BLM

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

Final Environmental Assessment

Barren Valley Complex
Wild Horse Gather Plan

U.S. Department of the Interior
Bureau of Land Management
Vale District/Jordan Field Office
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TABLE OF CONTENTS

1.0 Purpose of and Need for Action 1

1.1 Background 1
1.2 Purpose of and Need for Action 2
1.3 Land Use Plan Conformance 2
1.4 Relationship to Laws, Regulations, and Other Plans 3
1.5 Conformance with Rangeland Health Standards and Guidelines 3
1.6 Decision to be Made 3

2.0 Proposed Action and Alternatives 3

2.1 Introduction 4
2.2 Description of Alternatives Considered in Detail 4
2.3 Summary Comparison of Alternatives 6
2.4 Alternatives Considered but Dismissed from Detailed Analysis 6

3.0 Affected Environment 7

3.1 General Description 7
3.2 Description of Affected Resources/Issues 7

4.0 Environmental Consequences 17

4.1 Introduction 17
4.2 Predicted Effects of Alternatives 17
4.3 Cumulative Effects for All Alternatives 25
4.4 Reasonably Foreseeable Future Actions 26
4.5 Summary of Past, Present, and Reasonably Foreseeable Future Actions 27

5.0 Monitoring and Mitigation Measures 28

6.0 List of Preparers 29

7.0 Consultation and Coordination 29

8.0 References 30

9.0 Appendices 30

1.0 Purpose of and Need for Action

1.1 Background

This Environmental Assessment (EA) is a site-specific analysis of the potential impacts that could result with the implementation of the Proposed Action or alternatives to the Proposed Action. Preparation of an EA assists the BLM authorized officer to determine whether to prepare an Environmental Impact Statement (EIS) if significant impacts could result, or a Finding of No Significant Impact (FONSI) if no significant impacts are expected.

The Barren Valley Complex comprises three Herd Management Areas (HMAs) in southeastern Oregon. Historically, the HMAs have been gathered both simultaneously and separately. Gathering the HMAs separately was not always successful due to wild horses crossing into adjoining HMAs during gather operations, therefore, the HMAs have been designated as a complex to be managed complete gather operations simultaneously.

Coyote Lake/Alvord-Tule Springs HMA comprises about 559,400 acres of public land. The HMA is located in Malheur and Harney Counties, west of Burns Junction, Oregon and east of Fields, Oregon (Map 1). The AML for wild horses within the HMA of 198-390 wild horses was reaffirmed in the Southeast Oregon Resource Management Plan Record of Decision (SEORMP/ROD, 2002). The HMA was last gathered in November 2008. The BLM is proposing to gather about 220 wild horses and remove approximately 50 excess wild horses from within and outside the Coyote Lake/Alvord-Tule Springs HMA beginning in about September 2011. One hundred ninety-eight wild horses would remain in the HMA after the gather; of these, about 80 would be mares treated with fertility control and about 120 would be studs or geldings to adjust the sex ratio and slow population growth.

The Sheepshead/Heath Creek HMA comprises about 204,500 acres of public land. The HMA is located in Malheur and Harney Counties, immediately northwest of Burns Junction, Oregon (Map 1). The AML for wild horses within the HMA is 161-302 wild horses. The AML was reaffirmed in the Andrews Management Unit Record of Decision and Resource Management Plan (AMURMP/ROD, 2005). The HMA was last gathered in November 2008. The BLM is proposing to gather about 350 wild horses and remove approximately 200 excess wild horses from within and outside the Sheepshead/Heath Creek HMA beginning in about September 2011. One hundred sixty-one wild horses would remain in the HMA after the gather; of these, about 60 would be mares treated with fertility control and about 100 would be studs or geldings to adjust the sex ratio and slow population growth.

The Sand Springs HMA comprises about 192,524 acres of public land. The HMA is located in Malheur County, immediately northeast of Burns Junction, Oregon and east of Highway 78 (Map 1). The AML for wild horses within the HMA is 100-200 wild horses. The AML was established in Southern Malheur Management Framework Plan (MFP) (1975) and was reaffirmed in the SEORMP/ROD (2002). The HMA was last gathered in September 2006. Currently, the numbers of wild horses residing in Sand Springs HMA is slightly below the low end of AML, therefore, the BLM is proposing to gather about 80 wild horses and remove only those animals that cross into Sand Springs HMA from Sheepshead/Heath Creek HMA during gather operations beginning in September 2011. There have also been approximately 25 wild horses observed outside of the Sand Springs HMA on public lands not designated as a herd area. Any wild horses residing outside the Sand Springs HMA would be gathered and removed. The current population of approximately 90 wild horses would remain in the HMA after the gather; of these, about 40 would be mares treated with fertility control and about 60 would be studs or geldings to adjust the sex ratio and slow population growth.

Since the previous gather in 2008, wild horses have concentrated in the Sheepshead/Heath Creek HMA and in Red Mountain North Pasture of the Coyote Lake/Alvord-Tule Springs HMA. There has also been movement into the Sand Springs HMA do to overcrowding in the Sheepshead/Heath Creek HMA. Based upon all information available at this time, the BLM has determined that approximately 250 excess wild horses exist within the Complex and need to be removed. In addition, approximately 25 wild horses exist south of the Sand Springs HMA that need to be gathered and removed. This assessment is based on the following factors including, but not limited to:

- An estimated population of 700 wild horses exists in the Barren Valley Complex in 2011 with approximately 200 horses in excess of the AML lower limits in Sheepshead/Heath Creek HMA and approximately 50 horses in excess of the AML lower limits in Coyote Lake/Alvord-Tule Springs HMA.
- Use by the approximately 25 wild horses residing south of the Sand Springs HMA is not within a herd area and does not comply with existing land use plans.
- Use by wild horses in Sheepshead/Heath Creek HMA is exceeding the maximum forage allocated to their use by approximately 10 - 30% in 2011.
- Riparian monitoring completed in 2008 and 2010 documents severe utilization of forage within riparian habitats, and extensive trampling and trailing damage by wild horses in the entire complex, but especially in Sheepshead/Heath Creek HMA and Red Mountain North Pasture of the Coyote Lake/Alvord-Tule Springs HMA.

1.2 Purpose of and Need for Action

The purpose and need for the proposed action is to meet the established objectives and goals of the SEORMP/ROD and AMURMP/ROD by maintaining the AML for the HMAs in the Barren Valley Complex (SEORMP/ROD, 2002, 55-57 and AMURMP/ROD, 2005 50-53). The purpose of the action is to gather and remove excess wild horses from the Barren Valley Complex. This action is necessary to maintain a thriving natural ecological balance which protects public land resources from deterioration. During the most recent field monitoring in 2010 and 2011, the wild horse population in the complex is concentrated in the Sheepshead/Heath Creek HMA and Red Mountain North Pasture of Coyote Lake/Alvord-Tule Springs HMA. This has created heavy to severe utilization of riparian and upland vegetation in and adjacent to perennial streams, springs, and reservoirs. Resource damage is occurring in some areas of the HMA due to the current overpopulation of wild horses, and is likely to continue to occur as well as increase without immediate action.

This action is needed in order to achieve and maintain a population size within the established AML, protect rangeland resources from further deterioration associated with the current overpopulation, and restore a thriving natural ecological balance and multiple use relationship on public lands in the area consistent with the provisions of Section 3(b)(2) of the Wild Free-Roaming Horses and Burros Act (WFRHBA) of 1971.

1.3 Land Use Plan Conformance

The Action Alternatives are tiered to the SEORMP/FEIS (2001, Chapter 3 242-246) and AMURMP/FEIS (2004, Chapter 4 171-183) and are in conformance with decisions made in the SEORMP/ROD (2002, 55-57) and AMURMP/ROD (2005, 50-53). Objectives identified for wild horse herds in these documents include (1) maintaining and managing HMAs at AMLs to ensure a thriving natural ecological balance between wild horse populations, wildlife, livestock, vegetation resources, and other resource values, and (2) enhancing and perpetuating special and unique characteristics that distinguish the herd.

1.4 Relationship to Laws, Regulations, and Other Plans

Statutes and Regulations

This action is governed by the WFRHBA of 1971 (Public Law (PL) 92-195 as amended) and Title 43 Code of Federal Regulations (CFR) part 4700. Gathering and disposal of the wild horses would be in accordance with PL 92-195 as amended by PL 94-579 (Federal Land Policy and Management Act (FLPMA)) and PL 95-514 (Public Rangelands Improvement Act (PRIA)). Included are:

- ❒ **43 CFR 4710.3-1 Herd management areas.**
  Herd management areas shall be established for the maintenance of wild horse and burro herds. In delineating each herd management area, the authorized officer shall consider the appropriate management level for the herd, the habitat requirements of the animals, the relationships with other uses of the public and adjacent private lands, and the constraints contained in 4710.4. The authorized officer shall prepare a herd management area plan, which may cover one or more herd management areas.
- ❒ **43 CFR 4710.4 Constraints on management.**
  Management of wild horses and burros shall be undertaken with limiting the animals' distribution to herd areas. Management shall be at the minimum feasible level necessary to attain the objectives identified in approved land use plans and herd management area plans.
- ❒ **43 CFR 4720.1 Removal of excess animals from public lands.**
  Upon examination of current information and a determination by the authorized officer that an excess of wild horses or burros exists, the authorized officer shall remove the excess animals immediately.
- ❒ **43 CFR 4740.1 Use of motor vehicles or aircraft.**
  (a) Motor vehicles and aircraft may be used by the authorized officer in all phases of the administration of the Act, except that no motor vehicle or aircraft, other than helicopters, shall be used for the purpose of herding or chasing wild horses or burros for capture or destruction. All such use shall be conducted in a humane manner.
  (b) Before using helicopters or motor vehicles in the management of wild horses or burros, the authorized officer shall conduct a public hearing in the area where such use is to be made.

1.5 Conformance with Rangeland Health Standards and Guidelines

As stated in 43 CFR 4180.2(b) - "Standards and guidelines must provide for conformance with the fundamentals of 43 CFR 4180.1." The Standards and Guidelines for Grazing Management for public lands have been reviewed by the Departmental Review Team who found that they comply with the requirements of the regulations. Gathering excess horses conforms to the standards and guides which were developed with full public participation and in consultation with Oregon/Washington's resource advisory councils and are in conformance with appropriate land use plans.

1.6 Decision to be Made

The authorized officer would determine whether to implement the proposed population control measures in order to achieve and maintain population size within the established AML and prevent the further deterioration of rangeland and riparian resources resulting from the current wild horse overpopulation. The authorized officer's decision would not set or adjust AML nor would it adjust livestock use, as these were set through previous decisions.

2.0 Proposed Action and Alternatives

2.1 Introduction

This section of the EA describes the Proposed Action and alternatives, including any that were considered but eliminated from detailed analysis. Five alternatives are considered in detail:

- Alternative 1: Proposed Action – Capture wild horses in order to remove approximately 250 excess wild horses, remove approximately 25 outside horses, apply PZP-22 fertility control vaccine to released mares, and establish a 60% male sex ratio.
- Alternative 2: – Capture wild horses in order to remove approximately 250 excess wild horses and remove approximately 25 outside horses (no fertility control or sex ratio adjustment).
- Alternative 3: Capture wild horses in order to remove approximately 250 excess wild horses, remove approximately 25 outside horses, and apply PZP-22 fertility control vaccine to released mares.
- Alternative 4: Capture wild horses in order to remove approximately 250 excess wild horses, remove approximately 25 outside horses, and establish a 60% male sex ratio.
- Alternative 5: No Action — Defer gather and removal.

