horses would be reduced, which would result in improved forage availability, vegetation density, increased plant vigor, seed production, seedling establishment, and forage production over current conditions. Population modeling (Appendix 5) completed for the Proposed Action and Alternative I (lower limit of the management range, with and without fertility control) found that the average median population size in 11 years is predicted to be 96 and 70 wild horses, respectively. This indicates that the population of wild horses would not exceed their carrying capacity until the fourth year (2008) following the proposed gather. The greatest opportunity for a positive impact to vegetation and soils would be provided by implementing the Proposed Action or Alternative I and Alternative III.

Population modeling completed for Alternative II and Alternative IV found that the average median population size in 11 years is predicted to be 110 and 316 wild horses, respectively. Implementation of either of these two alternatives would initially provide the opportunity for the vegetative communities to progress toward achieving a thriving natural ecological balance. However, wild horses would exceed their carrying capacity very shortly after the proposed gather. Implementation of Alternative III (midpoint of the management range, with fertility control) would provide a greater opportunity for a positive impact to vegetation and soils than Alternative II (midpoint of the management range, without fertility control) because fertility control would limit the number of foals produced in 2004 and 2005. There may be progress toward a thriving natural ecological balance but it would occur much slower than under the Proposed Action or Alternative I.

Implementation of Alternative IV (No Action) would allow impacts to vegetation and soils to increase each year that a gather is postponed, having a negative affect on vegetation and soils. Utilization levels would continue to be in excess of objectives, and progression toward achieving a thriving natural ecological balance would not be possible.

Direct impacts associated with the Proposed Action and Alternatives I, II, or III include potential importation or transportation of new non-native species (noxious weeds), spread of existing noxious weed seeds and plant parts to new areas in the HMA, and increases in the size of existing noxious weed infestations. These impacts would potentially occur if contractor vehicles are carrying noxious weed seeds and plant parts when they arrive on site, or drive through existing infestations and spread seed into previously weed free areas, or if their livestock had been fed contaminated hay before arriving on site and the seeds pass

through their digestive system. Feeding contaminated hay to gathered wild horses, which are released before the seeds pass through their digestive system, could also spread noxious weeds. The contractor together with the on site BLM representative would examine vehicles and hay for noxious weed seeds or plant parts, prior to initiating the gather. If noxious weed seeds or plant parts are found in hay or on vehicles, the hay would be removed from the area and the vehicles cleaned. Proposed trap sites and holding sites would be examined for the presence of noxious weeds prior to construction. If noxious weeds were found, the location of the facilities would be moved to a suitable noxious weed free location.

Potential indirect impacts would be related to population size. The average population size for the median trial as projected by the population model shows that the Proposed Action results in the lowest number of wild horses in 11 years. The model also shows that the projected population size in 11 years is increasingly higher for Alternatives, II thru IV. The action that results in the lowest population size would have the lowest potential for increasing the incidence of noxious weeds, while the largest population size would have the highest potential for increasing the incidence of noxious weeds. The potential increase in noxious weeds would be from increasing utilization levels and ground disturbance, from the Proposed Action thru Alternative IV. Noxious weeds can increase with overuse of the range by grazing animals, or surface disturbance. Maintenance of healthy populations of native perennial plant species minimizes the establishment of invasive, non-native weeds.

#### **IV. Cumulative Impacts**

Cumulative impacts are impacts on the environment, which 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 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 Antelope Hills/Cyclone Rim HMA. Please refer to the Antelope Hills/Cyclone Rim HMA Map (Appendix 2) which displays the HMA boundary. Past, proposed and reasonably foreseeable actions that may have similar effects to the Antelope Hills/Cyclone Rim HMA 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 4-5 year gather cycle. Over time, as wild horse population levels are maintained in 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 I, II, or III, 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 (Alternatives I – IV).

Adverse cumulative impacts on natural resources would occur depending on which alternative is

selected (Alternative I, II, III or IV). In general, adverse cumulative impacts increase for each successive alternative, from Alternative I through Alternative IV, 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 IV, 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 I, II, or III, would not cause a major affect to the environment. Alternative IV, 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. There would be minor adverse cumulative impacts from implementing Alternatives I, II, or 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 IV, No Action.

## **V. 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 Antelope Hills/Cyclone Rim HMA.

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. This meeting was held on July 8, 2004 in Lander, Wyoming. No negative comments were made regarding the use of helicopters in rounding up wild horses.

Extensive public scoping was conducted prior to and during the preparation of the Evaluation of

Wild Horse Herd Areas, Green Mountain Grazing EIS, Rawlins RMP and the Lander RMP, which established the current decisions regarding the management of this HMA. Several public meetings were held in the Lander area. Numerous comments were received regarding this HMA, and were incorporated in the Evaluation, RMPs and EIS.

**VI. List of Preparers**

Roy C. Packer	-	Team Leader, Rangeland Management Specialist
Connie Breckenridge	-	Wildlife Biologist
Greg Bautz	-	Soil Scientist
Carol Ann Murray	-	Archaeologist
Rubel Vigil	-	Assistant Field Manager, Lander
Jack Kelly	-	Lander Field Manager
Alan Shepherd	-	Wild Horse Specialist, State Office

**Distribution**

This environmental assessment will be available at the Wyoming BLM website. A letter will be sent to all wild horse interest groups on the Lander Field Office mailing list, livestock interest groups, individual livestock owners who operate in or near the HMA, the Wyoming Game and Fish Department, wildlife interest groups, any identified interested publics, the State of Wyoming, and individuals with notification that the environmental assessment is available online. Those requesting a copy of the document will be sent a copy. Additional copies are available at the Bureau of Land Management, Lander Field Office, P.O. Box 589, 1335 Main Street, Lander, Wyoming 82520.

