

**Little Owyhee Complex**  
**(Little Owyhee HMA & Snowstorm Mountains HMA)**  
**Wild Horse Gather Plan and Environmental Assessment**  
NV-020-04-22



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Winnemucca BLM Field Office

**TABLE OF CONTENTS**

**1.0 Purpose and Need For Action.....4**

1.1 Background Information.....4

1.2 Purpose of and Need for Action .....5

1.3 Conformance with Existing Land Use Plans.....5

1.4 Conformance with Rangeland Health Standards.....6

1.5 Relationship to Statutes, Regulations, Policies, Plans, or Other Environmental Analyses...6

**2.0 Alternatives.....6**

2.1 Actions in Common.....6

2.1.0 Management Range.....6

2.1.1 Selective Removal Criteria.....7

2.1.2 Gather Operations .....7

2.1.3 Data Collection.....8

1. Blood Samples.....8

2. Sex Ratio/Age Structure.....8

3. Reproduction and Survival.....8

4. Herd Characteristics .....8

5. Condition Class .....8

6. Other Data .....8

**2.2 Alternatives Considered in Detail**

2.2.1 Proposed Action.....8

2.2.2 Alternative I.....9

2.2.3 Alternative II.....9

2.2.4 Alternative III .....9

2.2.5 No Action Alternative .....10

**2.3 Alternatives Considered but Eliminated from Further Analysis .....10**

2.3.1 Fertility Control Only.....10

2.3.2 Natural Control.....10

**3.0 Affected Environment .....10**

3.0.1 Invasive, Non-Native Species.....11

3.0.2 Wilderness Study Areas.....11

3.0.3 Air and Water Quality .....11

3.0.4 Cultural Resources.....11

3.0.5 Wild Horses.....11

3.0.5.1 Gather History and Population Characteristics .....12

3.0.6 Soils and Vegetation.....13

3.0.7 Wildlife and Migratory Birds.....13

3.0.8 Threatened or Endangered Species .....14

3.0.9 Riparian Areas .....14

3.0.10 Native American Religious Concerns.....14

**4.1 Environmental Consequences.....14**

**4.2 Critical Elements.....14**

4.2.1 Invasive, Non-Native Species.....14

4.2.2 Wilderness Study Areas.....15

4.2.3 Air and Water Quality .....15

4.2.4 Cultural Resources.....15

4.2.5 Wild Horses .....16

    4.0.5.1 Actions in Common.....16

4.2.6 Soils and Vegetation.....24

4.2.7 Wildlife and Migratory Birds.....24

4.2.8 Threatened or Endangered Species .....25

4.2.9 Riparian Areas .....25

4.2.10 Native American Religious Concerns.....25

**4.3 Cumulative Impacts.....26**

**5.0 Mitigation and Monitoring.....27**

**6.0 Consultation and Coordination .....27**

**7.0 List of Preparers .....28**

**8.0. Literature Cited .....28**

**APPENDICES**

APPENDIX A. Standard Operating Procedures (SOPs) .....29

APPENDIX B Population Modeling .....36

**LIST OF TABLES**

Table 1. Little Owyhee Complex Management Range.....6

Table 2. Little Owyhee Complex Gather History .....12

Table 3. Population Modeling: Average Population and Growth Rate .....19

**EXHIBITS**

Map 1. Project Location Map .....50

## 1.0 Need for the Proposed Action

### 1.1 Background Information

The Bureau of Land Management (BLM) is proposing to remove approximately 565 excess wild horses from the Little Owyhee Complex which includes the Little Owyhee and Snowstorm Mountains Herd Management Areas (HMA) and approximately 20 horses east of Greeley Crossing that are outside the HMA. The gather would occur no earlier than August 1, 2004 and would restore the range to a thriving natural ecological balance and prevent deterioration of the range. It is also proposed to implement a fertility control treatment on about 80 mares released back to the Complex following the gather.

The Little Owyhee Complex is located 50 miles north east of Winnemucca, in the north east corner of Humboldt County and the north west corner of Elko County, Nevada. The 2 HMAs are approximately 577,500 acres in size (see General Location & HMA Map).

The appropriate management level (AML) of wild horses within the Little Owyhee HMA was established in 1993 at a range of 194-298 head (refer to the Little Owyhee Final Multiple Use Decision dated March 26, 1993). The AML was established based on an in-depth analysis of monitoring data including water monitoring and vegetation sampling.

The appropriate management level (AML) of wild horses within the Snowstorm Mountains HMA was established in 1994 at a range of 90-140 head (refer to the Bullhead Final Multiple Use Decision dated August 25, 1994). The AML was established based on in-depth analysis and monitoring data including use pattern mapping and utilization transects.

The Little Owyhee HMA was last gathered in July 2001 to remove excess wild horses during a severe drought. After the gather, 290 horses remained on the range. The HMA was partially censused in August 2000 with the population estimated at 705 head and again in August 2001 with 312 counted. The current estimated wild horse population is 475 head or nearly 2 and a half times higher than the low end of the AML range.

The Snowstorm Mountain HMA was last gathered in October 1999 to remove wild horses from an area of the HMA for emergency fire rehabilitation. Following the gather, 118 horses remained on the range. The HMA was aerially censused in September 1999 with the population estimated at 238 head and again in August 2000 with 156 counted. The current estimated wild horse population based on the 2000 census and an annual recruitment rate of 15% each year is 273 head or 183 head higher than the low end of the AML range. However, based on more recent ground observations within the Dry Hills pasture and the Castle Ridge pasture there are approximately 300 horses in these 2 pastures alone. The First Creek and Snowstorms Flat area horses were censused at 43 head in August 2000. With an increase of 15% (annual recruitment rate) per year the current 2004 population estimate for the First Creek and Snowstorm Flats area is 74 horses. This added to the 300 horses observed from the ground in the spring of 2004 equals approximately 374 horses within the entire Snowstorm Mountains HMA which is 4 times higher than the low end of the AML range.

A complete census of the entire Little Owyhee Complex is planned prior to gathering to ensure accurate numbers are obtained.

Monitoring data collected for the Little Owyhee HMA since AML was established in 1993 highlights that utilization by wild horses has been slight to light. However, available water is the primary limiting factor in this HMA, and was the basis for determining the AML. Since AML was established, available water has been lacking during severe drought years when horse numbers were above AML. This data, together, with a recent review of the analysis which established AML for this HMA, indicates that the current AML of 298 wild horses is appropriate.

Monitoring data collected for the Snowstorm Mountains HMA since AML was established in 1994 highlights that utilization by wild horses has increased with the increase in wild horse numbers. Severe hedging of four wing saltbush (*Atriplex canescens*) by wild horses is evident in the Dry Hills area. Allowable utilization for wild horses in key areas within the Dry Hills area and the Castle Ridge area was exceeded in the fall of 2003 and the spring of 2004. Excess utilization and trampling in key areas is currently impacting range conditions and preventing recovery of key sites. This data, together, with a recent review of the analysis which established AML for the HMA, indicates that the current AML of 140 wild horses is appropriate.

## 1.2 Purpose Of and Need for the Proposed Action

BLM has determined that there are excess wild horses present and the Proposed Action is needed to remove approximately 565 horses within the Complex and 20 horses outside the Complex and to restore wild horse herd numbers to levels consistent with the AML for the Complex. Applying fertility control measures as part of the proposed action would slow the reproduction rate of mares returned to the Complex following the gather, allowing vegetation resources time to recover; this would also reduce disturbance to the herd by decreasing the gather frequency and provide a more stable wild horse social structure.

Vegetation and water monitoring in relation to use by wild horses in this complex has determined that current wild horse population levels are exceeding the range's capacity to sustain wild horse use over the long term. Resource damage is occurring and is likely to continue to occur without immediate action. The proposed capture and removal is needed at this time in order to achieve a thriving natural ecological balance between wild horse populations, wildlife, livestock and vegetation, and to protect the range from the deterioration associated with overpopulation of wild horses as authorized under Section 3(b) (2) of the 1971 Free-Roaming Wild Horses and Burros Act and section 302(b) of the Federal Land Policy and Management Act of 1976.

## 1.3 Conformance with Existing Land Use Plans

The Proposed Action is in conformance with the Paradise Denio Management Framework Plan issued on July 9, 1982. Applicable decisions and goals are: to reserve AUMs within the Little Owyhee and Snowstorm HMAs for wild horses and to conduct gathers that will maintain herd

numbers within the AML range.

The Proposed Action has been determined to be in conformance with this plan as required by regulation (43 CFR 1610.5-3(a)). The Little Owyhee and Snowstorm HMAs have been designated as suitable for long term sustained wild horse use in the Paradise Denio Management Framework Plan and the proposed capture and removal is consistent with the land use plan decisions and resource management goals and objectives.

1.4 Conformance with Rangeland Health Standards

The Little Owyhee and Snowstorm HMAs have not been assessed for conformance with Rangeland Health Standards and Guidelines. The Complex is scheduled for assessment in 2005.

1.5 Relationship to Statutes, Regulations, Policies, Plans, or Other Environmental Analyses

The proposed action is in conformance with all applicable regulations at 43 CFR (Code of Federal Regulations) 4700, the National Selective Removal Policy, the 1971 Free-Roaming Wild Horses and Burros Act, and section 302(b) of the Federal Land Policy and Management Act of 1976.

2.0 Alternatives, Including the Proposed Action

2.1 Actions in Common - Alternatives I, II, III, IV

Five alternatives including the Proposed Action and the No Action Alternatives will be analyzed. Details of each Alternative will follow the “Actions in Common” section below.

During the gather activities, the Winnemucca Field Office (WFO) Wild Horse and Burro (WH&B) Specialists would determine animal sex, age, and color; assess herd health (e.g., pregnancy, parasite loading, physical condition, etc); and, sort individuals as to age, size, sex, temperament and/or physical condition. Data would be collected, including biological samples, for analysis and inclusion into future planning documents. Selected animals would be returned to the range. Excess animals would be transported to a BLM adoption preparation/holding facility.