The Proposed Action, Alternative 2, Alternative 3 and Alternative 4 were developed to respond to the identified resource issues and the Purpose and Need to differing degrees. The No Action Alternative would not achieve the identified Purpose and Need. However, it is analyzed in this EA to provide a basis for comparison with the other action alternatives, and to assess the effects of not conducting a gather at this time. The No Action Alternative is in violation of the WFRHBA which requires the BLM to immediately remove excess wild horses.

2.2 Description of Alternatives Considered in Detail

2.2.1 Management Actions Common to Alternatives 1-4

- ❑ The gather would begin about September 2011 and take about 20 days to complete. Several factors such as animal condition, herd health, weather conditions, or other considerations could result in adjustments in the schedule.
- ❑ Gather operations would be conducted in accordance with the Standard Operating Procedures (SOPs) described in the National Wild Horse and Burro Gather Contract (Appendix A). The primary gather (capture) methods would be the helicopter drive method with occasional helicopter assisted roping (from horseback).
- ❑ Trap sites and temporary holding facilities will be located in previously used sites or other disturbed areas whenever possible. Undisturbed areas identified as potential trap sites or holding facilities would be inventoried for cultural resources. If cultural resources are encountered, these locations would not be utilized unless they could be modified to avoid impacts to cultural resources.
- ❑ An Animal and Plant Inspection Service (APHIS) or other veterinarian may be on-site during the gather, as needed, to examine animals and make recommendations to BLM for care and treatment of wild horses.
- ❑ Decisions to humanely euthanize animals in field situations will be made in conformance with BLM policy (Washington Office Instruction Memorandum 2009-041). Current policy reference: http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/2009/IM_2009-041.html
- ❑ Data including sex and age distribution, condition class information (using the Henneke rating system), color, size and other information may also be recorded, along with the disposition of that animal (removed or released).
- ❑ Hair samples would be collected on about 50-100 animals to assess the genetic diversity of the herd. Samples would also be collected during future gathers as needed to determine whether BLM's management is maintaining acceptable genetic diversity (avoiding inbreeding depression).
- ❑ Excess animals would be transported to the Burns BLM corral facility where they will be prepared (freeze-marked, vaccinated and de-wormed) for adoption, sale (with limitations) or long-term holding.
- ❑ Temporary closure of roads within the HMA during gather operations may be instituted as necessary to allow for safe and effective operations to proceed.

2.2.2 Alternative 1. Proposed Action

The Proposed Action would gather about 650 and remove approximately 275 excess wild horses from within and outside the Barren Valley Complex beginning about September 2011. Animals would be removed using a selective removal strategy. Selective removal criteria for the HMA include: (1) First Priority: Age Class – Four Years and Younger; (2) Second Priority: Age Class – Eleven to Nineteen Years (3) Third Priority: Age Class Five to Ten Years 4) Fourth Priority: Age Class Twenty Years and Older should not be removed from the HMA unless specific exceptions prevent them from being turned back to the range. Irrespective of their age class, all animals residing outside the HMA would be removed. Up to 559 of the captured wild horses would be released; of these, about 223 would be mares of which most would be treated with fertility control and about 336 would be studs (or geldings) as follows:

- ❒ Mares would be treated with a two-year Porcine Zona Pellucida (PZP-22) or similar vaccine and released back to the range. Fertility control treatment would be conducted in accordance with the approved standard operating and post-treatment monitoring procedures (SOPs, Appendix B). Mares would be selected to maintain a diverse age structure, herd characteristics and conformation (body type).
- ❒ Studs and geldings would be selected for release with the objective of establishing a 60% male sex ratio. Studs and geldings would be selected to maintain a diverse age structure, herd characteristics and body type (conformation).
- ❒ Post-gather, every effort would be made to return released horses to the same general area from which they were gathered.

2.2.3 Alternative 2: Removal Only

Alternative 2 would gather about 650 and remove approximately 275 excess wild horses from within and outside the Barren Valley Complex beginning about September 2011. Fertility control would not be applied and no changes to the herd's existing sex ratio would be made.

2.2.4 Alternative 3: Removal with Fertility Control

Alternative 3 would gather about 650 and remove approximately 275 excess wild horses from within and outside the Barren Valley Complex beginning about September 2011. Fertility control would be applied, but no changes to the herd's existing sex ratio would be made.

2.2.5 Alternative 4: Removal with Sex Ratio Adjustment

Alternative 4 would gather about 650 and remove approximately 275 excess wild horses from within and outside the Barren Valley Complex beginning about September 2011. The herd's existing sex ratio would be adjusted to establish a 60% male sex ratio. Fertility control would not be applied.

2.2.6 Alternative 5: No Action

Under the No Action Alternative, no gather would occur and no additional management actions would be undertaken to control the size of the wild horse population at this time.

2.3 Summary Comparison of Alternatives

Table 1: Summary Comparison of the Alternatives

Item	Alternative 1: Proposed Action	Alternative 2: Removal Only	Alternative 3: Removal and Fertility Control only	Alternative 4: Removal and Sex Ratio only	Alternative 5: No Action
Impacts to Wild Horses					
• Gather Number	650	650	650	650	0
• Removal Number	275	275	275	275	0
• Fertility Control - # Mares	200	0	200	0	0
• Post-Gather Sex Ratio	60/40	50/50	50/50	60/40	0
• Post-Gather Population Size by HMA	CLAT 198 SHHC 161 SS 90	CLAT 198 SHHC 161 SS 90	CLAT 198 SHHC 161 SS 90	CLAT 198 SHHC 161 SS 90	CLAT 255 SHHC 350 SS 90

2.4 Alternatives Considered but Dismissed from Detailed Analysis

2.4.1 Use of Bait and/or Water Trapping

It would not be timely, cost-effective or practical to use bait and/or water trapping as the primary gather method because the number of water sources on both private and public lands within and outside the HMA would make it almost impossible to restrict wild horse access to the selected water trap sites. When water sources become limited, accessibility to these water sources is extremely remote, thereby, becoming an unpractical and economically unfeasible method of gathering horses. As a result, this alternative was dismissed from detailed analysis.

2.4.2 Remove or Reduce Livestock within the HMA

This alternative was not brought forward for detailed analysis because it is outside the scope of the analysis and it is contrary to previous decisions which allocated forage for livestock use. Such an action would not be in conformance with the existing land use plan, would be contrary to the BLM's multiple-use mission as outlined in the 1976 Federal Land Policy and Management Act (FLPMA), and would also be inconsistent with the WFRHBA which directs the Secretary to immediately remove excess wild horses.

2.4.3 Gather the HMA to the AML Upper Limit

This alternative was dismissed from detailed study because AML would be exceeded the foaling season following the gather in 2011. This would result in the need to follow up with another gather within one year, and increased stress to individual wild horses and the herd and continuing resource damage due to wild horse overpopulation in the interim. Nor would this alternative be consistent with the WFRHBA, which upon determination excess wild horses are present, requires their immediate removal.

2.4.4 Fertility Control Treatment Only (No Removal)

Population modeling was completed to analyze the potential impacts associated with conducting gathers about every 2-3 years over the next 20 year period to treat captured mares with fertility control. Under this alternative, no excess wild horses would be removed. While the average population growth would be reduced for the next couple of years, AML would not be achieved and the damage to the range associated with wild horse overpopulation would continue. This alternative would not meet the Purpose and Need for the Action, and would be contrary to the WFRHBA, and was dismissed from further study.

3.0 Affected Environment

3.1 General Description of the Affected Environment

The Barren Valley Complex encompasses approximately 956,000 acres of public land within Malheur and Harney Counties, Oregon (Map 1). The complex is made up of three HMAs; Coyote Lake/Alvord-Tule Springs, Sheepshead/Heath Creek, and Sand Springs HMAs. The complex is partially located in the Owyhee uplands with the Owyhee River the east boundary of the Sand Springs HMA. Highway 78 is the boundary between the Sheepshead/Heath Creek and Sand Springs HMAs. The rest of this complex is located in the Alvord Desert and the eastern foothills of the Steens Mountains.

Precipitation in the Barren Valley Complex averages 6 inches in the Steens Mountain rainshadow to 12 inches on the top of the Sheepshead Mountains. Most of this precipitation comes during the winter and spring months in the form of snow, supplemented by localized thunderstorms during the summer months. The primary native vegetation varies throughout the allotment from salt desert vegetation communities to shrub-steppe communities. There is a variety of big sagebrush, low sagebrush, and perennial grasses.

3.2 Description of Affected Resources/Issues

Table 2 lists the elements of the human environment subject to requirements in statute, regulation, or executive order which must be considered.

Table 2: Supplemental Authorities and Other Elements

Supplemental Authorities	Present	Affected	Rationale
ACECs	**YES**	**NO**	Saddle Butte and Palomino Playa ACECs in Sand Springs HMA on the Vale District. Alvord Desert, Mickey Hot Springs, Mickey Basin, Serrano Point, and Borax Lake ACECs in Coyote Lake/Alvord-Tule Springs HMA on the Burns District. To prevent any impacts to ACECs, trap sites and temporary holding facilities would be located in previously disturbed areas. Use of trap sites or holding facilities outside existing areas of disturbance would not be located in areas with existing ACECs.
Air Quality	**YES**	**NO**	The planning area is outside a non-attainment area. Implementation of the Proposed Action would result in small and temporary areas of disturbance.
Cultural Resources	**YES**	**NO**	To prevent any impacts to cultural resources, trap sites and temporary holding facilities would be located in previously disturbed areas. Cultural resource surveys would be conducted prior to using trap sites or holding facilities outside existing areas of disturbance.
Environmental Justice	**NO**	**NO**	Not present.
Fish Habitat	**NO**	**NO**	Not present.
Floodplains	**NO**	**NO**	Not present.
Forest and Rangelands	**YES**	**YES**	Discussed below.
Human Safety	**YES**	**NO**	Implementing the road closures identified in Section 2.2 would eliminate the impacts to human safety created by the proposed action.
Migratory Birds	**NO**	**NO**	Not present.
Native American Religious Concerns	**NO**	**NO**	There are no known Native American Religious Concerns regarding this project.
Noxious Weeds	**YES**	**NO**	To prevent the risk for spread, any noxious weeds or non-native invasive weeds would be avoided when establishing and accessing trap sites and holding facilities.
Prime or Unique Farmlands	**NO**	**NO**	Not present.
Riparian-Wetland Zones	**YES**	**YES**	Discussed below.
T&E Species	**YES**	**YES**	Discussed below.
Water Quality	**YES**	**NO**	Locate trap sites and temporary holding facilities away from any riparian areas to avoid impacts to water quality.
Waste (Hazardous or Solid)	**NO**	**NO**	Not present.
Wild and Scenic Rivers	**NO**	**NO**	Not present.
Wilderness and Wilderness Study Area	**YES**	**NO**	Wilderness Study Areas of: Palomino Hills (3-114) and Saddle Butte (3-111) are located within the Vale District; Wildcat Canyon (2-72C) and Sheepshead Mountain (2-72D) are located within the Vale and shared with the Burns District are located within the HMA. To prevent any impacts to WSA values, trap sites and temporary holding facilities would be located in previously disturbed areas. Use of trap sites or holding facilities outside existing areas of disturbance would not be located in areas with existing WSA values.