## **VII. References Cited:**

BLM. Wyoming State Office, (2001) Draft Management Guidelines for Sage-grouse and Sagebrush Ecosystems in Wyoming. 39pp.

Coates-Markle, L (2000) Summary Recommendations, BLM Wild Horse and Burro Population Viability Forum April 1999, Ft. Collins, CO. Resource Notes 35: 4 pp.

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## **APPENDIX 1**

### **WILD HORSE GATHERING PLAN 2004 FOR THE ANTELOPE HILLS/CYCLONE RIM/CYCLONE RIM HMA LANDER FIELD OFFICE**

#### **Introduction**

The purpose of this plan is to outline the methods and approaches for gathering and removing approximately 145 wild horses from private, state and BLM administered public lands in the Lander Field Office area. These wild horses would be gathered from the Antelope Hills/Cyclone Rim/ Wild Horse Herd Management Area (HMA) and the surrounding area.

#### **BLM Commitments**

- Prior to gathering, cultural resource clearances will be conducted on all wild horse trap sites. A BLM archaeologist will be notified if any cultural resources are discovered during gathering operations or if new trap sites are selected. Appropriate action will be determined at that time.
- Trap sites will be surveyed and cleared for threatened, endangered, candidate, and sensitive plant and animal species prior to construction.
- Existing roads and trails will be used.
- Trap sites will not be constructed in riparian or wetland areas.
- Operations will not be conducted when it is so wet that resource damage would occur. If resource damage occurs during gathering operations, it will be reclaimed in accordance with BLM reclamation standards and procedures.
- If needed, only certified weed-seed-free hay will be used during gathering operations.
- Blood or hair samples will be collected for genetic marker analysis or testing for diseases common to horses. As resources allow, horses will be sampled. This data will be compared over time and provide background information concerning the genetic viability of the herd. The following information will be collected from each animal captured: age, sex, color, overall health, pregnancy or nursing status.

#### **Gathering Areas**

The Antelope Hills/Cyclone Rim covers approximately 117,000 acres of public, state and private lands.

## **Capture Methods**

Helicopter drive trapping will be the primary capture method. Throughout the years this has proven to be a safe, effective, and humane method of gathering wild horses. This technique has been in use in Wyoming since June of 1977. Prada or Judas horses will also be employed where determined desirable by the head wrangler. Use of helicopters is in conformance with Section 9 of Public Law 92-195, which states,

“...the Secretary may use or contract for the use of helicopters or, for the purpose of transporting captured animals, motor vehicles... such use shall be undertaken only after a public hearing...”

A public hearing for the use of helicopters during gathering operations for 2004 was held on July 8, 2004 in Lander, Wyoming.

All horses located outside of the HMA will be gathered and removed before gathering operations begin within the HMA. All areas outside the HMA are considered total removal areas.

It has been the policy of the BLM since 1992 not to remove horses from the public lands for which no adoption demand exists. Horses captured for which no adoption demand exists have historically been returned to the HMA where they were captured. That policy is being temporarily modified in order to facilitate the BLM goal of reaching AML in all HMAs by 2005.

During this action, horses will be removed regardless of age. Horses aged five and under will be placed in the adoption program. Horses six and older will be placed in one of the BLM maintained sanctuaries. A number of special placement options will be available to BLM managers once horses have been removed from the range. These include halter training and saddle training programs.

Gathering operations would start around the middle of October, 2004, requiring approximately one week for completion. In the event that weather or other factors prevent a gather at this time, the operation would be conducted as scheduling permitted later in the fall or early winter of 2004. If some unforeseen factors prevent a gather in the fall of 2004, the operation would be conducted at about the same time in 2005 or 2006.

## **BLM vs Contract**

The wild horses will be gathered by a BLM crew, a contract crew, or a combination of the two. Techniques and methods are essentially the same. Two contractors could potentially be used in Wyoming for gathering of wild horses. Normally, a contract crew is composed of a lead wrangler, up to six wranglers, a supervisor, and a helicopter pilot and fuel truck driver.

## **Herding and Stress Reduction Procedures**

Wild horses will not be herded for distances greater than 10 miles. The Authorized Officer may reduce this distance after consideration of temperature, topography, soil conditions, horse condition, or other pertinent factors. When trap locations are selected, they will be placed in as close proximity to the horses as is practical. For this reason, it is imperative that actual trap site locations remain flexible to accommodate horse distribution. Horses will be allowed to choose their own rate of travel, and the helicopter pilot will stay well away from the animals while maintaining visual contact. As the trap is approached, pressure from the helicopter will increase. Concurrent with this action, wranglers will follow the horses and encourage them into the trap and close the gate. Several herding runs may be made in a day.

A visual barrier of plastic snow fence or jute mesh will be placed on all gates and pens. This helps reduce the possibility of injury, and the visual barrier tends to settle the horses down in the pens. When horses are sorted in the field, the field sorting/holding facility may be one of the traps. The horses will be sorted by sex and age. If the horses can not be sorted in the field, they will be transported to a holding/preparation facility for sorting. Foals under 6 weeks old will be sorted and hauled separately, then reunited with their mothers at the holding facility. When herding bands containing small foals, extra care will be exercised and operations monitored. At any time a mare and foal start to fall behind the band, the mare and foal will be dropped. If the mare refuses to leave the band to stay with her foal, then the band will be left. If a foal becomes separated from the mother, every effort will be made to assure either capture or otherwise rejoining of the mare and foal.