The gather operation is scheduled to occur in late summer of 2004. A tentative start date would be no earlier than August 1, 2004. Gather schedules are subject to change, based on national and state wide priorities.

2.1.0 Management Range

Maintain a management range in the Little Owyhee Complex of 284-438 wild horses as shown in Table 1.

Table 1. Little Owyhee Complex Management Range

HMA	Management Range
Little Owyhee	194 to 298 head
Snowstorm Mountains	90 to 140 head
Total	284 to 438 head

### 2.1.1 Selective Removal Criteria

Determination of which horses would be returned back to the range would be based on an analysis of individual animals to existing population characteristics and HMA objectives. Wild horses would be selected based on historic herd characteristics of the area such as color, sex ratio, and conformation. Wild horses selected for release back into the Little Owyhee Complex 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, Washington Office IM 2002-095*. The selective removal priorities are:

- a. Age Class Five Years and Younger: Wild horses five 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 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 Six to Nine Years: Wild horses aged six to nine years old should be removed last and only if the Complex cannot achieve AML without their removal.

The National selective removal criteria would be followed to the extent possible, however population modeling estimated that only 100 wild horses (56 mares and 44 studs) would fall into the of 6-9 year old age categories (Appendix B, Population Modeling). Therefore, it is anticipated that additional animals from the younger and/or older categories would need to be released to meet the Alternative objectives. Release of animals older than 9 years of age would be preferred for several reasons that include decreased adoption demand for older animals and the cost to place them in long-term holding facilities. Exceptional animals that represent historic color, size, and/or conformation may be chosen for release outside of the selective removal priorities. Weak, unhealthy, and/or unthrifty animals would not be selected for release back onto the Little Owyhee Complex.

### 2.1.2. Gather Operations

The gather would be conducted through use of the *Great Basin Wild Horse and Burro Gather Contract*. Multiple gather sites (traps) may be used to gather wild horses from the Little Owyhee Complex. To the 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 A. The helicopter drive trap gather technique would be utilized for this gather. It may be necessary to utilize the helicopter rope technique to

remove selected animals that could not be trapped. It is estimated that several trap sites would be required to complete the gather. Efforts would be made to release animals back into the same general area from which they were gathered.

An Animal & Plant Health Inspection Service (APHIS) veterinarian may be on-site during gather operations to examine animals and make recommendations to the WFO WH&B Specialists concerning the care and treatment of wild horses. Consultation with a veterinarian would take place prior to euthanasia in accordance with Washington Office Instruction Memorandum 2001-165.

### 2.1.3 Data Collection

The following data would be collected from animals during the gather to facilitate the development of a Population Management Plan (PMP):

1. **Blood Samples.** Blood samples may be collected and analyzed to establish/maintain genetic baseline data (e.g., genetic diversity, historical origins of the herd, unique markers) for the Little Owyhee Complex animals in accordance with the *Gather Policy and Selective Removal Criteria for Wild Horses, Washington Office IM 2002-095*. Samples would be collected from release animals. 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 Little Owyhee Complex.
3. **Reproduction and Survival.** Data on reproduction and survival would be collected through documentation of animals gathered and the age of those released.
4. **Herd Characteristics.** Color and size of the animals would be recorded. The type of horse would be noted or a general impression of the herd type recorded. Incidence of albinism, parrot mouth, club feet, severely crooked legs, or other negative trait believed to be genetic would be recorded along with the disposition of the animal.
5. **Condition Class.** Condition class would be recorded using the Henneke System for animals that are noticeably thin or fat.
6. **Other Data.** All other data believed to be essential to the Population Management Plan would be collected during the gather. This may include parasite load, disease (from blood samples), percentage and age of pregnant mares, or other data.

## 2.2. Alternatives Considered in Detail

### 2.2.1 Proposed Action – Removal to the Lower Level of the Management Range with Fertility Control

The Proposed Action is to capture approximately 764 head and remove approximately 565 wild horses and administer an immunocontraceptive drug (PZP) to all release mares

(approximately 80) and gather and remove approximately 20 horses east of Greeley Crossing outside of the Complex.

Wild horse mares would be treated with a single-dose two-year porcine zona pellucidae (PZP) vaccine and would be freeze-marked on the hip for identification purposes. The WFO would assure that these animals do not enter the adoption program for three years following treatment. A field data sheet would be used to record all pertinent data relating to identification of the mare (including photo when possible), date of treatment, type of treatment (1 yr, 2yr, and Adjuvant used), HMA, etc. The form and any photos would be maintained at the field office and a copy of the completed form would be sent to the National Program Office (NPO), Reno, NV.

A tracking system would be maintained by the 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 would not be removed sooner than the mandatory three year holding period. In those rare instances when, due to unforeseen circumstances, a treated mare(s) is removed from an HMA it would 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 it is necessary to remove treated mares, their removal and disposition would be coordinated through NPO. After expiration of the holding period, the animal may be placed in the adoption system.

In addition to field and routine monitoring, aerial monitoring to determine contraceptive efficacy would be scheduled subsequent to breeding seasons in years 2 and 4 after application of the vaccine.

#### 2.2.2 Alternative I -- Removal to the Lower Level of the Management Range without Fertility Control

Alternative I is to capture approximately 764 head and remove approximately 565 wild horses without administering fertility control drugs to the release mares and gather and remove approximately 20 horses east of Greeley Crossing outside of the Complex.

#### 2.2.3 Alternative II -- Removal to the Upper Level of the Management Range with Fertility Control

Alternative II is to capture approximately 764 head and remove approximately 411 wild horses and administer an immunocontraceptive drug (PZP) to all release mares (approximately 159) and gather and remove approximately 20 horses east of Greeley Crossing outside of the Complex.

#### 2.2.4 Alternative III -- Removal to the Upper Level of the Management Range without Fertility Control

Alternative III is to capture approximately 764 head and remove approximately 411 wild

horses without administering fertility control drugs to the release mares and gather and remove approximately 20 horses east of Greeley Crossing outside of the Complex.

#### 2.2.5 No Action Alternative -- Delay Removal of Wild Horses

Under this alternative, the Complex would not be gathered immediately and existing management as it has been implemented would continue. Wild horse populations are estimated to increase at 15-25% per year. The wild horse populations may eventually 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 environmental factors. Or, a management action to reduce herd numbers may be evaluated and implemented at another time.

### 2.3 Alternatives Considered But Eliminated From Further Analysis

#### 2.3.1 Fertility Control Only

One alternative considered was wild horse management using fertility control measures only to regulate wild horse populations. Periodic capture operations would be required to administer the vaccine to mares, or suitable remote delivery methods would need to be developed.

This alternative was eliminated from further analysis since the immunocontraceptive vaccine has not been formally approved by the Food and Drug Administration for management based applications. Even with formal approval, an effective remote delivery methodology (aerial or water based) has not been developed for current formulations. The current data suggest that repeated long- term applications of the vaccine may affect fecundity.

#### 2.3.2 Natural Controls

Another alternative which was considered was to allow natural controls to regulate wild horse numbers. There would be no active management to control the size of this population. Under this alternative, wild horses would be allowed to regulate their numbers naturally through predation, disease, and forage, water and space availability.

This alternative was eliminated from further consideration due to several factors. Wild horses in the complex are not substantially regulated by predators. In addition, wild horses are a long-lived species with documented foal survival rates exceeding 95% (survivability rates collected are as follows: the Pryor herd (>95%; 15 years and younger, except for foals, both sexes (93%); Granites herd (>95%; 15 years and younger, except for male foals, (92%); and Garfield herd (> 95%; 24 years and younger, except both foals, both sexes (92%)). This alternative would result in a steady increase in numbers and further exceed the carrying capacity of the range. The Wild Horse and Burro Act of 1971 mandates the Bureau to prevent the range from deterioration associated with overpopulation, and preserve and maintain a thriving natural ecological balance and multiple use relationship in that area.

### 3.0 Affected Environment

#### 3.0.1 Invasive Non-native Species

Noxious weed and invasive non-native species introduction and proliferation is a growing concern among local and regional interests. A noxious weed survey including invasive and non-native species in the North Fork of the Little Humboldt River WSA was completed. This survey indicated that the following state listed noxious weeds occur:

<u>Scientific Name</u>	<u>Common Name</u>	<u>Plant Symbol</u>
<i>Cirsium vulgare</i>	Bull Thistle	CIVU
<i>Cardaria draba</i>	Whitetop	CADR
<i>Tamarix ramosissima</i>	Salt Ceder	TARA

These weeds occur in a variety of habitats including road side areas, rights-of-way, wetland meadows, as well as undisturbed upland rangelands.

### 3.0.2 Wilderness Study Areas (WSAs)

The North Fork of the Little Humboldt River Wilderness Study Area lies within the Little Owyhee HMA (see map). This WSA lies within the central Little Owyhee Desert and straddles 14 miles of the North Fork of the Little Humboldt River Gorge. The area is a high, Great Basin desert landscape with gently rolling to flat terrain. The uniform desert landscape is interrupted by a deeply cut basalt river gorge that runs north-south through the WSA.

### 3.0.3 Air and Water Quality

Air and water quality within the Little Owyhee Complex is considered good and is typical of rural areas within the northern Great Basin.

### 3.0.4 Cultural Resources

The Little Owyhee and Snowstorm Mountains HMAs contain a complex array of cultural resources representing the remains of human habitation dating from perhaps 10,000 years ago to recent historic times. In addition to the vast depth of time represented by these resources, a wide breadth of behaviors are also indicated including hunting and gathering, trade and exchange, mining, ranching, and transportation. While archaeologists have studied some aspects of these activities, many more are not well understood.

The evaluation of known archaeological sites indicates that many contain information that can be used to address questions that can aid in our understanding of these lesser-known aspects of past human behavior. Further inventory will undoubtedly reveal the existence of many more properties of important research value. In most cases, these sites are the only sources of information available to archaeologists in their efforts to understand the past and are, thus, valuable non-renewable resources.