In addition to the critical elements listed in Table 2, the following resources may be affected by the Action Alternatives and/or the No Action Alternative. The existing situation (affected environment) relative to these resources is described below.

3.2.1 Wild Horses

Coyote Lake/Alvord-Tule Springs HMA

The Coyote Lake/Alvord-Tule Springs HMA is comprised of portions of four allotments in both Vale and Burns District BLM. The topography of the HMA ranges from relatively flat to mountainous. Elevation varies from approximately 3,900 to 6,100 feet, with the southern end of the Sheepshead Mountains being the highest prominent landmark.

The area's designation as a herd management area was analyzed in the SEORMP/FEIS (2001). AML is established at a population range of 198 - 390 wild horses. Forage is allocated for 4680 animal unit months (AUMs). Inventory data show the majority of wild horses historically concentrating on Red Mountain, Tule Springs, and Mickey Basin throughout the spring, summer, and fall as water sources and forage become scarce. During most winters, horses tend to disperse across the lower elevations in the HMA as water becomes available in potholes and playas.

The current estimated population of 250 wild horses in the Coyote Lake/Alvord-Tule Springs HMA is based on a direct count aerial population survey completed in April 2010. Calculation of population growth has been difficult to determine by individual HMA as horses continually move into adjacent HMAs. The current population is approximately 50 horses over the AML lower limit.

In the early 1970's, wild horses within the Coyote Lake portion of the HMA were very varied in color while the Alvord-Tule Springs portion of the HMA was dominated by bay, black, brown, sorrel, palomino, and buckskin. Adult horses in the HMA weigh an average of 950 to 1150 pounds and stand between 14.3 and 15.3 hands, with some stallions being slightly larger. The horses exhibit saddle stock conformation with quarter horse and thoroughbred influence.

Baseline genetic diversity samples were taken in 2001. These samples indicate that genetic variability within the Coyote Lake/Alvord-Tule Springs HMA is moderate to good. The herd appears to be of mixed origins from light racing and riding breeds which includes the thoroughbred and quarter horse. In comparison with other Oregon herds, the Coyote Lake/Alvord-Tule Springs herd shows closest resemblance to the Jackies Butte and Paisley herds.

The last removal of excess wild horses from the Coyote Lake/Alvord-Tule Springs HMA was completed in November 2008 when 393 horses were gathered and 244 were removed. Seventy-four mares were fertility control treated and released with 70 stallions/geldings for a post-removal 50/50 % male/female sex ratio.

Sheepshead/Heath Creek HMA

The Sheepshead/Heath Creek HMA is comprised of portions of two allotments in both Vale and Burns District BLM. The topography of the HMA ranges from relatively flat to mountainous. Elevation varies from approximately 3,900 to 6,300 feet, with the northern end of the Sheepshead Mountains being the highest prominent landmark. Approximately 20% of this HMA burned in the Sheepshead fire in 2001. There have been several smaller fires within this area from the 1980's to present. The location of the Sheepshead burn is where most of the horses are currently congregated within the HMA.

The area's designation as a herd management area was analyzed in the AMURMP/FEIS (2004). AML is established at a population range of 161-302 wild horses. Forage is allocated for 3624 AUMs. Inventory data show the majority of wild horses historically concentrating on the north end of the Sheepshead Mountains, Bone Springs Canyon, and Wildcat Canyon yearlong.

The current estimated population of 350 wild horses in the Sheepshead/Heath Creek HMA is based on a direct count aerial population survey completed in April 2010. Calculation of population growth has been difficult to determine by individual HMA as horses continually move into adjacent HMAs, but the overall population growth in the Barren Valley Complex has been over 20% since the previous gather. The increase in numbers in Sheepshead/Heath Creek HMA indicates there has most likely been movement from adjacent HMAs. The current population in this HMA is approximately 190 horses over the AML lower limit.

In the early 1970's, wild horses within the Sheepshead portion of the HMA were very varied in color while the Heath Creek portion of the HMA was dominated by dun, bay, black, brown, sorrel, and an occasional paint. Adult horses in the HMA weigh an average of 950 to 1150 pounds and stand between 14.3 and 15.3 hands, with some stallions being slightly larger. The horses exhibit saddle stock conformation with quarter horse and thoroughbred influence.

Baseline genetic diversity samples were taken in 2002. These samples indicate that genetic variability within the Sheepshead/Heath Creek HMA is low. The herd appears to be of mixed origins from North American gaited breeds and occasional draft horse influence. In comparison with other Oregon herds, this HMA shows closest resemblance to the Paisley HMA.

The last removal of excess wild horses from the Sheepshead/Heath Creek HMA was completed in November 2008 when 233 horses were gathered and 145 were removed. Forty-six mares were fertility control treated and released with 43 stallions/geldings for a post-removal 40/60% male/female sex ratio.

Since the Barren Valley Complex was identified as individual HMAs in the 1970's, management and gathers have occurred independently and cooperatively. Therefore, the table below reflects the gather history for all of the HMAs in the Barren Valley Complex except for Sand Springs HMA.

Table 3: Coyote Lake/Alvord-Tule Springs and Sheepshead/Heath Creek Gather History

HMA	Year	Captured	Removed	Released	Died/Euthanized
Coyote Lake/Alvord-Tule Springs	2008	393	244	184	4
Sheepshead/Heath Creek	2008	212	145	84	1
Coyote Lake/Alvord-Tule Springs	2005	367	367		
Sheepshead/Heath Creek	2002	320	257	63	
Coyote Lake/Alvord-Tule Springs	2001	303	303		
Alvord-Tule Springs	1997	113	113		
Coyote Lake	1996	151	134		
Sheepshead	1994	190	190		
Sheepshead	1992	115	115		
Coyote Lake	1991	203	203		
Alvord/Barren Valley/Sheepshead/Tule Springs	1988	6	6		
Sheepshead	1988	214	214		
Coyote Lake	1987	5	5		
Coyote Lake	1986	547	545	0	2
Alvord/Barren Valley/Sheepshead/Tule Springs	1985	207	207	0	0
Sheepshead	1985	258	258	0	0
Sheepshead /Heath Creek	1984	389	388	0	1
Alvord/Barren Valley/Sheepshead/Tule Springs	1981	338	336	0	2
Barren Valley/Sheepshead/Alvord	1979	518	510	5	3
Sheepheads/Coyote Lake	1977	599	598	0	1
Barren Valley/Sheepshead/Alvord	1976	8	8	0	0
Barren Valley/Sheepshead/Alvord	1975	20	20	0	0
Barren Valley/Sheepshead/Alvord	1974	38	35	0	3

Sand Springs HMA
The Sand Springs HMA is comprised of portions of two allotments in the Vale District. The topography of the HMA ranges from relatively flat to river canyon country. Elevation varies from approximately 3,900 to 4,500 feet, with Saddle Butte being the highest prominent landmark just outside the north boundary of the HMA. Approximately 35% of this HMA burned in the Happy Valley fire in 2006. There have been several smaller fires within this area from the 1980's to present. The location of the Happy Valley fire is where the perennial upland water sources are located in the HMA, thereby being in the heart of summer range and habitat.

The area's designation as a herd management area was analyzed in the SEORMP/FEIS (2001). AML is established at a population range of 100-200 wild horses. Forage is allocated for 2400 AUMs. Inventory data show the majority of wild horses historically concentrating on the rims above the Owyhee River during the winter and around the few perennial springs during the spring, summer, and fall.

The current estimated population of 90 wild horses in the Sand Springs HMA is based on a direct count aerial population survey completed in April 2010. Calculation of population growth has been difficult to determine by individual HMA as horses continually move into adjacent HMAs, but the increase in numbers in this HMA indicates there has most likely been movement from adjacent HMAs. The current population in this HMA is approximately 10 horses under the AML lower limit.

In the early 1970's, wild horses within the Sand Springs HMA were very predominantly pinto and buckskin colors. Adult horses in the HMA weigh an average of 950 to 1050 pounds and stand between 14.2 and 15.2 hands, with some stallions being slightly larger. The horses exhibit saddle stock conformation with quarter horse and thoroughbred influence.

Baseline genetic diversity samples have not been analyzed for this herd.

The last removal of excess wild horses from the Sand Springs HMA was completed in September 2006 when 130 horses were gathered and 115 were removed in an emergency gather following a large wildfire.

Table 4: Sand Springs Gather History

HMA	Year	Captured	Removed	Released	Died/Euthanized
Sand Springs	2006	130	115	15	5
Sand Springs	2005	280	220	60	2
Sand Springs	2000	194	138	56	1
Sand Springs	1992	189	189		
Sand Springs	1988	208	208		
Sand Springs	1985	327	325	0	2
Sand Springs	1981	350	246	0	4
Sand Springs	1977	280	277	0	3

Most of the wild horses observed in the Barren Valley Complex in 2010 were a Body Condition Score of 4-6 using the Henneke Body Condition Chart.

3.2.2 Grazing Management

Coyote Lake/Alvord-Tule Springs HMA
The Coyote Lake portion of the HMA is located within the Coyote Lake Allotment and part of the Whitehorse Butte Allotment in the Vale Distrit. Coyote Lake has two livestock operators. One operator is authorized to utilize 344 active AUMs from November 16 to February 14 and the other operator is authorized to utilize 3014 active AUMs and 1945 exchange of use AUMs from October 1 to January 31. Livestock grazing reductions

have been made on a voluntary basis by past owners of the White Horse Ranch in the Red Mountain North pasture due to lack of water and impacts on Willow Creek.

The BLM allocated forage for livestock use in the SEORMP/ROD (2002,p. E-181). The allocation was carried forward from the Southern Malheur Rangeland Program Summary Update (December 1986). The allocation will be revisited during activity planning associated with evaluation and assessment within Barren Valley Geographic Management Area as described in the SEORMP.

The Alvord-Tule Springs portion of the HMA is located within the Alvord Allotment in the Burns District. There are four pastures within the allotment. Three of the pastures are authorized as spring/summer use and one pasture is authorized as winter use. There is one livestock operator authorized to graze a total of 7,355 AUMs of annually from December 1 to April 15 on the winter pasture and from April 16 to June 30 on the spring pastures.

Forage for livestock use was most recently allocated by the BLM in the 2005 AMURMP/ROD. The allocation will be revisited during activity planning associated with evaluation and assessment within the Alvord Allotment as described in the Andrews RMP.

Table 5 summarizes information about livestock grazing and its relationship to wild horse management within the Coyote Lake/Alvord-Tule Springs HMA.