## **Roping**

The primary method for gathering wild horses in Wyoming is helicopter drive trapping. Roping may be used occasionally as a supplemental gathering technique under certain circumstances such as when a mare is captured but the foal is left behind, when a young horse refuses to enter the trap, or when there are escaped horses in an area of total removal (outside the HMA). In cases where more than occasional roping is anticipated, permission must be obtained from the Authorized officer.

## **Trap Sites**

Established trap sites will normally be used. New trap sites will be established as deemed appropriate and surveyed for cultural and other values. Traps will not be constructed when soils are so saturated that resource damage would occur. In the event that resource damage does occur, the area will be reclaimed. Vehicle traffic would be restricted to existing roads and trails. Wild horse trap locations which may be used depending upon the location of the horses at the time of the removal include the Horse track ridge, and Cyclone rim trap sites. Other trap sites may be used, if necessary.

## **Trap Construction**

Traps will be constructed using 6-foot steel panels in 10 to 12 foot lengths. 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:

Traps and holding facilities shall be constructed of portable panels, the top of which shall not be less than 72 inches high, 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.

All loading chute sides shall be fully covered with plywood (without holes) or like material. The loading chute shall also be a minimum of 6 feet high.

All runways shall be of sufficient length and height to ensure animal and wrangler safety, and may be covered with plywood, burlap, plastic snow fence or like material a minimum of 1 foot to 6 feet for horses. Main catch/holding pens (usually three) are also constructed. A small pen, separate from the main holding pens, would be constructed to hold the small foals or any other animal that requires special handling. Variation in trap design may be necessary based on site specific requirements. Sliding wooden gates will be used in the loading alley to prevent injury and a portable loading chute will be used to load horses onto the trucks. To load trailers, panels will be attached to the existing loading alley.

Handling at the trap site is carefully monitored to insure that aggression and injury are kept to a minimum. The decision on when and how to load is determined by the behavior of the captured animals. Individuals or bands may be separated, if necessary. The long years of experience in trap construction have resulted in the use of materials and methods which minimize the horses' exposure to injury. When members of the public view the gather operation, they are required to occupy specific areas and conduct themselves so as to avoid additional stress to captured horses.

### **Fences Or Other Hazards To Wild Horses**

Although fences are not a major problem, they may be encountered during gathering operations. The pilot will be briefed and provided a map, in accordance with the aviation safety plan, showing all fences or other hazards that could pose problems. If it should become necessary to move horses through fences to a trap, at least 30 feet of fence ( or fence gate, if available) will be laid back and jute, black plastic, or other material that provides a visual barrier will be placed on each side where the wire is laid back. A small wing of jute will be place out from the fence as is necessary to guide the horses through the fence.

### **Sorting/Holding Facility**

The Herd Area holding/sorting facility will act as the final destination for this gather effort. Animals will be sorted at the holding/sorting facility and excess animals will be moved to the BLM Rock Springs Corrals. Horses will be sorted by age and sex. Feed and water will be provided for all horses while in the sorting/holding facility. Horses may be transported to other approved facilities for sorting and temporary holding, if the need arises. Horses selected for

adoption will be transported to the BLM Rock Springs Corrals where they will be prepared for adoption. This will be done as soon as possible after capture.

### **BLM Personnel**

There will be one wrangler foreman and up to five wranglers, as a general rule. The wranglers will also serve as truck drivers for BLM equipment. Contract trucks and drivers will be hired if necessary. There will also be a contract helicopter pilot, a fuel truck driver, and a BLM helicopter manager. Usually a public contact representative is on site to help in handling the public. The Lander field office Wild Horse Specialist will usually be on site to help coordinate the gathers. Operations can be conducted seven days a week, weather permitting. Additional personnel may be needed to sort, water, feed and care for the horses, or to provide security.

### **Equipment**

A semi-tractor and straight deck stock trailer with a capacity of 30 to 33 horses will be used. A stock truck, with a maximum load of 14 head, can also be used. A one-ton flatbed truck and two compartment 28 foot horse trailer can haul for saddle horses and up to six separated wild horses. Other equipment may be used as needed. All equipment will be inspected prior to use and will be in good condition. Floors of vehicles, trailers, and the loading chute shall be covered and maintained with materials sufficient to prevent the animals from slipping.

### **Transportation**

Straight deck stock trailers, stock trucks, and horse trailers will be used to transport the horses from the trap sites to the Riverton Honor Farm or the BLM Rock Springs corrals to be prepared for adoption. Contract trucks/trailers that are routinely used to haul wild horses may be used. All trailers and stock trucks will be loaded loose enough to insure that if a horse should fall it will have enough room to regain its footing. Floors of vehicles, trailers, and the loading chute shall be covered and maintained with materials sufficient to prevent the animals from slipping. In order to minimize stress, captured animals are loaded and transported within a short time of capture. Captured animals are not ordinarily held over night at the trap site. Captured animals may be hauled to temporary holding and then excess animals would be hauled to the BLM Rock Springs corrals. The transport vehicles are continuously inspected for safety and adequacy and provide for separation in groups of twelve or less. When warranted, colts may be separated and transported separately.

### **Humane Destruction And Disposal**

Wild Horses requiring destruction, as determined by the Authorized Officer, will be destroyed and disposed of in accordance with Instruction Memorandum 98-141. Humane destruction of wild horses is provided for in the Wild and Free Roaming Horse and Burro Act, amended, Section 3(b) 2(A), 43 CFR 4730.1, and BLM manual 4730 (Destruction of Wild Horses and Burros and Disposal of their Remains). Any captured horses that are found to have the following conditions may be humanely destroyed:

- a. The animal shows a hopeless prognosis for life.
- b. Suffers from a chronic disease.
- c. Requires continuous care for acute pain and suffering.
- d. Not capable of maintaining a body condition rating of one or two.
- e. The animal is a danger to itself or others.