### 3.0.5 Wild Horses

Horses within the Complex are descendants of ranch horses and horses that either escaped or were released into the area. Past capture data was used to determine typical animal colors and approximate percentage of frequency within the herd. The majority of horses exhibit bay (34%), sorrel (13%), and grey (10%) color patterns; however there are black(9%), brown(8%), red roan (7%), pinto (5%), blue roan (4%), chestnut (2%),

palomino (2%), buckskin (2%), white (1%), and various other colors(3%).

**Little Owyhee HMA (NV-200)**

The Little Owyhee HMA is located in the northern portion of the Little Owyhee Complex. It is comprised of approximately 454,439 acres of public land and 5747 acres of private land.

The established AML for this HMA is 194-298 horses. The current estimated population (July 2004) is 475 horses.

**Snowstorm Mountains HMA (NV-201)**

The Snowstorm Mountains HMA is located in the southern portion of the Little Owyhee Complex. It is comprised of approximately 103,812 acres of public land and 13,134 acres of private.

The established AML for this HMA is 90-140 horses. The current estimated population (July 2004) is 374 horses.

3.0.5.1 Gather History and Population Characteristics

Table 2 summarizes the gather history of the Little Owyhee Complex. In 1997 on the Little Owyhee HMA, wild horses 10 years of age and older were released back into the HMA. On the Snowstorm HMA during the 1996 gather most horses 10 and over were released and during the 1999 gather wild horses 10 years of age and older were released back into the HMA. The 1992 and 2001 were emergency drought gathers and the 1996 and 1999 gathers were for emergency fire rehabilitation.

**Table 2. Little Owyhee Complex Gather History**

<b>Year</b>	<b>Number Gathered Horses</b>	<b>Number Removed Horses</b>	<b>Number Released Horses</b>
2001*	761	510	240
1999**	170	115	5
1997*	915	595	312
1996**	174	88	86
1994**	285	187	96
1992*	831	695	136
1985	984	984	0
1984	686	686	0
1983	768	768	0
1981	548	548	0
1977*	1065	1065	0
<b>TOTAL</b>	<b>7187</b>	<b>6241</b>	<b>875</b>

\* Little Owyhee HMA only

\*\* Snowstorm Mountains HMA only

Overall sex ratios for the gathered wild horses on the Little Owyhee HMA in 2001 were 49.5% female and 50.5% male. At completion of the 2001 gather, 240 wild horses were released. Sex ratios for the gathered wild horses on the Snowstorm Mountains HMA in 1999 were 55.3% female and 44.7% male. At the completion of the 1999 gather, 50 wild horses were released. Currently, the sex ratio of both HMA's is expected to be approximately 50% females and 50% males. The reproductive rate calculated from the 1999 gather of the Snowstorm Mountains HMA was 32.9% (foals/adults). The reproductive rate calculated from the 2001 gather of the Little Owyhee HMA was 16.8% (foals/adults).

### 3.0.6 Soils and Vegetation

Major plant associations in the Complex are characterized as big sagebrush-grass and low sagebrush-grass. The big sagebrush-grass and low sagebrush-grass types are dominated by big sagebrush (*Artemisia tridentata*), low sagebrush (*A. arbuscula*), shadscale (*Atriplex confertifolia*), spiny hopsage (*Grayia spinosa*), bud sage (*Artemisia spinescens*), rabbit brush (*Chrysothamnus* spp.), and winterfat (*Eurotia lanata*) respectively. Major grass species include bluebunch wheatgrass (*Agropyron spicatum*), Idaho fescue (*Festuca idahoensis*), Sandberg bluegrass (*Poa secunda*), indian ricegrass (*Oryzopsis hymenoides*), needlegrass (*Stipa* spp.), and bottlebrush squirreltail (*Sitanion hystrix*). Forbs include arrowleaf balsamroot (*Balsamorhiza sagittata*), lupine (*Lupinus* spp.), phlox (*Phlox* spp.), and aster (*Aster* spp.).

The majority of soils in all the Little Owyhee Complex are desert soils developed under low precipitation with minimal topsoil development--Aridisols and Entisols. The soils are mostly fine textured with severe erosion potentials when disturbed. Loss of topsoil from these desert soils leads to an irreplaceable loss in soil productivity, and thus ability to regain natural plant communities if lost.

There are no known listed threatened, sensitive, or endangered plants in the proposed project area.

### 3.0.7 Wildlife and Migratory Birds

Within the proposed project area, numerous species of wildlife occur. Mule deer, California bighorn sheep, pronghorn antelope, mountain lions, coyotes, bobcats and kit foxes are the main game and furbearer species present. Sage-grouse, chukar, mourning doves, and cottontail rabbits constitute the major upland game species. In addition, a variety of non-game mammals, birds, and reptiles occur in the project area.

No migratory bird inventory has been completed for the proposed project area. However, common migratory birds which may use the area as habitat include various species of song birds, owls, blackbirds, crows, ravens, hawks, finches, doves, juncos, and meadow larks.

### 3.0.8 Threatened or Endangered Species

No on the-ground field observations have been conducted for sensitive/protected animal species. However, according to the Nevada Natural Heritage's database (May 2004) the following species may occur in the project area on a seasonal or yearlong basis: two threatened species (bald eagle & Lahontan cutthroat trout), one candidate species (Columbia spotted frog), twelve BLM sensitive species (pygmy rabbit, small-footed myotis, long-eared myotis, fringed myotis, long-legged myotis, pale Townsend's big-eared bat, Pacific Townsend's big-eared bat, western sage-grouse, interior redband trout, California floater, grimy ivesia, and Packard stickleaf) and seven State of Nevada Listed Species (golden eagle, burrowing owl, ferruginous hawk, Swainson's hawk, osprey, white pelican, and white-faced ibis).

### 3.0.9 Riparian Areas

Riparian areas are limited within the Little Owyhee Complex and are generally associated with springs and small creeks that include: Milligan Creek, Button Lake, Twin Valley Springs, Willow Spring, Kelly Creek Spring, and the South Fork of the Little Humboldt River. Resource degradation including over-utilization of riparian forage, trailing, bank erosion, trampling, and soil movement caused by wild horses is currently occurring at most springs within the Little Owyhee Complex. Animals are known to utilize winter snow for water in this area and often dig for water at undeveloped springs during the dry summer months. Riparian sites are heavily utilized especially when the water flow is low as occurs during droughts.

### 3.0.10 Native American Religious Concerns

The Little Owyhee and Snowstorm Mountains HMAs lie the traditional territory of Northern Paiute and Western Shoshone peoples. The Fort McDermitt Tribal Council and Battle Mountain Band Council have been contacted via notification letter to elicit any concerns that they may have relative to the proposed action and alternatives. Responses to these contacts are pending.

## 4.1 Environmental Consequences

The following critical or other elements of the human environment are not present or would not be affected by the Proposed Action or the alternatives (list): Environmental Justice, Unique Farmlands, Floodplains, Wastes, Hazardous and Solid, Areas of Critical Environmental Concern, Native American Religious Concerns, Surface and Ground water, and Wild and Scenic Rivers.

## 4.2 Critical Elements

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

### 4.2.1 Invasive Non-native Species

Noxious weed impacts associated with the proposed action or alternatives include potential importation or transportation of new species of weeds to the Little Owyhee

Complex area, spread of existing noxious weed seeds and plant parts to new areas in the two HMAs, and increases in the size of existing weed infestation sites. These impacts would potentially be accomplished by contractor vehicles and livestock entering the complex area and through feeding of contaminated hay to captured horses which are released before seeds pass through their system.

#### 4.2.2 Wilderness Study Areas (WSAs)

Proposed Action and Alternatives I, II, and III: There would be no impacts to wilderness values since all trap sites and holding facilities would be located outside wilderness study areas.

No Action Alternative: If no wild horse gather occurred the number of wild horses would exceed management levels for that area and there could be an impact to wilderness values.

#### 4.2.3 Air and Water Quality

Direct impacts associated with the Proposed Action and Alternatives I, II, III would consist of an increase in dust as wild horses are herded to temporary gather site(s) and transported by stock trailer(s) to a temporary holding facility. Dust caused by a concentration of animals at the temporary gather site(s) and at the temporary holding facility would be controlled by watering the areas as needed, to keep dust to a minimum. In addition, there would be an increase in vehicle traffic as excess wild horses are transported from the temporary holding site to a BLM adoption preparation/holding facility. These impacts would be temporary, with a short duration, and minimal. No direct or indirect impacts would occur with the No Action alternative.

#### 4.2.4 Cultural Resources

##### Proposed action

Ground disturbance caused by trampling is the primary source of adverse impacts to cultural resources. These disturbances, particularly when horses are aggregated in traps or holding facilities, have the potential to disperse and destroy artifacts, disrupt site integrity, and eradicate subsurface and/or datable cultural deposits.

In order to avoid these impacts, traps locations previously inventoried for cultural resources during the 1999 Snowstorm Mountain HMA and the 2001 Little Owyhee horse gathers would be used. If new traps or holding facilities are required, a Class III cultural resource inventory would be conducted at these locations. If significant cultural resources are identified, the location would be moved so that the resource is avoided.

Provided that previously inventoried trap locations are used and avoidance measures are implemented at any newly designated areas, the proposed action would have *no effect* on significant cultural resources.

Alternative I

Potential adverse impacts would be the same as those associated with the proposed action. In order to prevent these impacts, previously inventoried trap locations would be used and Class III surveys would be conducted and avoidance measures implemented at any new trap or holding facility locations. Therefore, this alternative would have *no effect* on significant cultural resources.

Alternative II

Potential adverse impacts would be the same as those associated with the proposed action. To mitigate these potential impacts, trap locations that have been previously inventoried for cultural resources would be used and any new locations would be inventoried to a Class III standard and cultural values avoided. With the implementation of these measures, this alternative would have *no effect* on significant cultural resources.