Table 5: Livestock Use Information

Allotment	Total Allotment Acres	% of Allotment in HMA	Number of Permittees	Number of Authorized Livestock	Authorized Season of Use	Authorized Livestock AUMs in Allotment	Average Actual Livestock Use (AUMs) (Past 5 years)
Coyote Lake	162,858 PD 15,500 Pvt 80 State	100%	2	Cattle	10/01-02/14	3,358	414 minimum 1,737 average 4,257 maximum
Whitehorse Butte	124,821 PD 14,544 Pvt 166 State	19%	1	Cattle	03/16-08/31	9,287	5152 average 3130 minimum 8089 maximum
Alvord	223,895 PD 5,600 Pvt	38%	1	700 Cattle 1254 cattle	4/16 – 6/30 12/01-4/15	7,355	1660 minimum 6035 average 8859 maximum

Sheepshead/Heath Creek HMA

The Sheepshead portion of the HMA is located within the Sheephead Allotment in the Vale District. There is one operator authorized to graze cattle annually, and who is authorized to utilize 3,949 active Animal Unit Months (AUMs) of forage within the allotment each year between March 01 and February 28. Currently there is no Allotment Management Plan (AMP) for the Sheephead Allotment. There is also no established grazing system within the Sheephead Allotment; however the permittee rotates his cattle around four unfenced use areas which are Palomino Hills, East and West Ryegrass and Sheephead.

The BLM allocated forage for livestock use in the SEORMP/ROD (2002, p. E-178). The allocation was carried forward from the Southern Malheur Rangeland Program Summary Update (December 1986). The allocation will be revisited during activity planning associated with evaluation and assessment within Barren Valley Geographic Management Area as described in the SEORMP.

The Heath Creek portion of the HMA is located within the Pollock Allotment in the Burns District. There are seven pastures within the allotment. Six of the pastures are authorized as spring/summer use and one pasture is authorized as winter use. There is one livestock operator authorized to graze a total of 4107 AUMs annually between November 15 to March 31 on the winter pasture and from April 1 to September 15 on the spring/summer pastures.

Table 6 summarizes information about livestock grazing and its relationship to wild horse management within the Sheepshead/Heath Creek HMA.

Table 6: Livestock Use Information

Allotment	Total Allotment Acres	% of Allotment in HMA	Number of Permittees	Number of Authorized Livestock	Authorized Season of Use	Authorized Livestock AUMs in Allotment	Average Actual Livestock Use (AUMs) (Past 5 years)
Sheepshead	152,037 PD 1,102 Pvt 602 State	100%	1	597 Cattle	03/01-02/28	3,949	3,966 minimum 4,057 average 4,233 maximum
Pollock	76,758 PD 4,895 Pvt 5,561 State	32%	1	520 Cattle 530 cattle	4/01 – 9/15 11/15-3/31	4107	1431 minimum 4305 average 4783 maximum

Sand Springs HMA

The Sand Springs HMA is located primarily within the Saddle Butte Allotment in the Vale District. There are a total of seven livestock operators authorized to graze cattle annually. The operators are authorized to utilize 6,314 Animal Unit Months (AUMs) of forage within the allotment each year between November 1 and March 31. An AUM is the amount of forage needed to sustain one cow, five sheep, or five goats for a month. The allotment is comprised of one pasture which is grazed by livestock. The Saddle Butte Allotment Management Plan (AMP) acknowledged that no formal grazing system was developed given that the allotment was to be grazed during the winter. Within the Saddle Butte Allotment the approximate growth period for the key forage species, bottlebrush squirreltail *(Elymus elymoides)*, is March 25 through August 1. Winter grazing use in the Saddle Butte Allotment is based on that year's forage production.

The BLM allocated forage for livestock use in the SEORMP/ROD (2002, p. E-208). The allocation was carried forward from the Southern Malheur Rangeland Program Summary Update (December 1986). The allocation will be revisited during activity planning associated with evaluation and assessment within Saddle Butte Geographic Management Area as described in the SEORMP.

Table 7 summarizes information about livestock grazing in Saddle Butte Allotment and its relationship to wild horse management within the Sand Springs HMA.

Table 7: Livestock Use Information

Allotment	Total Allotment Acres	% of Allotment in HMA	Number of Permittees	Number of Authorized Livestock	Authorized Season of Use	Authorized Livestock AUMs in Allotment	Average Actual Livestock Use (AUMs) (Past 5 years)
Saddle Butte	175,841 PD 9,172 Pvt 623 State	100%	7	1,714 Cattle	11/1 – 3/31	6,314	1,999 minimum 4,081 average 5,971 maximum

3.2.3 Wildlife

The project area includes habitat for approximately 300 wildlife species. Many of these species use the area for part of the year and/or as connective habitat while traveling to more productive ground.

Big Game: Pronghorn Antelope are widely distributed across the project area and represent the primary big game species in this area. Mule deer use this area throughout the year, but are only found in large numbers during the winter. During October through May this area is particularly important as Mule deer winter range habitat. Elk also use this area in the winter, but are less frequent than pronghorn antelope and mule deer. California Bighorn sheep are common on the Sheepshead Mountains, Red Mountain, and around Tule Springs, but only use Coyote Lake in winter.

Raptors: A variety of Raptor species use the project area at various times during the year. Most Raptors species migrate through and are only in the area for a short time. These include: the bald and golden eagle, Swainson's, Ferruginous, red- tailed and sharp shinned hawk, prairie and peregrine falcon, northern harrier, American Kestrel, and Western burrowing owl.

Other important game species known to occur in the HMA include chukar and Hungarian partridge, mourning doves, and sage grouse.

The area lacks perennial water and habitat for native species of fish.

3.2.4 Threatened and Endangered/Special Status Species

No threatened and/or endangered animal species are known or suspected to occur within the Barren Valley Complex. Special status wildlife species likely to occur within the project area include kit fox, spotted bat, pygmy rabbit, peregrine falcon, and sage grouse.

Greater sage grouse: The greater sage grouse is currently a species that is considered "warranted for listing under the Endangered Species Act of 1973. A small number of sage grouse use this area, but wildfire has reduced the amount of sage brush and diminished the habitat. Approximately half of the Barren Valley HMA is considered category 2 sage grouse habitat. The northern quarter of the unit is category 1. The management goals for category 2 sage grouse habitat are: avoid development within these areas, or if impacts are unavoidable, maintain the current habitat quantity or quality and provide a net benefit to sage grouse habitat. Category 1 habitat is priority habitat for sage grouse. Actions within category 1 habitat should not diminish or reduce the quality of habitat for sage grouse.

Information on the remaining special status species is limited, but the likelihood of additional special status species using this area for a significant portion of their life history requirements is low.

Special Status Plant Species:

In February 2008 a new interagency special status species list for Oregon/Washington BLM and Region 6 of the USFS was developed (BLM 2008). The interagency list is an attempt to coordinate management for rare species across land ownership boundaries. This new and most current list used new criteria to determine if species are sensitive and eliminated the categories of Bureau Assessment and Bureau Tracking Species. As a result, some previously listed species have come off the list and some species' status has changed from sensitive to strategic. There are now three categories of special status species for Oregon/Washington BLM and Region 6 of the USFS: Federally listed species under the ESA, and Sensitive species or Strategic species as designated by the State Director or the Regional Forester.

A number of previously known special status plants in the Barren Valley complex are no longer special status. This change in status could be due to a number of factors such as the new criteria in determining if species are sensitive or expansion of a species range as a result of increased inventory and survey. For this reason only those plants presently designated as Bureau Sensitive or Bureau Strategic will be addressed within this section.

Within the Barren Valley Complex nine different special status species occur: Davis' peppergrass (*Lepidium davisii*), Desert chaenactis (*Chaenactis xantiana*), Transmontane sand-verbena (*Abronia turbinata*), Wheeler's skeleton-weed (*Chaetadelpah wheeleri*), Lyrate malacothrix (*Malacothrix sonchoides*), Salt heliotrope (*Heliotropium curassavicum*), Iodine bush (*Allenrolfea occidentalis*) and Desert needlegrass (*Achnatherum speciosum*). Aside from Davis' peppergrass, abundance of all other species occurrences is low with isolated infrequent pockets throughout the complex. Wild horses do not pose a known threat to the aforementioned species aside from Davis' peppergrass.

Davis' peppergrass (*Lepidium davisii*), is a Bureau Sensitive specie with known occurrences in five playas within the Coyote Lake/Alvord – Tule Springs HMA and seven playas within Sand Springs HMA. Recent and past monitoring reveals heavy horse use on the playas. The use generally occurs during times when the playas are wet and being used as a water source for the horses. This continues through most of the summer, causing extensive soil compaction and heavy disturbance. In Oregon wild horse impact is the primary threat to this species.

3.2.5 Vegetation

Shrub steppe vegetation communities in the area result from cold winters and hot dry summers. Historically, the project area supported a wide variety of sagebrush/perennial grassland cover types. Disturbance factors that have occurred within the complex include historic domestic livestock grazing use, wild horse grazing use, wildfire and invasive plants. Outside of seedings and cheatgrass, this vast area consists of a sagebrush (*Artemisia*) overstory with an understory dominated by perrenial bunchgrass. Dominant species of shrub and bunchgrass include: Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*), mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), low sagebrush (*Artemisia arbuscula*), shadscale (*Atriplex confertiflora*), spiny hopsage (*Grayia spinosa*), Sandberg bluegrass (*Poa sandbergii*), Cusick's bluegrass (*Poa cusickii*), bluebunch wheatgrass (*Pseudorogneria spictata*), Thurber's needlegrass (*Achnatherum thurberiana*), Idaho fescue (*Festuca idahoensis*) and Indian ricegras (*Achnatherum hymenoides*). Riparian habitats are very infrequent throughout the complex. Riparian vegetation consists of but is not limited to the following: Beardless wildrye (*Leymus triticoides*), Coyote willow (*salix exigua*), yellow willow (*Salix lutea*), Nebraska sedge (*Carex nebraskensis*), *Carex* sp., spikerush (*Eleocharis* sp.), Baltic rush (*Juncus balticus*), tufted hairgrass (*Deschampsia caespitosa*), alpine timothy (*Phleum alpinum*), Leiberg's bluegrass (*Poa leibergii*), hardstem bulrush (*Schoenoplectus acutus*), and cattail (*Typha* sp.).

Portions of the complex are infested with a conglomerate of mostly annual weeds or weedy species. Perennial pepperweed (*Lepidium latifolium*), whitetop (*Lepidium spp.)*, Russian knapweed (*Acroptilon repens*), halogeton (*Halogeton glomeratus*) and saltcedar (*Tamorix ramosissima*) are common in the Upper and Lower Willow Creek Waterholes areas (Little Coyote Playa). With the exception of saltcedar, these species as well as Scotch (*Onapordum acanthium*) and Canada thistle (*Circium arvense*), occur as small, isolated patches within other portions of the area.

3.2.6 Soils

The soils found in the Barren Valley Complex were surveyed and described in Oregon's Long Range Requirements for Water 1969, Appendix I-11, Owyhee Drainage Basin and Appendix I-12. They are mainly a

combination of Unit 75 and 77 soils on slopes varying from three to twelve percent and Unit 30 and 55 soils on slopes varying from zero to twelve percent. The area also contains smaller amount of Units 57, 76, and 99.