The Authorized Officer will determine if injured animals must be destroyed and provide for destruction of such animals. The contractor/BLM may be required to dispose of the carcasses as directed by the Authorized Officer.

The carcasses of the animals that die or must be destroyed as a result of any infectious, contagious, or parasitic disease will be disposed of by burial to a depth of at least 3 feet.

The carcasses of the animals that must be destroyed as a result of age, injury, lameness, or non-contagious disease or illness will be disposed of by removing them from the capture site or holding corral and placing them in an inconspicuous location to minimize visual impacts. Carcasses will not be placed in drainages regardless of drainage size or downstream destination.

### **Branded And Claimed Horses**

Branded and/or claimed horses will be transported to the preparation/holding facility. Ownership will be determined under the estray laws of the State of Wyoming by a Wyoming Brand Inspector. Collection of gather fees and any appropriate trespass charges will be collected at the time of change of possession.

### **Veterinarian Services**

A veterinarian will not normally be at the trap sites or field sorting facilities. Several veterinarians are available in Lander and Riverton, and will be on call should the need arise. Under the terms of the current Memorandum of Understanding with the United States Department of Agriculture, a USDA veterinarian may also be used. A veterinarian inspects the horses that are transported to the preparation facility for sorting or adoption within 24 hours of arrival. Should the need for a veterinarian arise before this time, they are locally available and will be called to assist or provide advice.

### **Public Interest**

There may be viewing and photographing opportunities at one or more of the trap sites. The Wild Horse Specialist, or other BLM employees, will assist in the control of these groups to insure that they do not add unnecessary stress to the horses or interfere with the gathering operations. Other requests will be considered as they are received. All media and other visitors will be expected to comply with the directions of a BLM employee assigned to this task.

### **Safety**

Safety of BLM employees, contractors, members of the public, and the wild horses will be given primary consideration. The following safety measures will be used by the Authorized Officer and all others involved in the operation as the basis for evaluating safety performance and for safety discussions during the daily briefings:

A briefing between all parties involved in the gather will be conducted each morning.

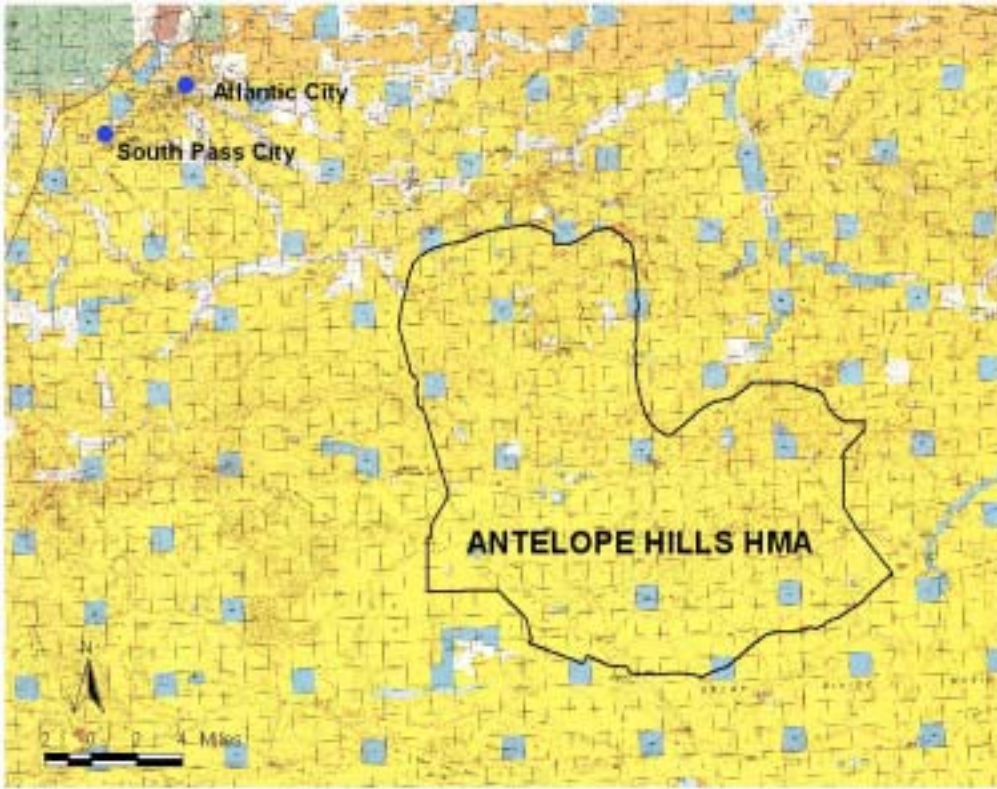
All BLM personnel, contractors and volunteers will wear protective clothing suitable for work of this nature. BLM will alert observers of the requirement to dress properly. BLM will assure that members of the public are in safe observation areas. All employees involved in the gathering operations will keep the best interests of the animals at the forefront at all times.

### **13. Responsibility and Lines of Communication**

If a contract gather crew is utilized, the Contracting Officer's Representative and Project Inspectors from the Lander Field Office, have the direct responsibility to ensure the contractor's compliance with the contract stipulations. The Lander Wild Horse Specialist also has the direct responsibility to ensure that the BLM gather crew conducts the gather in compliance with EA # WY050-EA4-060 and this gather plan.

The Lander Field Manager will take an active role to ensure the appropriate lines of communication are established between the Field Office, State Office, and Rock Springs Corral offices.