Alternative III

Potential adverse impacts would be the same as those associated with the proposed action. These impacts would be mitigated by the using trap locations that have previously been examined for cultural resources and inventorying any new proposed locations at a Class III level. Any cultural resources identified would be documented and avoided. These measures would insure that this alternative has *no effect* on significant cultural values.

No action

The no action alternative would have *no effect* on cultural resources.

4.2.5 Wild Horses

4.2.5.1 Actions in Common – Proposed Action and Alternatives I, II, and III

The Wild Free-Roaming Horse and Burro Act of 1971 (Public Law 92-195 as amended) states that all management activities shall be implemented 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.

The following positive impacts for wild horses and their habitat would occur:

- Achieve and maintain a thriving natural ecological balance by reducing the wild horse population to the management range;
- Ensure a viable population of wild horses are likely to survive during years when resources are limited due to severe winter conditions, drought, or other uncontrollable

- and unforeseeable environmental influences;
- 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 Little Owyhee Complex, the intent of the Wild Free Roaming Horse and Burro Act, that all management actions shall be at the minimum feasible level, would not be met. The following impacts would occur:

- 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 each year that a gather is postponed;
- Annual gathers would be required to remove the annual increase in population numbers each year, approximately 66 horses;
- Annual gathers would have greater 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 animals would be injured or killed.

### **Selective Removal Criteria**

Direct impacts associated with the Proposed Action and Alternatives I, II, and III would consist of selecting wild horses for release that possess historic characteristics (color pattern, sex ratio) and age structure that are typical of the herd demographics. The National Selective Removal Policy (described in Section 2.1.1.) would be followed to the extent possible. Animals selected for release would be the most capable of surviving environmental extremes, thus ensuring a viable population is present in the HMA. 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 would have a minimal impact on herd population dynamics, age structure, and sex ratio, as long as selection criteria for the removal maintains the social structure and breeding integrity of the herd.

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.

The effects of successive removals on populations causing shifts in herd demographics

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

### **Gather Operations**

These direct impacts include: handling stress associated with the gathering, processing and transportation of animals from gather sites to temporary holding facilities, and from the temporary holding facilities to an adoption preparation facility. The intensity of these impacts varies by individual and is indicated by behaviors ranging from nervous agitation to physical distress. Mortality does occur during a gather, however it is infrequent and typically occurs to no more than one half to one percent (0.5% – 1.0%) of the total animals gathered.

Impacts which may occur after the initial stress of herding and capture include: spontaneous abortion in mares and increased social displacement/conflict in studs. Spontaneous abortion following capture is rare, depending on the time of year gathered. Traumatic injuries that may occur typically involve bites and/or kicks that result in bruises and minor swelling. These impacts occur intermittently and the frequency of occurrence varies with the individual and situation.

Population-wide impacts can occur during or immediately following a gather. 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 changes to herd demographics, direct 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.

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 would incorporate proven Standard Operation Procedures (SOPs, Appendix A). SOPs represent the best methods for reducing impacts to animals associated with gathering, handling, transporting and collecting data.

### **Data Collection**

Direct impacts associated with data collection involve increased stress levels to the animals as they are restrained in the portable aging chute. Animals selected for blood sampling may become very agitated as samples are drawn. Animal stress levels decrease rapidly once the animal is released from the chute. The collection of data is a positive impact to the long term management of the population. These data will be used to

develop population specific objectives that will help ensure the long-term viability of the population. This procedure is within the intent of Public Law 92-195 as amended.

**ALTERNATIVES -**

Population modeling, using WinEquus Version 1.40 developed by Stephen H. Jenkins (see Appendix B), was completed for the Proposed Action, the No Action Alternative and Alternatives I through III. One objective of the modeling was to identify if the Proposed Action or any of the Alternatives “crash” the population or result in extremely low population numbers or growth rates. Modeling results do not indicate a crash is likely to occur under the Proposed Action or any of the Alternatives. Minimum population levels and growth rates were found to be within reasonable levels and adverse impacts to the population are not likely. At this time, there is no evidence to indicate that the Little Owyhee Complex herd would suffer from reduced genetic fitness in any way from implementation of the Proposed Action or Alternatives I through III.

Table 3 displays differences between the Proposed Action, No Action, and Alternatives I-III based on the results of the population modeling. This table shows the average population size for the median trial in five years and average growth rate for the median trial in four years following a gather under different Alternatives. Refer to Appendix B, Population Modeling, for additional information.

**Table 3. Population Modeling: Average Population and Growth Rates**

<b>Alternative</b>	<b>Projected Population Size (year 5)</b>	<b>Projected Growth Rate - % (year 4)</b>
<b>Proposed Action</b> (Lower management range with fertility control)	498	14.4
<b>Alternative I</b> (Lower management range without fertility control)	534	19.2
<b>Alternative II</b> (Upper management range with fertility control)	651	10.5
<b>Alternative III</b> (Upper management range without fertility control)	753	18.4
<b>No Action</b> (No management action at this time)	1339	17.7

Proposed Action**Removal to the Lower Limit of the Management Range with Fertility Control**

Direct impacts associated with the Proposed Action 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 (refer to Section 2.1.1.) and the stress associated with gathering would be the same as those discussed under “Gather Operations” (refer to Section 2.1.2.).

Implementation of the Proposed Action would likely prevent the wild horse population from increasing beyond the upper limit of the management range (438 head) until 2009. This would allow implementation of a four-year gather cycle to maintain horse/burro numbers within the management range.

**Fertility Control.** Each mare to be released would receive a single-dose of the two-year PZP contraceptive vaccine. When injected, PZP (antigen) causes the mare’s immune system to produce antibodies that bind to her eggs, effectively blocking sperm penetration and fertilization (Zoo Montana, 2000). PZP is relatively inexpensive, meets BLM requirements for safety to mares and the environment, and can easily be administered in the field. PZP contraception appears to be completely reversible and to have no ill effects on ovarian function if mares are not vaccinated 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 effects on pregnancies in progress, the health of offspring, or on the behavior of treated mares. Based on Clan Alpine studies, the PZP two-year vaccine has proven 94% effectiveness in year one, 82% effectiveness in year two, and 32% in year three if mares are inoculated during the winter months. However, administration of this drug in August would only be expected to limit foal production two years. Inoculated mares would foal normally in 2005 and the contraceptive would limit foal production in 2006 and have a residual effect in 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 is extremely rare in treated mares. 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.

Syringes, darts, needles, vaccine containers, etc. used in the administration of the

immunocontraceptive vaccine are considered regulated medical waste. Regulated medical waste must be placed in leak proof containers that are contained in a red plastic bag labeled medical waste. Medical waste must be handled and transported separately from other waste to an approved disposal facility (WFO Programmatic EA, 1999).

The use of fertility control is not expected to have any long-term direct or indirect impacts to the Little Owyhee Complex population's genetic health, long term viability, or future reproductive success of mares within the herd (WFO Programmatic EA, 1999). Implementation of fertility control is expected to improve the health of mares and foals.

The outcome of Proposed Action would provide more forage to wild horses during drought or extreme winters than would be available under Alternatives II or III which gather to the upper limit of the management range. Improved condition of mares and foals would aid in the long-term health and viability of the Little Owyhee Complex wild horse population. Reduced growth rates would occur with the implementation of fertility control, reducing competition for resources and utilization levels of those resources. Reduced growth rates would increase the time interval between gathers, having overall beneficial impacts to wild horse populations, wildlife, and domestic livestock. It would also contribute to the achievement and maintenance of a thriving natural ecological balance. This action would support 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 Land Use Plan, and the multiple use management objectives established through the Allotment Evaluation, FMUD, and HMAP.

### Alternative I

#### **Removal to the Lower Limit of the Management Range without Fertility Control**

Direct impacts associated with Alternative I include potential changes to herd demographics and stress associated with gathering. The effect on herd demographics was discussed in the Selective Removal Criteria section (refer to Section 2.1.1.) and the stress associated with gathering would be the same as those discussed under Gather Operations (refer to Section 2.1.2.).

Implementation of Alternative I would likely prevent the wild horse population from increasing beyond the upper limit of the management range (438 head) until 2008. This would allow implementation of a four-year gather cycle to maintain horse numbers within the management range. Gathering to the lower limit of the management range (263 horses) would allow the wild horse population to increase over time to the upper limit of the management range (438 horses).

The outcome of Alternative I would provide more forage to wild horses during drought or extreme winters than would be available under Alternatives II or III which gather to the upper limit of the management range. This action would support 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 Land Use Plan, and the multiple use management objectives established through the Allotment Evaluation, FMUD, and HMAP. No fertility control would be administered.

### Alternative II

#### **Removal to the Upper Limit of the Management Range 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 (refer to Section 2.1.1.) and the stress associated with gathering would be the same as those discussed under “Gather Operations” (refer to Section 2.1.2.). Impacts associated with implementing an immunocontraceptive fertility control research project are the same as discussed in the Proposed Action above.

Implementation of Alternative II involves gathering only to the upper limit of the management range (438 horses). As soon as the gather is completed, mares would foal and the upper limit of the management range would be exceeded almost immediately. Overuse of forage and water resources would resume. 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 would 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 include over-utilization of upland and riparian forage resources. 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 users.

The outcome of Alternative II would not ensure the Little Owyhee Complex 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 exceed the upper limit of the management level almost immediately after the action. The wild horse population would be at a higher risk of ill fitness and disease should elements of the habitat become limited due to drought or winter extremes. Fertility control would be implemented; however herd size would be over AML in the first post gather year.

### Alternative III

#### **Removal to the Upper Limit of the Management Range 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 (refer to Section 2.1.1.) and the stress associated with gathering would be the same as those discussed under “Gather Operations” (refer to Section 2.1.2.).