Unit 30 soils are deep, poorly drained soils formed in fine-textured alluvium on flat basins and old playa bottoms. The native vegetation consists mostly of western wheatgrass, silver sagebrush, big sagebrush, and rabbitbrush.

Unit 55 soils are shallow, loamy, well drained soils with cemented pans. These soils occur on very extensive to moderately steep old fans and high terrace remnants. Native vegetation consists mostly of big sagebrush, low sagebrush, rabbitbrush, budsage, Atriplex spp., needlegrass, squirreltail grass, and Sandberg bluegrass.

Unit 57 soils are deep, well drained soils derived from loamy materials on old fans. Sloes are dominantly nearly level to gently sloping. Native vegetation consists mostly of big sagebrush, low sagebrush, rabbitbrush, budsage, Atriplex spp., needlegrass, and squirreltail grass.

Unit 75 soils are loamy, shallow, very stony, well drained soils over basalt, rhyolite, or welded tuff. Unit 75 soils occur on gently undulating to rolling lava plateaus with some very steep faulted and dissected terrain. The soil profile consists of very stony silt loam, stony loam, and stony silt loam over bedrock at 15+ inches.

Unit 76 soils are shallow, clayey, very stony, well drained soils over basalt, rhyolite, or welded tuff. They occur on gently undulating to rolling lava plateaus and some very steep faulted and dissected terrain. The soil profile consists of very stony, silt loam, stony silty clay, to stony and channery, heavy, silty clay loams over fractured bedrock at 18+ inches.

Unit 77 soils are very shallow, very stony, rocky, well-drained soils over basalt, rhyolite, or welded tuff. These soils occur on gently undulating to rolling lava plateaus. Native vegetation consists mostly of big sagebrush, low sagebrush, and Sandberg bluegrass.

Unit 99 is a miscellaneous land unit consisting of recent lava flows. These flows are generally on low slopes, but do have extremely irregular, rough surfaces. There do tend to be small pockets of soil development on which there is some vegetation.

3.2.7 Riparian Areas and Water Resources

In the Coyote Lakes portion of the HMA, Willow Creek is the only perennial riparian area. Willow Creek is on the State of Oregon's 303(d) list which indicates that the stream is unable to meet water quality standards. Oregon Department of Environmental Quality (ODEQ) has initiated a Total Maximum Daily Load study on Willow Creek (Willow Creek Total Maximum Daily Load, ODEQ, March 1999). This study identifies wild horse grazing in the riparian area as one of the factors contributing to the stream's degraded condition.

In the Alvord-Tule Springs portion of the HMA, the only perennial water sources are springs in Mickey Basin, Mickey Hot Springs, and Tule Springs. Wells provide some extension of range during the winter. Season long grazing near perennial springs, (Tule Springs, Buckbrush Springs, Big Sand Gap Springs, Little Sand Gap Springs), and Calderwood Desert Well, becomes a resource concern as horse numbers continue to increase. Table Mountain pasture has historically perennial springs and water holes fed from Wildcat Creek which are currently dry. There are a few scattered playas and seeps throughout the rest of the HMA that provide limited riparian habitat.

Riparian areas in the Sheepshead/Heath Creek HMA are associated with a few perennial springs, Heath Creek, Wildcat Canyon, and bone Canyon. The entire riparian habitat in this HMA is associated with the higher elevations along the ridges associated with the Sheepshead Mountains. Most of the limited water sources in the lower elevations of this HMA are associated with reservoirs.

Riparian vegetation in the Sand Springs HMA is extremely limited, existing primarily at a few scattered springs and reservoirs. Most of the riparian areas are related to several perennial springs and seeps along the eastern edge of the HMA above the Owyhee River Rim. There are also several natural water gaps on the Owyhee River that wild horses rarely use.

While not extensive, riparian zones are an important resource for wildlife, wild horses, and livestock. Because of the demands on riparian areas, management considerations have focused on protecting these areas. Maintaining AML of wild horse herds is important to keeping utilization at acceptable levels and preserving riparian habitat.

4.0 Environmental Consequences

4.1 Introduction

This section of the EA documents the potential environmental impacts which would be expected with implementation of the Action Alternatives (Alternatives 1-4) and/or the No Action Alternative. These include the direct impacts (those that result from the management actions) and indirect impacts (those that exist once the management action has occurred).

4.2 Predicted Effects of Alternatives

The direct and indirect impacts to these resources which would be expected to result with implementation of the Action Alternatives or No Action Alternative are discussed in detail below.

4.2.1 Wild Horses

Results of Win Equus Population Modeling

The Alternatives were modeled using Version 3.2 of the Win Equus population model (Jenkins, 2000). The purpose of the modeling was to analyze and compare the effects of the Action Alternatives on population size, average population growth rate, and average removal number. Another objective of the modeling was to identify if any of the alternatives "crash" the population or cause extremely low population numbers or growth rates.

Minimum population levels and growth rates were found to be within reasonable levels and adverse impacts to the population are not likely. There was not a significant difference in the Action Alternatives for the number average number of horses removed over the next 11 years. See Appendix C for additional detail.

Impacts Common to Action Alternatives (1-4)

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

The BLM has been conducting wild horse gathers since the mid-1970s. During this time, methods and procedures have been identified and refined to minimize stress and impacts to wild horses during gather implementation. The SOPs (Appendix A) would be implemented to ensure a safe and humane gather occurs

and would minimize potential stress and injury to wild horses. In addition to implementation of the SOPs, BLM would temporarily close roads in the HMA where gather operations were occurring to assist in ensuring the safety of the public, BLM contractors, BLM personnel, and wild horses.

In any given gather, gather-related mortality averages about one half of one percent (0.5%), which is very low when handling wild animals. Approximately another six-tenths of one percent (0.6%) of the captured animals could be humanely euthanized due to pre-existing conditions and in accordance with BLM policy (IM-2009-041). These data affirm that the use of helicopters and motorized vehicles has proven to be a safe, humane, effective, and practical means for the gather and removal of excess wild horses (and burros) from the public lands. The BLM also avoids gathering wild horses by helicopter during the 6 weeks prior to and following the peak foaling season (i.e., March 1 through June 30).

Individual, direct impacts to wild horses include the handling stress associated with the roundup, capture, sorting, handling, and transportation of the animals. The intensity of these impacts varies by individual, and is indicated by behaviors ranging from nervous agitation to physical distress. When being herded to trap site corrals by the helicopter, injuries sustained by wild horses may include bruises, scrapes, or cuts to feet, legs, face, or body from rocks, brush or tree limbs. Rarely, wild horses may encounter barbed wire fences and may receive wire cuts. These injuries are very rarely fatal and are treated on-site until a veterinarian can examine the animal and determine if additional treatment is indicated.

Other injuries may occur after a horse has been captured and is either within the trap site corral, the temporary holding corral, during transport between facilities, or during sorting and handling. Occasionally, horses may sustain a spinal injury or a fractured limb but based on prior gather statistics, serious injuries requiring humane euthanasia occur in less than 1 horse per every 100 captured.

To minimize the potential for injuries from fighting, the animals are transported from the trap site to the temporary (or short-term) holding facility where they are sorted as quickly and safely as possible, then moved into large holding pens where they are provided with hay and water.

Indirect individual impacts are those which occur to individual wild horses after the initial event. These may include miscarriages in mares, increased social displacement, and conflict in studs. These impacts, like direct individual impacts, are known to occur intermittently during wild horse gather operations. An example of an indirect individual impact would be the brief skirmishes between older studs which ends when one stud retreats. Injuries typically involve a bite or kick with bruises which do not break the skin. Like direct individual impacts, the frequency of these impacts varies with the population and the individual. Observations following capture indicate the rate of miscarriage varies, but can occur in about 1 to 5% of the captured mares, particularly if the mares are in very thin body condition or in poor health.

Gathering the wild horses during the Fall/Winter reduces risk of heat stress, although this can occur during any gather, especially in older or weaker animals. Adherence to the SOPs as well and techniques used by the gather contractor help minimize the risks of heat stress. Heat stress does not occur often, but if it does, death can result. Most temperature related issues during a gather can be mitigated by adjusting daily gather times to avoid the extreme hot or cold periods of the day.

A few foals may be orphaned during a gather. This can occur if the mare rejects the foal, the foal becomes separated from its mother and cannot be matched up following sorting, the mare dies or must be humanely euthanized during the gather, the foal is ill or weak and needs immediate care that requires removal from the mother, or the mother does not produce enough milk to support the foal. On occasion, foals are gathered that

were previously orphaned on the range (prior to the gather) because the mother rejected it or died. These foals are usually in poor, unthrifty condition. Every effort is made to provide appropriate care to orphan foals. Veterinarians may administer electrolyte solutions or orphan foals may be fed milk replacer as needed to support their nutritional needs. Orphan foals may be placed in a foster home in order to receive additional care. Despite these efforts, some orphan foals may die or be humanely euthanized as an act of mercy if the prognosis for survival is very poor.

Wild horses not captured may be temporarily disturbed and moved into another area during the gather operation. With the exception of changes to herd demographics from removals, direct population 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 awareness of human presence.

It is not expected that genetic health would be negatively impacted by the Proposed Action. The AML range in the Barren Valley Complex of 559-892 should provide for acceptable genetic diversity.

By maintaining wild horse population size within the AML within the Sheepshead/Heath Creek HMA, there would be a lower density of wild horses across all of the HMAs within the complex. This results in reducing competition for resources and allowing wild horses to utilize their preferred habitat. Maintaining population size within the established AMLs would be expected to improve forage quantity and quality and promote healthy, self-sustaining populations of wild horses in a thriving natural ecological balance and multiple use relationship on the public lands in the area. Deterioration of the range associated with wild horse overpopulation would be avoided. Managing wild horse populations in balance with the available habitat and other multiple uses would lessen the potential for individual animals or the herd to be affected by drought, and would avoid or minimize the need for emergency gathers, which would reduce stress to the animals and increase the success of these herds over the long-term.

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

About 275 excess horses would be removed. Animals would be transported from the capture/temporary holding corrals to the designated BLM short-term holding corral facility(s) according to SOPs (Appendix A). During transport, potential impacts to individual horses can include stress, as well as slipping, falling, kicking, biting, or being stepped on by another animal. Unless wild horses are in extremely poor condition, it is rare for an animal to be seriously injured or die during transport.

Upon arrival at the short term holding facility, most wild horses begin to eat and drink immediately and adjust rapidly to their new situation. Recently captured wild horses, generally mares, in very thin condition may have difficulty transitioning to feed. Some of these animals are in such poor condition that it is unlikely they would have survived if left on the range. Similarly, some mares may lose their pregnancies. Every effort is taken to help the mare make a quiet, low stress transition to captivity and domestic feed to minimize the risk of miscarriage or death.

After recently captured wild horses have transitioned to their new environment, they are prepared for adoption or sale. During the preparation process, potential impacts to wild horses are similar to those that can occur during handling and transportation. Serious injuries and deaths from injuries during the preparation process are rare, but can occur.

At short-term corral facilities, a minimum of 700 square feet is provided per animal. Mortality at short-term holding facilities averages approximately 5% per year (GAO-09-77, page 51), and includes animals euthanized

due to a pre-existing condition; animals in extremely poor condition; animals that are injured and would not recover; animals which are unable to transition to feed; and animals which are seriously injured or accidentally die during sorting, handling, or preparation.