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



**APPENDIX 2**



## APPENDIX 3

# **Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the Bureau of Land Management in the State of Wyoming**

The Wyoming State Director approved the following Standard and Guidelines August 12, 1997

### **Introduction**

According to the Department of the Interior's final rule for grazing administration, effective August 21, 1995, the Wyoming Bureau of Land Management (BLM) State Director is responsible for the development of standards for healthy rangelands and guidelines for livestock grazing management on 18 million acres of Wyoming's public rangelands. The development and application of these standards and guidelines are to achieve the four fundamentals of rangeland health outlined in the grazing regulations (43 CFR 4180.1). Those four fundamentals are: (1) watersheds are functioning properly; (2) water, nutrients, and energy are cycling properly; (3) water quality meets State standards; and (4) habitat for special status species is protected.

Standards address the health, productivity, and sustainability of the BLM administered public rangelands and represent the minimum acceptable conditions for the public rangelands. The standards apply to all resource uses on public lands. Their application will be determined as use-specific guidelines are developed. Standards are synonymous with goals and are observed on a landscape scale. They describe healthy rangelands rather than important rangeland by-products. The achievement of a standard is determined by measuring appropriate indicators. An indicator is a component of a system whose characteristics (e.g., presence, absence, quantity, and distribution) can be measured based on sound scientific principles.

Guidelines provide for, and guide the development and implementation of, reasonable, responsible, and cost-effective management practices at the grazing allotment and watershed level. The guidelines in this document apply specifically to livestock grazing management practices on the BLM administered public lands. These management practices will either maintain existing desirable conditions or move rangelands toward statewide standards within

reasonable timeframes. Appropriate guidelines will ensure that the resultant management practices reflect the potential for the watershed, consider other uses and natural influences, and balance resource goals with social, cultural/historic, and economic opportunities to sustain viable local communities. Guidelines, like standards, apply statewide.

Quantifiable resource objectives and specific management practices to achieve the standards will be developed at the BLM Field Office level and will consider all reasonable and practical options available to achieve desired results on a watershed or grazing allotment scale. The objectives shall be reflected in site-specific activity or implementation plans as well as in livestock grazing permits/leases for the public lands. Interdisciplinary activity or implementation plans will be used to maintain or achieve the Wyoming standards for healthy rangelands. These plans may be developed formally or informally through mechanisms available and suited to local needs (such as Coordinated Resource Management [CRM] efforts).

The development and implementation of standards and guidelines will enable on-the-ground management of the public rangelands to maintain a clear and responsible focus on both the health of the land and its dependent natural and human communities. This development and implementation will ensure that any mechanisms currently being employed or that may be developed in the future will maintain a consistent focus on these essential concerns.

These standards and guidelines are compatible with BLM's three-tiered land use planning process. The first tier includes the laws, regulations, and policies governing BLM's administration and management of the public lands and their uses. The previously mentioned fundamentals of rangeland health specified in 43 CFR 4180.1, the requirement for BLM to develop these state (or regional) standards and guidelines, and the standards and guidelines themselves, are part of this first tier. Also part of this first tier is the specific requirements of various federal laws and the objectives of 43 CFR 4100.2 that require BLM to consider the social and economic well-being of the local communities in its management process.

These standards and guidelines will provide for statewide consistency and guidance in the preparation, amendment, and maintenance of BLM land use plans, which represent the second tier of the planning process. The BLM land use plans provide general allocation decisions concerning the kinds of resource and land uses that can occur on the BLM administered public lands, where they can occur, and the types of conditional requirements under which they can occur. In general, the standards will be the basis for development of planning area-specific management objectives concerning rangeland health and productivity, and the guidelines will direct development of livestock grazing management actions to help accomplish those objectives.

The third tier of the BLM planning process, activity or implementation planning, is directed by the applicable land use plan and, therefore, by the standards and guidelines. The standards and guidelines, as BLM statewide policy, will also directly guide development of the site-specific objectives and the methods and practices used to implement the land use plan decisions.

Activity or implementation plans contain objectives which describe the site-specific conditions desired. Grazing permits/leases for the public lands contain terms and conditions which describe specific actions required to attain or maintain the desired conditions. Through monitoring and

evaluation, the BLM, grazing permittees, and other interested parties determine if progress is being made to achieve activity plan objectives.

Wyoming rangelands support a variety of uses which are of significant economic importance to the state and its communities. These uses include oil and gas production, mining, recreation and tourism, fishing, hunting, wildlife viewing, and livestock grazing. Rangelands also provide amenities which contribute to the quality of life in Wyoming such as open spaces, solitude, and opportunities for personal renewal. Wyoming's rangelands should be managed with consideration of the state's historical, cultural, and social development and in a manner which contributes to a diverse, balanced, competitive, and resilient economy in order to provide opportunity for economic development. Healthy rangelands can best sustain these uses.

To varying degrees, BLM management of the public lands and resources plays a role in the social and economic well-being of Wyoming communities. The National Environmental Policy Act (part of the above-mentioned first planning tier) and various other laws and regulations mandate the BLM to analyze the socioeconomic impacts of actions occurring on public rangelands. These analyses occur during the environmental analysis process of land use planning (second planning tier), where resource allocations are made, and during the environmental analysis process of activity or implementation planning (third planning tier). In many situations, factors that affect the social and economic well-being of local communities extend far beyond the scope of BLM management or individual public land users' responsibilities. In addition, since standards relate primarily to physical and biological features of the landscape, it is very difficult to provide measurable socioeconomic indicators that relate to the health of rangelands. It is important that standards be realistic and within the control of the land manager and users to achieve.