Implementation of Alternative III involves gathering only to the upper limit of the management range (438 horses). As soon as the gather is completed, mares would foal and the upper limit of the management range would be exceeded almost immediately. Overuse of forage and water resources would resume. No fertility control would be administered. The population would 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 include over-utilization of upland and riparian forage resources. 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 users.

Population modeling found Alternative III has the fourth highest average population sizes in 5 years, and the second highest average growth rate.

The outcome of Alternative III would not ensure the Little Owyhee Complex 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 over the upper limit of the management level almost immediately after the action. The wild horse population would be at a higher risk of ill fitness and disease should elements of the habitat become limited due to drought or winter extremes. No fertility control would be implemented.

#### No Action Alternative

Direct impacts associated with the no Action Alternative include potential changes to herd demographics and stress associated with overpopulation and habitat degradation. The current population of 849 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, the No Action Alternative poses the greatest risk to the long-term health and viability of the Little Owyhee Complex wild horse population, wildlife populations, vegetative health, habitat conditions, and water resources.

Implementation of the No Action Alternative would maximize competition for available water, forage resources, and space by wild horses. Animals would move out of the Little Owyhee Complex into unmanaged areas. The areas closest to water sources would experience severe utilization and degradation of the range resource. Over the course of time, animals would deteriorate in condition as a result of declining forage availability and the increasing distance traveled between forage and water sources. 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, water, and the degradation of 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. Irreparable damage to the resources, which would include primarily vegetative, soil and riparian resources, would have obvious impacts to the future of the Little Owyhee Complex and all other uses of the resources which depend

upon them for survival.

Population modeling found the No Action had highest average population size as no gather action would occur at this time. The Average Median Trial reported a potential wild horse population of 1,339 animals in 2009. The average growth rate for this Alternative was modeled at 17.7%. Refer to Table 8 for additional details.

The outcome of No Action Alternative would not ensure the Little Owyhee Complex would be a successful self-sustaining population of healthy animals in balance with other uses and the productive capacity of the habitat. The wild horse population would be at a higher risk of ill fitness and disease should elements of the habitat become limiting due to drought or winter extremes. No gather action or fertility control would be implemented at this time.

#### 4.2.6 Soils and Vegetation

Implementation of the proposed action or alternative I would reduce the wild horse population to the lower limit of the AML range in the Little Owyhee Complex which would help to promote and maintain a thriving natural ecological balance for a period of approximately four years.

The proposed action or alternative I would lessen the impact of hoof action on the soil around unimproved springs and stream bank riparian areas which should lead to an improvement in stream bank stability and improved riparian habitat conditions. There would also be a reduction in hoof action on upland habitat and reduced competition for available water sources.

Impacts to vegetation with implementation of the proposed action or alternative I could include disturbance of native vegetation immediately in and around temporary trap sites, and holding and processing facilities. Impacts are created by vehicle traffic, and hoof action of penned horses, and can be locally severe in the immediate vicinity of the corrals or holding facilities. Generally, these activity sites would be small (less than one half acre) in size. Since most trap sites and holding facilities are re-used during recurring wild horse gather operations, any impacts would remain site specific and isolated in nature. In addition, most trap sites or holding facilities are selected to enable easy access by transportation vehicles and logistical support equipment and would therefore generally be adjacent to or on roads, pullouts, water haul sites, or other flat spots which were previously disturbed.

#### 4.2.7 Wildlife and Migratory Birds

The proposed action or alternative I would result in reduced competition with wildlife which would increase the quantity and quality of available forage. There would be fewer disturbances associated with wild horses along riparian habitat and adjacent upland habitat. Impacts to wildlife would be potential disturbance from the helicopter and

increased traffic. These disturbances would be during the capture period only.

Executive Order #13186 titled “Responsibilities of Federal Agencies to Protect Migratory Birds”, signed 1/10/01 requires that the BLM evaluate the effects of federal actions on migratory birds. The Proposed Action or Alternatives I, II, or III would occur in August, therefore neotropical migratory birds should not be breeding or nesting and little to no impact should occur.

#### 4.2.8 Threatened or Endangered Species

The potential direct and indirect impacts associated with the Proposed Action or Alternatives I-III or the No Action Alternative to Threatened or Endangered or sensitive species would be related to the wild horse population size. Reduction of the current wild horse population provides the best opportunity for conservation, protection, and preservation of threatened species and their habitat. Implementation of the Proposed Action would provide the greatest opportunity for the conservation, protection, and preservation of any threatened species and their habitat. The opportunity for improvement decreases for each successive Alternative. Implementation of the No Action alternative would allow potential impacts to threatened species populations and their habitat to increase each year that a gather is postponed.

#### 4.2.9 Riparian Areas

If implemented, the Proposed Action would have the greatest positive effect on riparian areas. Decreased numbers of horses would utilize these areas allowing them to recover from past disturbances. Alternatives I-III would also have a positive effect on the riparian areas but to a lesser extent. Horse numbers are projected to be higher with each successive Alternative as would the use of these sensitive areas. The No Action Alternative, if implemented, would have the greatest negative impact on the riparian areas. Heavy resource damage would likely occur each summer until a future gather occurs.

#### 4.2.10 Native American Religious Concerns

##### Proposed action

The proposed action is not likely to effect places of traditional and religious importance to Northern Paiute and Western Shoshone groups. However, input from the Fort McDermitt Tribal Council and the Battle Mountain Band Council is pending.

##### Alternative I

It is not likely that this alternative will effect places of traditional and religious importance to local Native American groups, although input from the Fort McDermitt Tribal Council and the Battle Mountain Band Council is pending.

Alternative II

This alternative is not likely to have an effect on places of religious or traditional concern. However, input from local Native American groups is pending.

Alternative III

It is unlikely that this alternative will have an effect on places of traditional or religious concern, though input from two local Northern Paiute and Western Shoshone groups, the Ft. McDermitt Tribal Council and the Battle Mountain Band Council, is pending.

No Action

This alternative would have no effect on places of traditional or religious concern.

4.3 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 Little Owyhee Complex. Please refer to the attached map. Past, proposed and reasonably foreseeable actions that may have similar effects to the wild horse population would include past and future wild horse gathers. Eleven gathers have been completed in the past on part or all of the HMAs in the Little Owyhee Complex and future gathers would be scheduled on a 4 year gather cycle. 7187 wild horses have been removed from the Little Owyhee Complex in the last 27 years and populations are thriving and have not been negatively impacted. As wild horse population levels are maintained in the established management range, a thriving natural ecological balance would be achieved and maintained. Cumulative effects that may result would include continued maintenance/improvement of range and riparian/wetland conditions. Cumulative beneficial effects from implementation of the Proposed Action or Alternatives I through III to wildlife, sensitive and threatened species, the wild horse population and domestic livestock would occur as forage availability and quality would be maintained and improved. Water quality and riparian habitat would also continually improve. The opportunity for cumulative beneficial effects decreases for each successive action (Proposed through No Action).

Adverse cumulative impacts on natural resources would occur by degree depending on which action is selected. In general, adverse cumulative impacts increase for each successive action (Proposed Alternative through No Action) since the modeled wild horse population is higher for each Alternative. Adverse cumulative impacts would include periodic or continual (No Action) over-utilization of vegetative resources resulting 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 No Action would include continued heavy over-utilization of vegetative resources which would result in decreased vegetative density, plant vigor, seed production, seedling establishment, and forage production. A potential increase of non-native and noxious weed species to new areas in the Little Owyhee Complex may result. Continued overuse 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 and increased negative impacts to stream banks and riparian habitat condition. Wildlife, sensitive and threatened species, migratory birds, livestock, and wild horses would all be negatively affected by these adverse cumulative impacts to the natural resources. This could lead to the listing of sage-grouse and/or pygmy rabbit as a threatened or endangered species.

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 adverse affect to the environment. The No Action alternative would cause a greater impact to the environment depending on how long a gather is deferred.

There would be no known adverse cumulative impacts to any of the resources analyzed in the as a result of implementing the Proposed Action or Alternative I in this EA. There would be minor adverse cumulative impacts to vegetation, soils, and riparian habitat from implementing Alternatives II or III due to the wild horse population exceeding the management range, a level that assures maintenance of a thriving ecological balance between wild horses and other resources and uses. Adverse cumulative impacts to vegetation, soils, and riparian habitat would occur from implementation of Alternative IV, No Action.

#### 5.0 Mitigation and Monitoring

Standard operating procedures would be followed during the gather (see Appendix A). Monitoring the wild horse population and habitat prior to, during and after the proposed gather will be preformed by the Winnemucca Field Office Wild Horse and Burro Specialists.

#### 6.0 Consultation and Coordination

Public hearings are held prior to gathers discussing the use of helicopters and motorized vehicles to capture wild horses. During these meetings, the public is given the opportunity to present new information and to voice any concerns regarding the use of these methods to capture wild horses. Additional consultation and coordination relative to the proposed action includes contacting the US Fish and Wildlife Service to obtain a list of federally listed, proposed, and candidate species.

All interested publics will receive information regarding the Proposed Action (see Public Mailing List attached).

7.0 List of Preparers

<u>Name</u>	<u>Title</u>	<u>Resource</u>
Heidi Hopkins	Wild horse and burro specialist	Wild horses
Rodger Bryan	Supervisory wildlife and wild horse specialist	Wild horses
Barb Keleher	Recreation planner	WSAs
Mark Ennes	Archeologist	Cultural
Matt Varner	Fisheries biologist	Riparian areas
Mike Zielinski	Soil Scientist	Soils, Vegetation, Air and Water Quality
Chuck Neill	Weeds specialist	Invasive Non-native Species
Jeff Johnson	NEPA coordinator	
Lynn Harrison	NEPA coordinator	

7.0 Literature Cited

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**APPENDIX A****Standard Operating Procedures (SOPs)**

Gathers would be conducted by utilizing contractors from the Wild Horse and Burro Gathers, Western United States Contract, or BLM personnel. The following procedures for gathering and handling wild horses would apply whether a contractor or BLM personnel conduct a gather. For helicopter gathers conducted by BLM personnel, gather operations will be conducted in conformance with the *Wild Horse and Burro Aviation Management Handbook* (March 2000).