From there, they would be made available for adoption or sale to qualified individuals or to long-term holding (grassland) pastures.

Adoption or Sale with Limitations, and Long Term Holding
Other indirect impacts include transportation to adoptions, sales, or long-term pastures (LTP). Adoptions are conducted in accordance with 43 CFR 5750. Sales of wild horses are conducted in accordance with Bureau policy. The BLM has maintained long-term pastures (LTP) in the Midwest for over 20 years. Potential impacts to wild horses from transport to adoption, sale or LTP are similar to those previously described.

LTPs are designed to provide excess wild horses with humane, life-long care in a natural setting off the public rangelands. Handling by humans is minimized to the extent possible although regular on-the-ground observation and weekly counts of the wild horses to ascertain their numbers, well-being, and safety are conducted.

Impacts of Alternative 1 (Proposed Action)
PZP application would be done according to SOPs (Appendix B). When injected, PZP (antigen) causes the mare's immune system to produce antibodies and these antibodies bind to the mare's eggs, and effectively block sperm binding and fertilization (Zoo Montana, 2000). PZP is relatively inexpensive, meets BLM requirements for safety to mares and environment, and can easily be administered in the field. In addition, among mares, PZP contraception appears to be completely reversible.

The highest success for fertility control has been obtained when applied during the timeframe of November through February. This gather would require PZP application outside the window for highest success. Below is the efficacy for the application of the two-year PZP vaccine:

	Year 1	Year 2	Year 3	Year 4
Summer Application	Normal	80%	65%	50%
Winter Application	Normal	94%	82%	68%

One-time application at the capture site would not affect normal development of the fetus, hormone health of the mare or behavioral responses to stallions, should the mare already be pregnant when vaccinated (Kirkpatrick, 1995). The vaccine has also proven to have no apparent effect on pregnancies in progress, the health of offspring, or the behavior of treated mares (Turner, 1997). Mares would foal normally in 2012 (Year 1).

Mares receiving the vaccine would experience slightly increased stress levels associated with handling while being vaccinated and freeze-marked. Serious injection site reactions associated with fertility control treatments are rare in treated mares. Any direct impacts associated with fertility control, such as swelling or local reactions at the injection site, would be minor in nature and of short duration. Most mares recover quickly once released back to the HMA, and none are expected to have long term consequences from the fertility control injections.

Under Alternative 1, some captured wild horses would be released back to the range to achieve a post-gather sex ratio of 60% studs or geldings and 40% mares. Under this alternative, band size would be expected to decrease, competition for mares would be expected to increase, recruitment age for reproduction among mares

would be expected to decline, and size and number of bachelor bands would be expected to increase. These effects would be slight, as the proposed sex ratio is not an extreme departure from normal sex ratio ranges. Modification of sex ratios for a post-gather population favoring studs or geldings would further reduce growth rates in combination with fertility control.

Impacts of Alternative 2 (Removal Only)
Implementation of Alternative 2 would result in capturing fewer wild horses than would be captured in Alternative 1. Alternative 2 would not involve fertility control; mares would not undergo the additional stress of receiving fertility control injections or freeze-marking and would foal at normal rates until the next gather is conducted. The post-gather sex ratio would be about 50:50 mares to studs. This would be expected to result in fewer and smaller bachelor bands, increased reproduction on a proportional basis within the herd, larger band sizes, and individual mares would likely begin actively producing at a slightly older age.

Impacts of Alternative 3 (Removal and Fertility Control)
Alternative 3 would involve fertility control, therefore, impacts related to fertility control would be the same as Alternative 1. The post-gather sex ratio would be about 50:50 mares to studs. This would be expected to result in fewer and smaller bachelor bands, increased reproduction on a proportional basis within the herd, larger band sizes, and individual mares would likely begin actively producing at a slightly older age.

Impacts of Alternative 4 (Removal and Sex Ratio Adjustment)
Alternative 2 would not involve fertility control, therefore, impacts related to fertility control would not apply. The post-gather sex ratio would be about 60:40 studs or geldings to mares. These impacts would similar to those discussed in Alternative 1.

Impacts of Alternative 5 (No Action)
Under the No Action Alternative, there would be no active management to control the population size within the established AML at this time. In the absence of a gather, wild horse populations would continue to grow at an average rate of 25% per year. Without a gather and removal now, the population would grow to 449 in four years based on the average annual growth rate.

Use by wild horses would continue to exceed the amount of forage allocated for their use. Competition between wildlife, livestock and wild horses for limited forage and water resources would continue. Damage to rangeland resources would continue or increase. Over time, the potential risks to the health of individual horses would increase, and the need for emergency removals to prevent their death from starvation or thirst would also increase. Over the long-term, the health and sustainability of the wild horse population is dependent upon achieving a thriving natural ecological balance and sustaining healthy rangelands. Allowing wild horses to die of dehydration or starvation would be inhumane and would be contrary to the WFRHBA which requires that excess wild horses be immediately removed. Allowing rangeland damage to continue to result from wild horse overpopulation would also be contrary to the WFRHBA which requires the BLM to "*protect the range from the deterioration associated with overpopulation*", "*remove excess animals from the range so as to achieve appropriate management levels*", and "*to preserve and maintain a thriving natural ecological balance and multiple-use relationship in that area*."

4.2.2 Grazing Management
Direct impacts to livestock and management practices from activity associated with gathering, including disturbance resulting from moving horses with a helicopter, would be minimal within the HMAs. Removal of horses from outside the HMAs may result in minimal livestock disturbance while herding wild horses into the HMAs.

Impacts Common to Action Alternatives (1-4)
Removal of approximately 275 head of horses from inside and outside the complex would reduce competition between livestock and wild horses for the available forage and water resources. Indirect impacts would include an increase in the quality and quantity of the available forage in the short-term. Over the longer-term, improved vegetation resources would lead to a thriving natural ecological condition.

Impacts of Alternative 1 (Removal, Sex Ratio Adjustment, and Fertility Control) – Impacts of removal would benefit livestock management opportunities due to limitations for forage and water resources as identified above. Those benefits would be extended by limiting future growth of the horse herd through sex ratio adjustments and fertility control.

Impacts of Alternative 2 (Removal Only) **–** Impacts would not be as beneficial as in Alternative 1 and 3 due to the wild horse population increasing at a faster rate as a result of not conducting fertility control measures or adjusting the sex ratio of the herd.

Impacts of Alternative 3 (Removal and Fertility Control) **-** Impacts would not be as beneficial as in Alternative 1 due to the wild horse population increasing at a faster rate as a result of not adjusting the sex ratio of the herd.

Impacts of Alternative 4 (Removal and Sex Ratio Adjustment) **-** Impacts would not be as beneficial as in Alternative 1 due to the wild horse population increasing at a faster rate as a result of not conducting fertility control measures.

Impacts of Alternative 5 (No Action)
The current wild horse population is 10-20% above their forage allocation. Heavy to severe utilization is occurring in areas where wild horses concentrate. The indirect impacts of No Action (Defer Gather and Removal) would be continued damage to the range, continuing competition between livestock, wild horses and wildlife for the available forage and water, reduced quantity and quality of forage and water, and undue hardship on the livestock operators who would continue to be unable to fully use the forage resource they are authorized to use.

4.2.3 Wildlife

Impacts Common to Action Alternatives (1-4)
Wildlife currently using the project area would be exposed to the activities associated with horse gathers. The use of a helicopter would result in disturbance to wildlife, proportionate to the amount of time the helicopter is in use and the amount of ground that is covered. Effects would be of short duration (8 to 10 days) and localized. The effects to wildlife from trapping would be specific to the trap site.

Reducing horse numbers in this area would reduce the competition between horses and wildlife for the limited water and riparian habitat.

Impacts of Alternative 2 (Removal Only) **–** Impacts would not be as beneficial as in Alternative 1 and 3 due to the wild horse population increasing at a faster rate as a result of not conducting fertility control measures or adjusting the sex ratio of the herd.

Impacts of Alternative 3 (Removal and Fertility Control) **-** Impacts would not be as beneficial as in Alternative 1 due to the wild horse population increasing at a faster rate as a result of not adjusting the sex ratio of the herd.

***Impacts of Alternative 4 (Removal and Sex Ratio Adjustment)* -** Impacts would not be as beneficial as in Alternative 1 due to the wild horse population increasing at a faster rate as a result of not conducting fertility control measures.

Impacts of Alternative 5 (No Action)
Wildlife populations in the HMA would be forced to compete more for limited water and forage, which would most likely alter use patterns. Habitat degradation would decrease wildlife populations and wildlife use in the HMA.

4.2.4 Threatened and Endangered/Special Status Species

Impacts Common to Action Alternatives (1-4)
Reducing the number of wild horses in the HMA will lead to increased herbaceous cover as well as maintained or improved vegetative conditions. This will benefit sage grouse and other special status species identified in the affected environment by limiting habitat fragmentation and providing increased forage and vegetative structure required by the various life processes of these species. Habitat quality and quantity would be increased reducing potential threats to the species viability within the Barren Valley Complex.

Reducing the number of wild horses in the HMA would avoid unnecessary adverse impacts from wild horses to special status plants and their potential habitats in the Barren Valley Complex. Trap sites and off road access points used for the gather would be surveyed for special status plants prior to the gather in order to avoid known occurrence and potential habitats.

***Impacts of Alternative 2 (Removal Only)* –** Impacts would not be as beneficial as in Alternative 1 and 3 due to the wild horse population increasing at a faster rate as a result of not conducting fertility control measures or adjusting the sex ratio of the herd.

***Impacts of Alternative 3 (Removal and Fertility Control)* -** Impacts would not be as beneficial as in Alternative 1 due to the wild horse population increasing at a faster rate as a result of not adjusting the sex ratio of the herd.

***Impacts of Alternative 4 (Removal and Sex Ratio Adjustment)* -** Impacts would not be as beneficial as in Alternative 1 due to the wild horse population increasing at a faster rate as a result of not conducting fertility control measures.

Impacts of Alternative 5 (No Action)
Special status species would be affected by increased horse numbers through degradation of habitat conditions which could reduce productivity of these species. Riparian vegetation browsing and trampling springs, primarily due to wild horse use, would further degrade habitat conditions for wildlife.

4.2.5 Vegetation

Impacts Common to Action Alternatives (1-4)
In the immediate vicinity of the catch pens or corrals and the loading chute, short-term disturbance would occur. The soil would be compacted and vegetation would be trampled during panel installation by personnel and vehicles and severely trampled in the catch pen area by wild horses, domestic horses, and the wranglers. It is estimated and anticipated that 1 to 3 years would be required for native vegetation to become reestablished or regain vigor under average conditions with no reclamation. The total area of impact per trap would be approximately 2 acres, with less than ¼ acre severely disturbed. Less than one AUM of livestock forage would be temporarily lost for one grazing season at each trap site used.

There would be a positive impact to the upland and riparian vegetation by reducing the total numbers of wild horses grazing year long within the HMA. Lessened utilization would allow critical growth period rest for key cool season grasses. The composition of vegetation would change to a higher percentage of desirable plants, soil cover would increase and the potential for erosion would decrease.