Implementation of the Wyoming standards and guidelines will generally be done in the following manner. Grazing allotments or groups of allotments in a watershed will be reviewed based on the BLM's current allotment categorization and prioritization process. Allotments with existing management plans and high-priority allotments will be reviewed first. Lower priority allotments will then be reviewed as time allows. The permittees and interested publics will be notified when allotments are scheduled for review and encouraged to participate in the review. The review will first determine if an allotment meets each of the six standards. If it does, no further action will be necessary. If any of the standards aren't being met, rationale explaining the contributing factors will be prepared. If livestock grazing practices are found to be among the contributing factors, corrective actions consistent with the guidelines will be developed and implemented. If a lack of data prohibits the reviewers from determining if a standard is being met, a strategy will be developed to acquire the data in a timely manner.

### **Standard #1**

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

#### **This Means That:**

The hydrologic cycle will be supported by providing for water capture, storage, and sustained

release. Adequate energy flow and nutrient cycling through the system will be achieved as optimal plant growth occurs. Plant communities are highly varied within Wyoming.

**Indicators May Include But Are Not Limited To:**

- Water infiltration rates
- Soil compaction
- Erosion (rills, gullies, pedestals, capping)
- Soil micro-organisms
- Vegetative cover (gully bottoms and slopes)
- Bare ground and litter

**Standard #2**

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

**This Means That:**

Wyoming has highly varied riparian and wetland systems on public lands. These systems vary from large rivers to small streams and from springs to large wet meadows. These systems are in various stages of natural cycles and may also reflect other disturbance that is either localized or widespread throughout the watershed. Riparian vegetation captures sediments and associated materials, thus enhancing the nutrient cycle by capturing and utilizing nutrients that would otherwise move through a system unused.

**Indicators May Include But Are Not Limited To:**

- Erosion and deposition rate
- Channel morphology and floodplain function
- Channel succession and erosion cycle
- Vegetative cover
- Plant composition and diversity (species, age class, structure, successional stages, desired plant community, etc.)
- Bank stability
- Woody debris and instream cover

- Bare ground and litter

### **Standard #3**

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

#### **This Means That:**

In order to maintain desirable conditions and/or recover from disturbance within acceptable timeframes, plant communities must have the components present to support the nutrient cycle and adequate energy flow. Plants depend on nutrients in the soil and energy derived from sunlight. Nutrients stored in the soil are used over and over by plants, animals, and microorganisms. The amount of nutrients available and the speed with which they cycle among plants, animals, and the soil are fundamental components of rangeland health. The amount, timing, and distribution of energy captured through photosynthesis are fundamental to the function of rangeland ecosystems.

#### **Indicators May Include But Are Not Limited To:**

- Vegetative cover
- Plant composition and diversity (species, age class, structure, successional stages, desired plant community, etc.)
- Bare ground and litter
- Erosion (rills, gullies, pedestals, capping)
- Water infiltration rates

### **Standard #4**

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

#### **This Means That:**

The management of Wyoming rangelands will achieve or maintain adequate habitat conditions that support diverse plant and animal species. These may include listed threatened or endangered species (U.S. Fish and Wildlife-designated), species of special concern (BLM-designated), and other sensitive species (State of Wyoming- designated). The intent of this standard is to allow the listed species to recover and be delisted.

#### **Indicators May Include But Are Not Limited To:**

- Noxious weeds
- Species diversity
- Age class distribution

- All indicators associated with the upland and riparian standards
- Population trends
- Habitat fragmentation

## **Standard #5**

Water quality meets State standards.

### **This Means That:**

The State of Wyoming is authorized to administer the Clean Water Act. BLM management actions or use authorizations will comply with all Federal and State water quality laws, rules and regulations to address water quality issues that originate on public lands. Provisions for the establishment of water quality standards are included in the Clean Water Act, as amended, and the Wyoming Environmental Quality Act, as amended. Regulations are found in Part 40 of the Code of Federal Regulations and in Wyoming's Water Quality Rules and Regulations. The latter regulations contain Quality Standards for Wyoming Surface Waters.

Natural processes and human actions influence the chemical, physical, and biological characteristics of water. Water quality varies from place to place with the seasons, the climate, and the kind substrate through which water moves. Therefore, the assessment of water quality takes these factors into account.

### **Indicators May Include But Are Not Limited To:**

- Chemical characteristics (e.g., pH, conductivity, dissolved oxygen)
- Physical characteristics (e.g., sediment, temperature, color)
- Biological characteristics (e.g., macro- and micro-invertebrates, fecal coliform, and plant and animal species)

## **Standard #6**

Air quality meets State standards.

### **This Means That:**

The State of Wyoming is authorized to administer the Clean Air Act. BLM management actions or use authorizations will comply with all Federal and State air quality laws, rules, regulations and standards. Provisions for the establishment of air quality standards are included in the Clean Air Act, as amended, and the Wyoming Environmental Quality Act, as amended. Regulations are found in Part 40 of the Code of Federal Regulations and in Wyoming Air Quality Standards and Regulations.