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

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

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

**A. Capture Methods Used in the Performance of a Gather****1. Helicopter Drive Trapping**

This capture method involves utilizing a helicopter to herd wild horses and burros into a temporary trap. The following stipulations apply:

- a. A minimum of two saddle horses shall be immediately available at the trap site to accomplish roping if necessary. Roping shall be done as determined by the BLM. Under no circumstances shall animals be tied down for more than one hour.
- b. The Contractor shall assure that bands remain together, and that foals shall not be left behind.
- c. Domestic saddle horses may be used as a pilot (i.e. Judas) horse to lead the wild horses into the trap. Individual ground hazers may also be used to assist in the gather.

## **2. Helicopter Assisted Roping**

This capture method involves utilizing a helicopter to herd wild horses or burros to ropers. The following stipulations apply:

- a. Under no circumstances shall animals be tied down for more than one hour.
- b. Roping shall be performed in such a manner that bands will remain together. Foals shall not be left behind.

## **3. Bait Trapping**

This capture method involves utilizing bait (water or feed) to lure wild horses or burros into a temporary trap. The following stipulations apply:

- a. Finger gates shall not be constructed of materials that may be injurious to animals such as; "T" posts, sharpened willows, etc.
- b. All trigger and/or trip gate devices must be approved by the BLM prior to capture of animals.
- c. Traps shall be checked a minimum of once every 10 hours.

## **B. Trapping and Care**

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

1. All trap and holding facility locations must be approved by the BLM prior to construction. The Contractor may also be required to change or move trap locations as determined by the BLM. All traps and holding facilities not located on public land must have prior written approval of the land owner. Prior to setting up a trap or temporary holding facility, BLM will conduct all necessary clearances (archaeological, T&E, etc.).
2. Proposed trap sites and holding facility sites would be examined for the presence of noxious weeds prior to construction. If noxious weeds were found, the trap/holding facility location would be moved to an alternate location.
3. The rate of movement and distance the animals travel shall not exceed limitations set by the BLM, who will consider terrain, physical barriers, weather, condition of the animals, and other factors.
4. All traps, wings, and holding facilities shall be constructed, maintained and operated to handle animals in a safe and humane manner and be in accordance with the following:

- a. Traps and holding facilities shall be constructed of portable panels, the top of which shall not be less than 72 inches for horses and 60 inches for burros, and the bottom rail of which shall not be more than 12 inches from ground level. All traps and holding facilities shall be oval or round in design.
  - b. All loading chute sides shall be a minimum of 6 feet high and shall be fully covered with plywood (without holes) or like material.
  - c. All runways shall be a minimum of 30 feet long and a minimum of 6 feet high for horses, and 5 feet high for burros, and shall be covered with plywood, burlap, plastic snow fence or like material a minimum of 1 foot to 5 feet for burros and 1 foot to 6 feet for horses. The location of the government furnished portable restraining chute used to restrain, age, or to provide additional care for animals shall be placed in the runway in a manner as instructed by or in concurrence with the BLM.
  - d. All crowding pens including the gates leading to the runways shall be covered with a material which prevents the animals from seeing out (plywood, burlap, snow fence etc.) and shall be covered a minimum of 1 foot to 5 feet above ground level for burros and 2 feet to 6 feet for horses. Eight linear feet of this material shall be capable of being removed or let down to provide a viewing window.
  - e. All pens and runways used for the movement and handling of animals shall be connected with hinged self-locking gates.
5. No fence modifications will be made without authorization from the BLM. The Contractor shall be responsible for restoration of any fence modification, which he has made.
  6. When dust conditions occur within or adjacent to the trap or holding facility, the Contractor shall be required to wet down the ground with water.
  7. Alternate pens, within the holding facility, shall be furnished by the Contractor to separate mares or jennies with small foals, sick and/or injured animals, and strays from the other animals. Animals shall be sorted as to age, number, size, temperament, sex and condition when in the holding facility so as to minimize, to the extent possible, injury due to fighting and trampling. Under normal conditions, the government will require that animals be restrained for the purpose of determining an animal's age, sex or other necessary procedure. In these instances, a portable restraining chute will be provided by the government. Alternate pens shall be furnished by the Contractor to hold animals if the specific gathering requires the animals to be released back into the capture area(s). In areas requiring one or more trap sites, and when a centralized holding facility is utilized,

the Contractor may be required to provide additional holding pens to segregate animals transported from remote locations so they may be returned to their traditional ranges. Either segregation or temporary marking and later segregation will be at the discretion of the BLM.

8. The Contractor shall provide animals held in the traps and/or holding facilities with a continuous supply of fresh clean water at a minimum rate of 10 gallons per animal per day. Separate water troughs shall be provided at each pen where animals are being held. Water troughs shall be constructed of such material (e.g. rubber, galvanized metal with rolled edges, rubber over metal) so as to avoid injury to the animals.
9. Animals held for 10 hours or more in the traps or holding facilities shall be provided good quality hay at the rate of not less than 2 pounds of hay per 100 pounds of estimated body weight per day. The contractor together with the on-site BLM representative would examine hay for noxious weed seeds or plant parts prior to initiating the gather. If noxious weed seeds or plant parts are found in the hay, the hay would be removed from the area.
10. It is the responsibility of the Contractor to provide security to prevent loss, injury or death of captured animals until delivery to final destination.
11. The Contractor shall restrain sick or injured animals if treatment is necessary. The BLM will determine if injured animals must be destroyed and provide for destruction of such animals. A veterinarian may be called to make a diagnosis and final determination for the disposition of sick or injured animals. The contractor may be required to dispose of the carcasses as directed by the BLM. Destruction shall be done by the most humane method available, in accordance with BLM policy outlined in Washington Office Instruction Memorandum No. 2001-165 which states;

A BLM authorized officer may authorize the euthanasia of a wild horse or burro with any of the following conditions:

- a. Displays a hopeless prognosis for life;
- b. Suffers from a chronic or incurable disease or serious congenital defect;
- c. Requires continuous treatment for the relief of pain and suffering; or
- d. Is incapable of maintaining a Henneke body condition score greater than 2, in a normal rangeland environment.

12. Animals shall be transported to final destination from temporary holding facilities within 24 hours after capture unless prior approval is granted by the BLM for unusual circumstances. Animals to be released back into the HMA following gather operations may be held up to 21 days or as directed by the BLM. Animals shall not be held in traps and/or temporary holding facilities on days when there is no work being conducted except as specified by the BLM. The Contractor shall schedule shipments of animals to arrive at final destination between 7:00 a.m. and 4:00 p.m. No shipments shall be scheduled to arrive at final destination on Sunday and Federal holidays, unless prior approval has been obtained by the BLM. Animals shall not be allowed to remain standing on trucks while not in transport for a combined period of greater than three (3) hours. Animals that are to be released back into the capture area may need to be transported back to the original trap site. This determination will be at the discretion of the BLM.
13. Branded or privately owned animals captured during gather operations will be handled in accordance with state estray laws and existing BLM policy.

### **C. Motorized Equipment**

1. All motorized equipment employed in the transportation of captured animals shall be in compliance with appropriate State and Federal laws and regulations applicable to the humane transportation of animals. The Contractor shall provide BLM with a current safety inspection (less than one year old) for all motorized equipment and tractor-trailers used to transport animals to final destination.
2. All motorized equipment, tractor-trailers, and stock trailers shall be in good repair, of adequate rated capacity, and operated so as to ensure that captured animals are transported without undue risk or injury.
3. Only tractor-trailers or stock trailers with a covered top shall be allowed for transporting animals from trap site(s) to temporary holding facilities, and from temporary holding facilities to final destination(s). Sides or stock racks of all trailers used for transporting animals shall be a minimum height of 6 feet 6 inches from the vehicle floor. Single deck tractor-trailers 40 feet or longer shall have two (2) partition gates providing three (3) compartments within the trailer to separate animals. Tractor-trailers less than 40 feet shall have at least one partition gate providing two (2) compartments within the trailer to separate animals. Compartments in all tractor-trailers shall be of equal size plus or minus 10 percent. Each partition shall be a minimum of 6 feet high and shall have at the minimum a 5 foot wide swinging gate. The use of double deck trailers is unacceptable and will not be allowed.
4. All tractor-trailers used to transport animals to final destination(s) shall be equipped with at least one (1) door at the rear end of the trailer, which is capable of sliding either horizontally or vertically. The rear door(s) of tractor-trailers and stock trailers must be capable of opening the full width of the trailer. Panels facing the inside of all trailers must be free of sharp edges or holes that could cause injury to the animals. The material facing the inside of the trailer must be strong enough, so that the animals cannot push

their hooves through the side. Final approval of tractor-trailers and stock trailers used to transport animals shall be held by the BLM.

5. Floors of tractor-trailers, stock trailers, and the loading chute shall be covered and maintained with wood shavings to prevent the animals from slipping.
6. Animals to be loaded and transported in any trailer shall be as directed by the BLM and may include limitations on numbers according to age, size, sex, temperament, and animal condition. The following minimum square feet per animal shall be allowed in all trailers:
  - 11 square feet/adult horse (1.4 linear feet in an 8 foot wide trailer)
  - 8 square feet/adult burro (1.0 linear feet in an 8 foot wide trailer)
  - 6 square feet/horse foal (0.75 linear feet in an 8 foot wide trailer)
  - 4 square feet/burro foal (0.50 linear feet in an 8 foot wide trailer)
7. The BLM shall consider the condition and size of the animals, weather conditions, distance to be transported, or other factors when planning for the movement of captured animals. The BLM shall provide for any brand and/or inspection services required for the captured animals.
8. If the BLM determines that dust conditions are such that the animals could be endangered during transportation, the Contractor will be instructed to adjust speed.
9. The contractor together with the on-site BLM representative would examine vehicles for noxious weed seeds or plant parts prior to initiating the gather. If noxious weed seeds or plant parts are found on vehicles, the vehicle would be cleaned.