Impacts of Alternative 1 (Removal, Sex Ratio Adjustment, and Fertility Control) – Impacts of removal would benefit vegetation resources as identified above. Those benefits would be extended by limiting future growth of the horse herd through sex ratio adjustments and fertility control.

Impacts of Alternative 2 (Removal Only) **–** Impacts would not be as beneficial as in Alternative 1 and 3 due to the wild horse population increasing at a faster rate as a result of not conducting fertility control measures or adjusting the sex ratio of the herd.

Impacts of Alternative 3 (Removal and Fertility Control) **-** Impacts would not be as beneficial as in Alternative 1 due to the wild horse population increasing at a faster rate as a result of not adjusting the sex ratio of the herd.

Impacts of Alternative 4 (Removal and Sex Ratio Adjustment) **-** Impacts would not be as beneficial as in Alternative 1 due to the wild horse population increasing at a faster rate as a result of not conducting fertility control measures.

Impacts of Alternative 5 (No Action)
Areas which are presently over utilized, such as areas adjacent to water sources, would continue to be used excessively. The area of over utilization would continue to increase in both size and degree. The composition of vegetation would change to a higher percentage of undesirable plants, soil cover would be reduced, and the potential for erosion would increase.

4.2.6 Soils

Impacts Common to Action Alternatives (1-4)

Soil loss and compaction would be expected to decrease in those areas near water sources where horses are forced to concentrate. Lower populations of horses would result in less hoof traffic, thereby decreasing negative impacts to soil micro biotic crusts.

Soil would be displaced and/or compacted on approximately two acres at each site in the construction of the trap, use of the access routes, and in the round-up and loading of the wild horses. The area of severe surface disturbance is normally less than 2,000 square feet. Minimal surface wind and water erosion is expected on these areas during the vegetative rehabilitation period (approximately 1 to 3 years).

Impacts of Alternative 2 (Removal Only) **–** Impacts would not be as beneficial as in Alternative 1 and 3 due to the wild horse population increasing at a faster rate as a result of not conducting fertility control measures or adjusting the sex ratio of the herd.

Impacts of Alternative 3 (Removal and Fertility Control) **-** Impacts would not be as beneficial as in Alternative 1 due to the wild horse population increasing at a faster rate as a result of not adjusting the sex ratio of the herd.

***Impacts of Alternative 4 (Removal and Sex Ratio Adjustment)* -** Impacts would not be as beneficial as in Alternative 1 due to the wild horse population increasing at a faster rate as a result of not conducting fertility control measures.

Impacts of Alternative 5 (No Action)
Soil loss and compaction would be expected to increase in those areas near water sources where horses are forced to concentrate. Increased wild horse numbers on uplands and riparian areas would negatively impact soil surface features and would increase erosion in the HMA.

4.2.7 Riparian Areas and Water Resources

Impacts Common to Action Alternatives (1-4)
The proposed action would limit the intensity of use at water sources and surrounding uplands. Regulating the number of wild horses in the HMA would reduce use near water sources and riparian areas by minimizing degradation to these resources.

The trap sites would not be located adjacent to any surface water sources or riparian areas, therefore, there would be no anticipated direct impact due to the gather.

***Impacts of Alternative 2 (Removal Only)* –** Impacts would not be as beneficial as in Alternative 1 and 3 due to the wild horse population increasing at a faster rate as a result of not conducting fertility control measures or adjusting the sex ratio of the herd.

***Impacts of Alternative 3 (Removal and Fertility Control)* -** Impacts would not be as beneficial as in Alternative 1 due to the wild horse population increasing at a faster rate as a result of not adjusting the sex ratio of the herd.

***Impacts of Alternative 4 (Removal and Sex Ratio Adjustment)* -** Impacts would not be as beneficial as in Alternative 1 due to the wild horse population increasing at a faster rate as a result of not conducting fertility control measures.

Impacts of Alternative 5 (No Action)
Increasing numbers of wild horses in the HMA would result in greater use and degradation of riparian areas. This would result in an unacceptable decline in water quality through increased sedimentation and water temperatures. Riparian area vegetation would be degraded as additional horse use would decrease vegetation recruitment, reproduction, and survivability. In addition, riparian vegetation community types and distribution would be changed, root density lessened, and canopy cover reduced. This would lead to reduced stream channel and spring/seep dynamics and further deterioration of these systems.

4.3 Cumulative Effects for All Alternatives

The NEPA regulations define cumulative impacts as impacts on the environment that result from the incremental impact of the Proposed Action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such actions (40 CFR 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. The cumulative impacts study area (CSA) for the purposes of evaluating cumulative impacts is the Barren Valley Complex.

According to the 1994 BLM *Guidelines for Assessing and Documenting Cumulative Impacts*, the cumulative analysis should be focused on those issues and resource values identified during scoping that are of major importance. Accordingly, the issues of major importance to be analyzed are maintaining rangeland health and proper management of wild horses.

Past and Present Actions

4.3.1 Wild Horses

Currently, management and AML of wild horses within the complex conforms to decisions in the SEORMP/ROD (2002) and the AMURMP/ROD (2005).

The actions which have influenced today's wild horse population are primarily wild horse gathers, which have resulted in the capture of some 7,352 wild horses, the removal of 6,919 excess horses, and release of 336 horses back into the HMA (see Table 3, Section 3.2.2).

4.3.2 Vegetation

Through land use planning decisions, the BLM has allocated the available forage to livestock, wildlife and domestic livestock. Additional benefits provided by healthy vegetation resources have resulted in land use planning decision to limit unacceptable impacts to vegetation. While the present livestock grazing system and efforts to manage the wild horse population within AML has reduced past historic impacts, monitoring indicates that the current overpopulation of wild horses is continuing to contribute to areas of heavy vegetation utilization, trailing and trampling damage and is preventing the BLM from managing for rangeland health and a thriving natural ecological balance and multiple use relationship on the public lands in the area.

4.4 Reasonably Foreseeable Future Actions

4.4.1 Wild Horses

Over the next 10-20 year period, reasonably foreseeable future actions include gathers about every 4 years to remove excess wild horses in order to manage population size within the established AML range. The excess animals removed would be transported to short-term corral facilities where they would be prepared for adoption, sale (with limitations), or LTPs. Any future wild horse management would be analyzed in appropriate environmental documents following site-specific planning with public involvement.

4.4.2 Vegetation

Continuing to graze livestock in a manner consistent with grazing permit terms and conditions would be expected to achieve or make significant progress towards achieving rangeland health standards and guidelines. Livestock grazing is expected to continue at similar stocking rates and utilization of the available vegetation (forage) would also be expected to continue at similar levels, with appropriate corrective actions implemented if current livestock management practices are found to contribute to not meeting rangeland health standards or guidelines. Similarly, appropriate actions would be implemented to adjust livestock grazing authorization terms and conditions, including livestock numbers and seasons of use, in the event that current livestock grazing practices are found to contribute to not meeting resource management objectives.

4.5 Summary of Past, Present, and Reasonably Foreseeable Future Actions

Impacts Common to Action Alternatives (1-4)

The cumulative effects associated with the capture and removal of excess wild horses includes gather-related mortality of less than 1% of the captured animals, about 5% per year associated with transportation, short term holding, adoption or sale with limitations and about 8% per year associated with long-term holding. This compares with natural mortality on the range ranging from about 5-8% per year for foals (animals under age 1), about 5% per year for horses ages 1-15, and 5-100% for animals age 16 and older (Stephen Jenkins, 1996, Garrott and Taylor, 1990). In situations where forage and/or water are limited, mortality rates increase, with the greatest impact to young foals, nursing mares and older horses.

The other cumulative effects which would be expected when incrementally adding either of the Action Alternatives to the CSA would include continued improvement of upland vegetation conditions, which would in turn benefit permitted livestock, native wildlife, and wild horse population as forage (habitat) quality and quantity is improved over the current level. Benefits from a reduced wild horse population would include fewer animals competing for limited forage and water resources. Cumulatively, there should be more stable wild horse populations, healthier rangelands, healthier wild horses, and fewer multiple use conflicts in the area over the short and long-term. Over the next 15-20 years, continuing to manage wild horses within the established AML range would achieve a thriving natural ecological balance and multiple use relationship on public lands in the area.

Impacts of Alternative 1 (Proposed Action)

Application of fertility control and adjustment in sex ratios to favor males should slow population growth and result in fewer gathers and less frequent disturbance to individual wild horses and the herd's social structure. However, return of wild horses back into the HMA could lead to decreased ability to effectively gather horses in the future as released horses learn to evade the helicopter.

Impacts of Alternative 2 (Removal Only)

Removal only of wild horses has been the predominant method of population control used in the past on this herd. This alternative will result in more frequent gathers and disturbance to the wild horses than Alternatives 1, 3 or 4. As wild horses are gathered and sorted through for selecting which animals to release back into the HMA, there could be a decrease in the ability to effectively gather horses in the future as released horses learn to evade the helicopter.

Impacts of Alternative 3 (Removal and Fertility Control)

Application of fertility control should slow population growth and result in fewer gathers and less frequent disturbance to individual wild horses and the herd's social structure. However, return of wild horses back into the HMA could lead to decreased ability to effectively gather horses in the future as released horses learn to evade the helicopter.

Impacts of Alternative 4 (Removal and Sex Ratio Adjustment)

Adjusting the sex ratio of the herd should slightly slow population growth and result in fewer gathers and less frequent disturbance to individual wild horses and the herd's social structure. However, return of wild horses back into the HMA could lead to decreased ability to effectively gather horses in the future as released horses learn to evade the helicopter.

Impacts of Alternative 5 (No Action)
Under the No Action Alternative, the wild horse population could exceed the low end of AML by approximately four or five times in four years. Movement outside the HMA would be expected as greater numbers of horses search for food and water for survival, thus impacting larger areas of public lands. Heavy to excessive utilization of the available forage would be expected and the water available for use could become increasingly limited. Eventually, ecological plant communities would be damaged to the extent that they are no longer sustainable and the wild horse population would be expected to crash.
Emergency removals could be expected under this alternative in order to prevent individual animals from suffering or death as a result of insufficient forage and water. These emergency removals could occur as early as FY 2012. During emergency conditions, competition for the available forage and water increases. This competition generally impacts the oldest and youngest horses as well as lactating mares first. These groups would experience substantial weight loss and diminished health, which could lead to their prolonged suffering and eventual death. If emergency actions are not taken, the overall population could be affected by severely skewed sex ratios towards stallions as they are generally the strongest and healthiest portion of the population. An altered age structure would also be expected.

Cumulative impacts would result in foregoing the opportunity to improve rangeland health and to properly manage wild horses in balance with the available forage and water and other multiple uses. Attainment of site-specific vegetation management objectives and Standards for Rangeland Health would not be achieved. AML would not be achieved and the opportunity to collect the scientific data necessary to re-evaluate AML levels, in relationship to rangeland health standards, would be foregone.

5.0 Monitoring and Mitigation Measures

The BLM Contracting Officer's Representative (COR) and Project Inspectors (PIs) assigned to the gather would be responsible for ensuring contract personnel abide by the contract specifications and the SOPs (Appendix A). Ongoing monitoring of forage condition and utilization, water availability, aerial population surveys, rangeland resources health, and animal health would continue.