### **Indicators May Include But Are Not Limited To:**

- Particulate matter
- Sulfur dioxide

- Photochemical oxidants (ozone)
- Volatile organic compounds (hydrocarbons)
- Nitrogen oxides
- Carbon monoxide
- Odors
- Visibility

**APPENDIX 4**

**BLM WYOMING STATE DIRECTOR'S SENSITIVE SPECIES LIST  
(ANIMALS AND PLANTS) FOR LANDER FIELD OFFICE**

Species Common Name	Scientific Name	Habitat	May be present in project (Y/N)	Rationale
<b>MAMMALS</b>				
Myotis, Long-eared	<i>Myotis evotis</i>	Conifer and deciduous forests, caves and mines	Y	No habitat conversions are expected to occur.
Bat, Spotted	<i>Euderma maculatum</i>	Cliffs over perennial water, basin-prairie shrub	Y	No habitat conversions are expected to occur.
Bat, Townsend's Big-eared	<i>Corynorhinus townsendii</i>	Forests, basin-prairie shrub, caves and mines	Y	No habitat conversions are expected to occur.
Prairie Dog, White-tailed	<i>Cynomys leucurus</i>	Basin-prairie shrub, grasslands	Y	No habitat conversions are expected to occur. Capture pens and herding will not take place in prairie dog towns.
Fox, Swift	<i>Vulpes velox</i>	Grasslands	Y	No habitat conversions are expected to occur.
Rabbit, Pygmy	<i>Brachylagus idahoensis</i>	Basin-prairie and riparian shrub	Y	No habitat conversions are expected to occur.
<b>BIRDS</b>				
Ibis, White-faced	<i>Plegadis chihi</i>	Marshes, wet meadows	Y	Roundups will not occur during nesting season.
Plover, Mountain	<i>Charadrius montanus</i>	Shortgrass prairie/sparse vegetation	Y	Roundups will not occur during nesting season.
Swan, Trumpeter	<i>Cygnus buccinator</i>	Lakes, ponds, rivers	Y	Roundups will not occur during nesting season.
Goshawk, Northern	<i>Accipiter gentilis</i>	Conifer and deciduous forests	Y	Roundups will not occur during nesting season.
Hawk, Ferruginous	<i>Buteo regalis</i>	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	<i>Falco peregrinus</i>	Tall cliffs	Y	Roundups will not occur during nesting season.
Sage-grouse, Greater	<i>Centrocercus urophasianus</i>	Basin-prairie shrub, mountain-foothill shrub	Y	Roundups will not occur during nesting season.
Curlew, Long-billed	<i>Numenius americanus</i>	Grasslands, plains, foothills, wet meadows	Y	Roundups will not occur during nesting season.
Cuckoo, Yellow-billed	<i>Coccyzus americanus</i>	Open woodlands, streamside willow and alder groves	Y	Roundups will not occur during nesting season.
Owl, Burrowing	<i>Athene cunicularia</i>	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	<i>Oreoscoptes montanus</i>	Basin-prairie shrub, mountain-foothill shrub	Y	Roundups will not occur during nesting season.



### Appendix 4 (Continued)

Shrike, Loggerhead	<i>Lanius ludovicianus</i>	Basin-prairie shrub, mountain-foothill shrub	Y	Roundups will not occur during nesting season.
Sparrow, Brewer's	<i>Spizella breweri</i>	Basin-prairie shrub	Y	Roundups will not occur during nesting season.
Sparrow, Sage	<i>Amphispiza billineata</i>	Basin-prairie shrub, mountain-foothill shrub	Y	Roundups will not occur during nesting season.
Sparrow, Baird's	<i>Ammodramus bairdii</i>	Grasslands, weedy fields	Y	Roundups will not occur during nesting season.
FISH				
Trout, Yellowstone Cutthroat	<i>Oncorhynchus clarki bouvieri</i>	Yellowstone drainage, small mountain streams and large rivers	N	No suitable habitat present.
REPTILES				
AMPHIBIANS				
Frog, Northern Leopard	<i>Rana pipiens</i>	Beaver ponds, permanent water in plains and foothills	Y	Capture pens will not be places in riparian areas.
Spadefoot, Great Basin	<i>Spea intermontana</i>	Spring seeps, permanent and temporary waters	Y	Capture pens will not be places in riparian areas.
Toad, Boreal (Northern Rocky Mountain population)	<i>Bufo boreas boreas</i>	Pond margins, wet meadows, riparian areas	Y	Capture pens will not be places in riparian areas.
Frog, Spotted	<i>Rana pretiosa (lutiventris)</i>	Ponds, sloughs, small streams	Y	Capture pens will not be places in riparian areas.
PLANTS				
Meadow Pussytoes	<i>Antennaria arcuata</i>	Moist, hummocky meadows, seeps or springs surrounded by sage/grasslands 4,950-7,900'	Y	Capture pens will not be places in riparian areas.
Porter's Sagebrush	<i>Artemisia porteri</i>	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.
Dubois Milkvetch	<i>Astragalus gilviflorus var. purpureus</i>	Barren shale, badlands, limestone, & redbed slopes & ridges 6,900-8,800'	N	No suitable habitat present.

**Appendix 4 (continued)**

Nelson's Milkvetch	<i>Astragalus nelsonianus</i> – or– <i>Astragalus pectinatus</i> var. <i>platyphyllus</i>	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.
Cedar Rim Thistle	<i>Cirsium aridum</i>	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.
Owl Creek Miner's Candle	<i>Cryptantha subcapitata</i>	Sandy-gravelly slopes & desert ridges on sandstones of the Winds River Formation 4,700-6,000'	N	No suitable habitat present.
Fremont Bladderpod	<i>Lesquerella fremontii</i>	Rocky limestone slopes & ridges 7,000-9,000'	Y	A survey for sensitive species will be conducted before locations for capture pens are approved.
Beaver Rim Phlox	<i>Phlox pungens</i>	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.
Rocky Mountain Twinpod	<i>Physaria saximontana</i> var. <i>saximontana</i>	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.
Persistent Sepal Yellowcress	<i>Rorippa calycina</i>	Riverbanks & shorelines, usually on sandy soils near high-H <sup>2</sup> O line	N	No suitable habitat present. Capture pens will not be places in riparian areas.
Shoshonea	<i>Shoshonea pulvinata</i>	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.
Barneby's Clover	<i>Trifolium barnebyi</i>	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.