#### **D. Safety and Communications**

1. The Contractor shall have the means to communicate with the BLM and all contractor personnel engaged in the capture of wild horses and burros utilizing a VHF/FM Transceiver or VHF/FM portable Two-Way radio. If communications are ineffective the government will take steps necessary to protect the welfare of the animals.
2. The proper operation, service and maintenance of all contractor furnished property is the responsibility of the Contractor. The BLM reserves the right to remove from service any contractor personnel or contractor furnished equipment which, in the opinion of the BLM, violate contract rules, are unsafe or otherwise unsatisfactory. In this event, the contractor will be notified in writing to furnish replacement personnel or equipment within 48 hours of notification. All such replacements must be approved in advance of operation by the BLM.
3. All accidents occurring during the performance of any delivery order shall be immediately reported to the BLM.

4. The Contractor must operate in compliance with all applicable Federal, State, and Local laws and regulations.
5. Fueling operations shall not take place within 1,000 feet of animals.

### **E. Public Participation**

Opportunities for public viewing (i.e. media, interested public) of gather operations will be made available to the extent possible, however the primary consideration will be to protect the health and welfare of the animals being gathered. The public must adhere to guidance from the on site BLM representative. It is BLM policy that the public will not be allowed to come into direct contact with wild horses and burros held in a BLM facility. Only BLM or contractor personnel may enter the trap site or temporary holding facility corrals. The general public may not directly handle the animals at any time or for any reason during gather operations.

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

The Contracting Officer's Representative, and Project Inspectors, from the Winnemucca Field Office, will have the direct responsibility to ensure the Contractor's compliance with the contract stipulations. All employees involved in the gathering operation will keep the best interests of the animals at the forefront at all times.

The Assistant Field Manager for Renewable Resources and the Field Manager will take an active role to ensure that appropriate lines of communication are established between the field, Field Office, Nevada State Office, National Wild Horse and Burro Program Office, and the Palomino Valley Wild Horse and Burro Center. All publicity, formal public contact and inquiries will be handled through the Assistant Field Manager for Renewable Resources.

### **G. Cultural Resources**

Personnel working at gather sites will be advised of illegality of collecting artifacts.

Prior to implementation of gather operations, trap sites and temporary holding facilities would be evaluated for cultural resources. Gather sites and temporary holding facilities would not be constructed on wetlands or riparian zones.

## **APPENDIX B**

### **Summary of Population Modeling of Wild Horses**

#### Population Model Overview

WinEquus is a computer software program designed to simulate population dynamics based on various management alternatives concerning wild horses. Version 1.40 was developed by Stephen H. Jenkins of the Department of Biology, University of Nevada at Reno on April 2, 2002. For further information about the model, please 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. It will provide background about the use of the model, the management options that may be used, interpretation of modeling results, 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 a wild horse population's demographics can not be established in advance. Therefore, each trial will give a different pattern of population growth. Some trials may include mostly "good" years, when the population grows rapidly; other trials may include a series of several "bad" years in succession. The stochastic approach to population modeling uses repeated trials to project a range of possible population trajectories over a period of years, which is more realistic than predicting a single specific trajectory.

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

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

Population 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 and 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 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 do not have data on survival probabilities for their herd 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 set 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 are not 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 the 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).

Gathering Efficiency

Typically, some horses will successfully resist being gathered, either by hiding in habitats where they can not be seen or moved by a helicopter, or by following escape routes that make it dangerous or un-economical for them to be herded from the air. These horses are not 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 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.

Long-term Holding Facility-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 not 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.

### Results - Population Modeling, Little Owyhee Complex

To complete the population modeling for the Little Owyhee Complex version 1.40 of the WinEquus program, created April 2, 2002, was utilized.

#### Objectives of Population Modeling

Review of the data output for each of the simulations provided many useful comparisons of the possible outcomes for each Alternative. The developer, Stephen Jenkins, recommends thinking about the range of possible outcomes and not just focusing on one average or typical trial. 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?

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

Initial age structure for the 2004 herd (post 2004 foaling) was developed from age structure data collected during the 2001 Little Owyhee wild horse gather and the 1999 Snowstorm Mountains wild horse gather. This data set was based on age structure data from the gather populations. The following table displays the age structure for released animals per HMA.

Initial Age Structure 1999 and 2001

Age Class	Little Owyhee Released Animals 2001		Little Owyhee Typical 98 Un-gathered Animals 2001		Snowstorm Mountains Released Animals 1999		Snowstorm Mountains Typical 68 Un-gathered Animals 1999	
	Females	Males	Females	Males	Females	Males	Females	Males
Foals	0	1	12	7	1	0	9	5
1	8	0	9	7	0	0	6	5
2	47	9	8	7	0	0	6	5
3	24	21	4	4	0	0	2	3
4	6	10	2	2	0	0	1	1
5	4	2	1	0	0	0	1	0
6	4	1	2	0	0	0	1	0
7	3	5	1	0	1	0	1	0
8	7	1	2	0	0	0	1	0
9	2	2	2	0	0	0	1	0
10-14	17	10	4	4	7	9	3	3
15-19	19	6	4	5	7	5	3	3
20+	3	2	3	8	6	14	2	6
Total	144	70	54	44	22	28	37	31

A simulation, using the estimated 1999 and 2001 post gather population as the initial age

structure was then run under the “no management” management option up to the present date. The most typical trial obtained from this simulation was saved and used to represent the 2004 age structure of the herd and rescaled to an initial population of 374 for the Snowstorm Mountains HMA and 475 for the Little Owyhee HMA (849 head which represents the estimated population within the entire Little Owyhee Complex in 2004).

The following table displays the initial age structure per HMA used for the Little Owyhee Complex 2004 wild horse population utilized in the population model for each Alternative.

**Initial Age Structure (Modeled) - 2004**

Age Class	Little Owyhee Initial Age Structure 2004		Snowstorm Mountains Initial Age Structure 2004	
	Females	Males	Females	Males
Foals	40	46	28	41
1	42	40	21	27
2	38	35	14	20
3	11	8	23	24
4	16	12	25	21
5	32	11	11	8
6	22	15	6	6
7	9	9	5	3
8	4	3	3	3
9	5	3	2	2
10-14	19	10	4	3
15-19	16	9	10	15
20+	11	9	17	32
Total	265	210	169	205

All simulations used the survival probabilities and foaling rates supplied with the WinEquus population model for the Granite Range HMA. Survival and foaling rate data were extracted from, *Wild Horses of the Great Basin*, by J. Berger (1986, University of Chicago Press, Chicago, IL, xxi + 326 pp.). Rates are based on Joel Berger’s 6 year study in the Granite Range HMA in northwestern Nevada. The sex ratio at birth observed by Berger in the Granite Range was modified from 57% males at birth to 50% males at birth for this modeling effort.

Survival probabilities and foaling rates utilized in the population model for each Alternative are displayed in the following table:

**Survival Probabilities and Foaling Rates**

Age Class	Survival Probabilities		Foaling Rates
	Females	Males	
Foals	.917	.917	--
1	.969	.969	--
2	.951	.951	.35
3	.951	.951	.40
4	.951	.951	.65
5	.951	.951	.75
6	.951	.951	.85
7	.951	.951	.90
8	.951	.951	.90
9	.951	.951	.90
10-14	.951	.951	.85
15-19	.951	.951	.70
20	.951	.951	.70

The next table displays the selective removal criteria utilized in the population model for the Action Alternatives:

**Removal Criteria - Standard**

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

*(a) Population Modeling Criteria*

The following summarizes the population modeling criteria that are common to all of the Proposed Action and Alternatives (I-III):

- Starting Year: 2004
- Initial gather year: 2004
- Gather interval: minimum interval of five years (4 year run)
- Sex ratio at birth: 50% male
- Percent of the population that can be gathered: 90%
- Minimum age for long term holding facility horses: 10 years old
- Foals are included in the AML
- Simulations were run for four years with 100 trials each
- Fertility control is estimated to be 94% effective in year 1 and 82% effective in year 2 and 68% effective in year 3

The following summarizes the population modeling criteria for the No Action Alternative:

- Starting Year: 2004
- Sex ratio at birth: 50% male
- Simulations were run for four years with 100 trials each

The following table displays additional population modeling parameters utilized in the model for the Action Alternatives (Proposed Action - III):

**Population Modeling Parameters, Action Alternatives (Proposed Action - III)**

<b>Alternative</b>	<b>Proposed</b>	<b>I</b>	<b>II</b>	<b>III</b>
Management by removal only	--	Yes	--	Yes
Management by removal and fertility control	Yes	--	Yes	--
Target population size following gathers	284	284	438	438
Gather for fertility control regardless of population size?	Yes	--	Yes	--
Gathers continue after removals to treat additional females?	NA	--	NA	--
Effectiveness of Fertility Control: year 1	94%	--	94%	--
Effectiveness of Fertility Control: year 2	82%		82%	--
Effectiveness of Fertility Control: year 3	68%		68%	--

Population Modeling Results

Population size in five years

Out of 100 trials in each simulation, the model tabulated minimum, average, and maximum population sizes. The model was run from 2004 to 2008 to determine what the potential effects would be on population size for all Alternatives. These numbers are useful to make relative comparisons of the different Alternatives and of the potential outcomes under different management options. The data displayed within the tables are broken down into different levels. The average lowest trial (minimum), average trial (average) and highest trial (maximum) are displayed for each simulation completed.

**Population Sizes in 5 years – Minimum**

	<b>Proposed Action</b>	<b>Alternative I</b>	<b>Alternative II</b>	<b>Alternative III</b>	<b>No Action</b>
<b>Little Owyhee</b>	228	231	365	380	524
<b>Snowstorm Mountains</b>	102	105	168	169	406
<b>Total</b>	<b>330</b>	<b>336</b>	<b>533</b>	<b>549</b>	<b>930</b>

The above table shows that in five years (based on 100 trials for each Alternative) minimum population size modeling results indicate a population crash would not occur with implementation of any of the Alternatives.