## **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.

The following data was summarized from the information provided within the WinEquus program, 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 (Jenkins 1989). 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 districts, foals are counted as part of the appropriate management level (AML). Foals are not counted as part of the AML for the Antelope Hills/Cyclone Rim HMA

### **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 –Antelope Hills/Cyclone Rim/Cyclone Rim HMA**

To complete the population modeling for the Antelope Hills/Cyclone Rim/Cyclone Rim HMA, 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 2004 herd was developed from age structure data collected during the 2001 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	8	8
1	9	9
2	11	9
3	11	9
4	10	8
5	4	4
6	3	3
7	3	3
8	3	3
9	4	5
10-14	12	15
15-19	3	7
20+	0	2

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

Survival probabilities and foaling rates utilized in the population model for five alternatives analyzed, including the Proposed Action and No Action Alternatives, and are displayed in the following table:

**Survival Probabilities**

foal	0.830	0.804
1	0.931	0.902
2	0.931	0.902
3	0.931	0.902
4	0.930	0.901
5	0.929	0.901
6	0.929	0.900
7	0.927	0.899
8	0.925	0.897
9	0.923	0.895
10-14	0.907	0.879
15-19	0.816	0.791
20+	0.207	0.207

These are estimated survival probabilities for feral horses at Pryor Mountain, Montana for 1996-2000. The raw data were supplied by Linda Coates-Markle of the BLM. S. H. Jenkins who did the calculations assumed that male survival probabilities were about 97% of female survival probabilities, as they were at Pryor Mountain in 1976-1986.

**Foaling Rates**

Age Class	Foaling Rate
foal	0
1	0
2	0.085
3	0.500
4	0.524
5	0.714
6	0.739
7	0.739
8	0.593
9	0.739
10-14	0.742
15-19	0.400
20+	0.200

Prop Males 0.47

These are foaling rates for 1996-2000 for wild horses at Pryor Mountain, Montana, as reported by Linda Coates-Markle of the BLM. There were no data for 20+ year-old horses, so a foaling rate equal to half that for 15-19 year-olds was arbitrarily used.

The following is the sex ratio at birth was utilized in the population modeling for the Proposed Action and all Alternatives:

**Sex ratio at Birth:**

47% Males  
53% Females

The following percent effectiveness of fertility control was utilized in the population modeling for Alternatives I and II:

**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**

<i>Age</i>	<i>Percentages for Removals</i>	
	<b>Females</b>	<b>Males</b>
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 The Proposed Action and Alternative II:

**Contraception Criteria  
(Alternatives I & II)**

<b>Age</b>	<b>Percentages for Fertility Treatment</b>
Foal	100%
1	100%
2	100%
3	100%
4	100%
5	75%
6	75%
7	75%
8	75%
9	75%
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: 2004
- Initial gather year: 2004
- Gather interval: regular interval of three years
- Gather for fertility treatment regardless of population size: No
- Continue to gather after reduction to treat females: No
- Sex ratio at birth: 49% males
- Percent of the population that can be gathered: 90%
- Minimum age for long term holding facility horses: 10 years old
- Foals are not included in the AML
- Simulations were run for eleven years with 100 trials each

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

## Population Modeling Parameters

Modeling Parameter	Proposed Action (Remove to Lower Limit of Management Range & Fertility Control)	Alternative I (Remove to Lower Limit of Management Range & No Fertility Control)	Alternative II (Remove to Middle Limit of Management Range & Fertility Control)	Alternative III (Remove to Middle Limit of Management Range & No Fertility Control)	Alternative IV No Action (No Removal & No Fertility Control)
Management by removal and fertility control	Yes	No	Yes	No	N/A
Management by removal only	No	Yes	No	Yes	N/A
Threshold Population Size for Gathers	82	82	82	82	N/A
Target Population Size Following Gathers	60	60	71	71	N/A
Gather for fertility control regardless of population size	No	No	No	No	N/A
Gathers continue after removals to treat additional females	No	No	No	No	N/A
Effectiveness of Fertility Control: year 1	N/A	94%	94%	N/A	N/A
Effectiveness of Fertility Control: year 2	N/A	82%	84%	N/A	N/A
Effectiveness of Fertility Control: year 3	N/A	68%	68%	N/A	N/A

## Population Modeling Summary

To summarize the results obtained by simulating the range of alternatives for the Antelope Hills/Cyclone Rim HMA, the original questions can be addressed.

- Do any of the Alternatives “crash” the population?

None of the alternatives or the proposed action indicate that a crash is likely to occur to the population. Minimum population levels and growth rates are all within reasonable levels, and adverse impacts to the population are not likely.

- What effect does fertility control have on population growth rate?

As expected, the two alternatives implementing fertility control (Proposed Action and Alternative II) reflect the lowest overall median growth rate.

- What effect do the different alternatives have on the average population size?

The level to which the population is gathered (lower or middle limit of the AML) appears to be more of an influence to population size than fertility control. It is clear that fertility control with a gather to the lower limit of the AML would produce the lowest minimum

population, and no fertility control with a gather to the middle limit of the AML would produce the highest minimum population, for the four action alternatives. As expected, the No Action Alternative results in the highest minimum population.

- What effects do the different alternatives have on the genetic health of the herd?

The minimum population levels of all of the action alternatives fall below Dr. E. Gus Cothran's recommendation of "maintaining an average herd size of 100 adult horses" The Antelope Hills/Cyclone Rim HMA lies in close proximity and unfenced to four other HMA's with which genetic interchange maintains the genetic health of the HMA.