**Population Sizes in 5 years – Average**

	<b>Proposed Action</b>	<b>Alternative I</b>	<b>Alternative II</b>	<b>Alternative III</b>	<b>No Action</b>
<b>Little Owyhee</b>	325	344	422	504	771
<b>Snowstorm Mountains</b>	173	190	229	249	568
<b>Total</b>	<b>498</b>	<b>534</b>	<b>651</b>	<b>753</b>	<b>1339</b>

The “Population sizes in 5 years – Average” table above displays the average population size expected after implementation of each Alternative (100 runs each) after five years. Comparisons of the Median Trial across Alternatives reflect the expected outcomes associated with gathering to lower or upper AML range limits and with implementation of fertility control or not. Proposed Action - gather to low AML range and implement fertility control results in the lowest average population in five years. Alternative I – gather to low AML range and do not implement fertility control results in a slightly higher five year population. Alternative II – gather to high AML range and implement fertility control is higher than the two alternatives that gather to the low range of AML. Alternative III – gathering to high AML range without fertility control results in the highest predicted five year population out of the four action Alternatives.

**Population Sizes in 5 years - Maximum**

	<b>Proposed Action</b>	<b>Alternative I</b>	<b>Alternative II</b>	<b>Alternative III</b>	<b>No Action</b>
<b>Little Owyhee</b>	513	514	518	632	1058
<b>Snowstorm Mountains</b>	407	409	407	404	752
<b>Total</b>	<b>920</b>	<b>923</b>	<b>925</b>	<b>1036</b>	<b>1810</b>

This table displays the largest populations that could be expected out of 100 trials for each Alternative. The same discussion applies to the population results as discussed under the Minimum table. All figures are similar because under all of the Alternatives, the same starting population, gather efficiency, etc. is assumed and the range of AML is not great. The numbers vary due to randomness and assumptions inherent to the modeling program.

Average Growth Rates in 5 years

Average growth rates were obtained by running the model for 100 trials from 2004 to 2008 for each Alternative. The following table displays the results obtained from the model:

**Average Growth Rate in 5 Years**

	<b>Proposed Action</b>	<b>Alternative I</b>	<b>Alternative II</b>	<b>Alternative III</b>	<b>No Action</b>
<b>Little Owyhee</b>	16.8	20.3	10.6	20.7	19.3
<b>Snowstorm Mountains</b>	12.0	18.1	10.4	16.1	16.1
<b>Average Growth Rate for Little Owyhee Complex</b>	<b>14.4</b>	<b>19.2</b>	<b>10.5</b>	<b>18.4</b>	<b>17.7</b>

The range of growth rates is a reasonable representation of what could be expected to occur in a wild horse population.

Totals in five years – Gathered, Removed, and Treated

The same type of tabular data was obtained from the model for the numbers of wild horses gathered, removed and treated under each Alternative. The data is for one gather only that is proposed to occur in 2004 and includes all animals 0-20+ years of age.

**Totals– Gathered**

	<b>Proposed Action</b>	<b>Alternative I</b>	<b>Alternative II</b>	<b>Alternative III</b>
<b>Little Owyhee</b>	534	593	829	620
<b>Snowstorm Mountains</b>	456	422	521	401
<b>Total</b>	<b>990</b>	<b>1015</b>	<b>1350</b>	<b>1021</b>

**Totals -- Removed**

	<b>Proposed Action</b>	<b>Alternative I</b>	<b>Alternative II</b>	<b>Alternative III</b>
<b>Little Owyhee</b>	408	460	313	491
<b>Snowstorm Mountains</b>	308	361	296	344
<b>Total</b>	<b>716</b>	<b>821</b>	<b>609</b>	<b>835</b>

**Totals– Treated**

	<b>Proposed Action</b>	<b>Alternative I</b>	<b>Alternative II</b>	<b>Alternative III</b>
<b>Little Owyhee</b>	44	NA	232	NA
<b>Snowstorm Mountains</b>	54	NA	91	NA
<b>Total</b>	<b>99</b>	<b>--</b>	<b>323</b>	<b>--</b>

The model indicates that 224 more mares would be treated with immuno-contraception under Alternative II than the Proposed Action. More animals would be released under Alternative II.

Population Modeling Summary

To summarize the results obtained by simulating the range of Alternatives for the Little Owyhee Complex wild horse gather, the original questions can be addressed.

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

None of the alternatives 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 growth rate.

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

<b>Alternative</b>	<b>Proposed</b>	<b>I</b>	<b>II</b>	<b>III</b>	<b>No Action</b>
<b>Minimum Median Trial</b>	<b>330</b>	<b>336</b>	<b>964</b>	<b>549</b>	<b>930</b>
<b>Average Median Trial</b>	<b>498</b>	<b>534</b>	<b>651</b>	<b>753</b>	<b>1339</b>
<b>Maximum Median Trial</b>	<b>920</b>	<b>923</b>	<b>925</b>	<b>1036</b>	<b>1810</b>

Comparing action Alternatives (Proposed Action – Alt III), Average Median Trial results indicate that fertility control with a gather to the lower limit of the management range (Proposed Action) would produce the lowest average population at 920 animals, and no fertility control with a gather to the upper limit of the management range would produce the highest average population at 1036 animals (Alt III). As expected, Alternative IV, the No Action Alternative results in the highest average population at 1810 animals as animal removal would be delayed.

In comparing fertility control Alternatives (Proposed Action and Alt II), gathering to the upper limit of the management range rather than to the lower limit of the management range results in an average medial population size that is about the same. The difference between gathering to the lower limit of the management range with no fertility (Alt I), and gathering to the lower limit of the management range and applying fertility control (Proposed Action) is 3 animals. The largest difference (excluding the No Action alternative) is noted between the Proposed Action, and Alternative III, where the average median population size is 116 head larger when fertility control is not implemented and the population is gathered to the upper limit of the management range.

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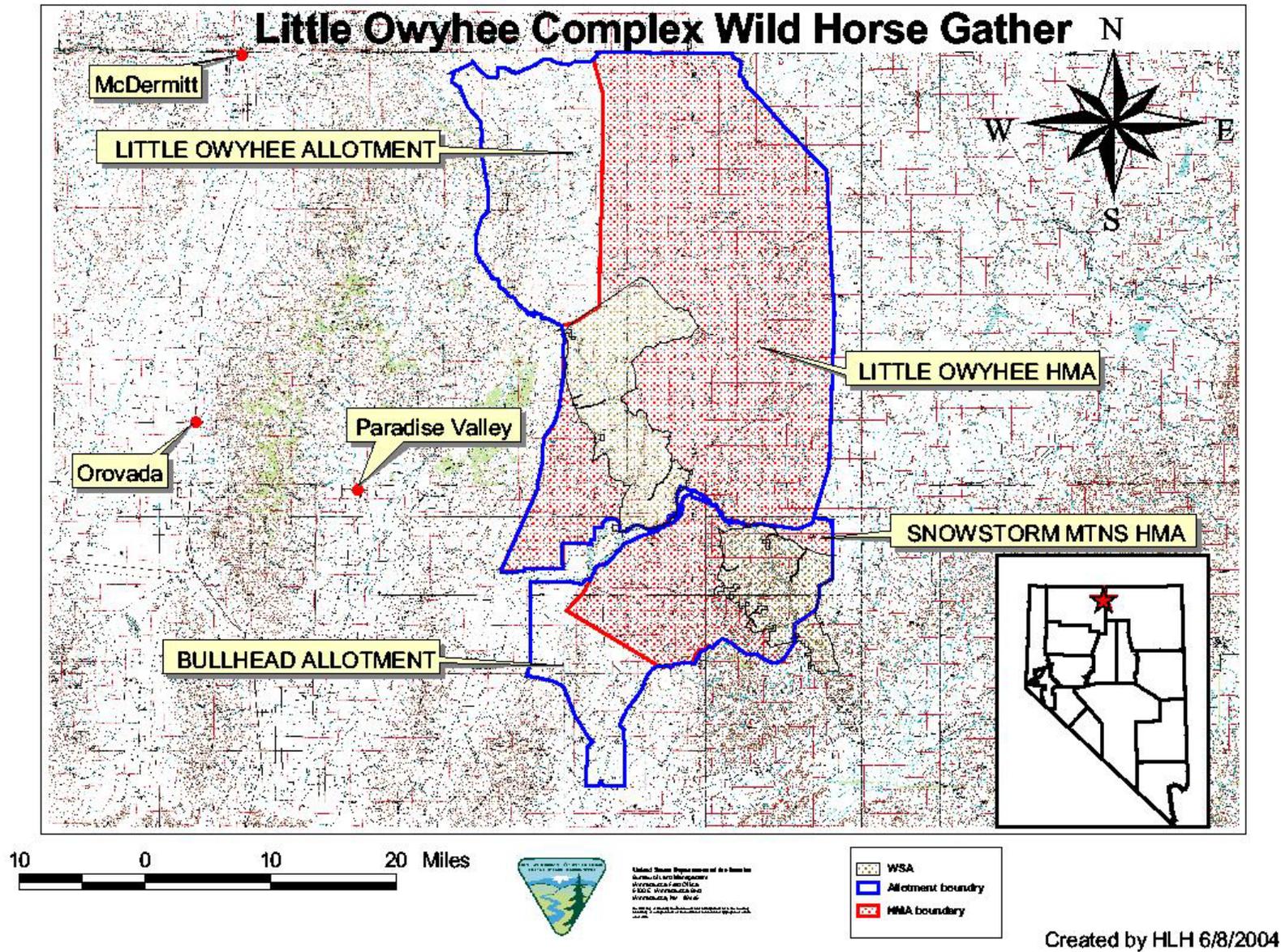


Figure 1: General Location and HMA Map