Fertility control monitoring would be conducted in accordance with the SOPs (Appendix B). Monitoring the herd's social behavior would be incorporated into routine monitoring. The objective of this additional monitoring would be to determine if additional studs form bachelor bands or are more aggressive with breeding bands for the forage and water present.

If genetic monitoring indicates a loss of genetic diversity, then mares would be introduced into the Barren Valley Complex from an HMA with similar characteristics.

6.0 List of Preparers

The following list identifies the interdisciplinary team member's area of responsibility:

Shaney Rockefeller - Wild Horse and Burro Specialist, Vale District
Gary McFadden - Wild Horse and Burro Specialist, Burns District
Aimee Huff - Rangeland Management Specialist, Vale District
Marcella Egger - Rangeland Management Specialist, Vale District
Louis Clayburn - Rangeland Management Specialist, Burns District
Garth Ross - Wildlife Biologist, Fisheries, Vale District
Diane Pritchard – Archaeologist, Vale District
Lynne Silva, Weed Specialist, Vale District
Linus Meyer – Hydrologist, Soil Scientist, Riparian Management, Vale District
Gillian Wigglesworth – Botanist, ACEC/RNA Coordinator, Vale District
Caryn Meinicke – Botanist, Burns District
Kari Frederick – Recreation, VRM, Wilderness, Vale District
Eric Haakenson – Recreation, VRM, Wilderness, Burns District
Steve Christensen - Planning and Environmental Coordinator, Vale District
Rhonda Karges - Planning and Environmental Coordinator, Burns District
Carolyn Freeborn – Field Manager, Jordan Resource Area, Vale District
Joan Suther – Field Manager, Andrews Resource Area, Burns District

7.0 Consultation and Coordination

Public hearing(s) are held as a single state-wide hearing at the Burns District Office regarding the use of helicopters and motorized vehicles to capture wild horses (or burros). During the hearing(s), the public is given the opportunity to present new information and to voice any concerns or opinions regarding the use of these methods to capture wild horses (or burros). The Burns BLM Office held a hearing on May 4, 2010. One member of the pubic attended the meeting. BLM reviewed its Standard Operating Procedures in response to the views and issues expressed at the hearing and determined that no changes to the SOPs were warranted.

A notice of the action was sent to the groups and individuals on the Vale and Burns District Mailing Lists including wild horse and burro interest groups.

Livestock operators in the Barren Valley Complex have been consulted.

Coordination has been conducted with Oregon Department of Fish and Wildlife.

8.0 References

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9.0 Appendices

Appendix A –	Standard Operating Procedures (Gather Operation)
Appendix B –	Standard Operating Procedures (Fertility Control Application and Monitoring)
Appendix C –	Win Equus Population Modeling Results
Map 1 –	Barren Valley Complex

APPENDIX A

Standard Operating Procedures (SOPs) for Wild Horse (or Burro) Gathers

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

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

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

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

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

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

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

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

All trap and holding facilities locations must be approved by the Contracting Officer's Representative (COR) and/or the Project Inspector (PI) prior to construction. The Contractor may also be required to change or move trap locations as determined by the COR/PI. All traps and holding facilities not located on public land must have prior written approval of the landowner.

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

factors. Under normal circumstances this travel should not exceed 10 miles and may be much less dependent on existing conditions (i.e. ground conditions, animal health, extreme temperature (high and low)).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

C. Use of Motorized Equipment

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

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

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

4. All tractor-trailers used to transport animals to final destination(s) shall be equipped with at least one (1) door at the rear end of the trailer which is capable of sliding either horizontally or vertically. The rear door(s) of tractor-trailers and stock trailers must be capable of opening the full width of the trailer. Panels facing the inside of all trailers must be free of sharp edges or holes that could cause injury to the animals. The material facing the inside of all trailers must be strong enough so that the

animals cannot push their hooves through the side. Final approval of tractor-trailers and stock trailers used to transport animals shall be held by the COR/PI.

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

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

11 square feet per adult horse (1.4 linear foot in an 8 foot wide trailer);
8 square feet per adult burro (1.0 linear foot in an 8 foot wide trailer);
6 square feet per horse foal (.75 linear foot in an 8 foot wide trailer);
4 square feet per burro foal (.50 linear feet in an 8 foot wide trailer).

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

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

D. Safety and Communications

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

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

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

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

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

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

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

E. Site Clearances

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

Prior to setting up a trap or temporary holding facility, BLM will conduct all necessary surveys (archaeological, T&E, etc). All proposed site(s) must be inspected by a government archaeologist. Once archaeological survey has been conducted, the trap or temporary holding facility may be set up. Said surveys shall be arranged for by the COR, PI, or other BLM employees.

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

F. Animal Characteristics and Behavior

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

G. Public Participation

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

H. Responsibility and Lines of Communication

Contracting Officer's Representative/Project Inspector
Shaney Rockefeller

Contracting Officer's Representative/Project Inspector
Gary McFadden

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

All publicity, formal public contact and inquiries will be handled through the District Public Affairs Officer. This individual will be the primary contact and will coordinate with the COR/PI on any inquiries.

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

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

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

APPENDIX B

Standard Operating Procedures for Population-level Fertility Control Treatments

One-year liquid vaccine: The following implementation and monitoring requirements are part of the Proposed Action:

1. PZP vaccine would be administered through darting by trained BLM personnel or collaborating research partners only. For any darting operation, the designated personnel must have successfully completed a Nationally recognized wildlife darting course and who have documented and successful experience darting wildlife under field conditions.

2. Mares that have never been treated would receive 0.5 cc of PZP vaccine emulsified with 0.5 cc of Freund's Modified Adjuvant (FMA) and loaded into darts at the time a decision has been made to dart a specific mare. Mares identified for re-treatment receive 0.5 cc of the PZP vaccine emulsified with 0.5 cc of Freund's Incomplete Adjuvant (FIA).

3. The liquid dose of PZP vaccine is administered using 1.0 cc Pneu-Darts with 1.5" barbless needles fired from either Dan Inject® or Pneu-Dart® capture gun.

4. Only designated darters would mix the vaccine/adjuvant and prepare the emulsion. Vaccine-adjuvant emulsion would be loaded into darts at the darting site and delivered by means of a capture gun.

5. Delivery of the vaccine would be by intramuscular injection into the left or right hip/gluteal muscles while the mare is standing still.

6. Safety for both humans and the horse is the foremost consideration in deciding to dart a mare. The Dan Inject® gun would not be used at ranges in excess of 30 m while the Pneu-Dart® capture gun would not be used over 50 m, and no attempt would be taken when other persons are within a 30-m radius of the target animal.

7. No attempts would be taken in high wind or when the horse is standing at an angle where the dart could miss the hip/gluteal region and hit the rib cage. The ideal is when the dart would strike the skin of the horse at a perfect 90° angle.

8. If a loaded dart is not used within two hours of the time of loading, the contents would be transferred to a new dart before attempting another horse. If the dart is not used before the end of the day, it would be stored under refrigeration and the contents transferred to another dart the next day. Refrigerated darts would not be used in the field.

9. No more than two people should be present at the time of a darting. The second person is responsible for locating fired darts. The second person should also be responsible for identifying the horse and keeping onlookers at a safe distance.

10. To the extent possible, all darting would be carried out in a discrete manner. However, if darting is to be done within view of non-participants or members of the public, an explanation of the nature of the project would be carried out either immediately before or after the darting.

11. Attempts will be made to recover all darts. To the extent possible, all darts which are discharged and drop from the horse at the darting site would be recovered before another darting occurs. In exceptional situations, the site of a lost dart may be noted and marked, and recovery efforts made at a later time. All discharged darts would be examined after recovery in order to determine if the charge fired and the plunger fully expelled the vaccine.

12. All mares targeted for treatment will be clearly identifiable through photographs to enable researchers and HMA managers to positively identify the animals during the research project and at the time of removal during subsequent gathers.

13. Personnel conducting darting operations should be equipped with a two-way radio or cell phone to provide a communications link with the Project Veterinarian for advice and/or assistance. In the event of a veterinary emergency, darting personnel would immediately contact the Project Veterinarian, providing all available information concerning the nature and location of the incident.

14. In the event that a dart strikes a bone or imbeds in soft tissue and does not dislodge, the darter would follow the affected horse until the dart falls out or the horse can no longer be found. The darter would be responsible for daily observation of the horse until the situation is resolved.

22-month time-release pelleted vaccine: The following implementation and monitoring requirements are part of the Proposed Action:

1. PZP vaccine would be administered only by trained BLM personnel or collaborating research partners.

2. The fertility control drug is administered with two separate injections: (1) a liquid dose of PZP is administered using an 18-gauge needle primarily by hand injection; (2) the pellets are preloaded into a 14-gauge needle. These are delivered using a modified syringe and jabstick to inject the pellets into the gluteal muscles of the mares being returned to the range. The pellets are designed to release PZP over time similar to a time-release cold capsule.

3. Delivery of the vaccine would be by intramuscular injection into the gluteal muscles while the mare is restrained in a working chute. The primer would consist of 0.5 cc of liquid PZP emulsified with 0.5 cc of Freunds Modified Adjuvant (FMA). The pellets would be loaded into the jabstick for the second injection. With each injection, the liquid or pellets would be injected into the left hind quarters of the mare, above the imaginary line that connects the point of the hip (hook bone) and the point of the buttocks (pin bone).

4. In the future, the vaccine may be administered remotely using an approved long range darting protocol and delivery system if or when that technology is developed.

5. All treated mares will be freeze-marked on the hip or neck HMA managers to positively identify the animals during the research project and at the time of removal during subsequent gathers.

Monitoring and Tracking of Treatments:
1. At a minimum, estimation of population growth rates using helicopter or fixed-wing surveys will be conducted before any subsequent gather. During these surveys it is not necessary to identify which foals were born to which mares; only an estimate of population growth is needed (i.e. # of foals to # of adults).

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

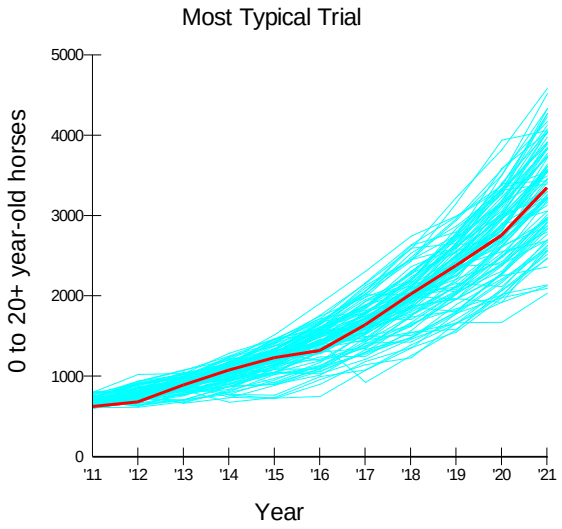
3. A PZP Application Data sheet will be used by field applicators to record all pertinent data relating to identification of the mare (including photographs if mares are not freeze-marked) and date of treatment. Each applicator will submit a PZP Application Report and accompanying narrative and data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

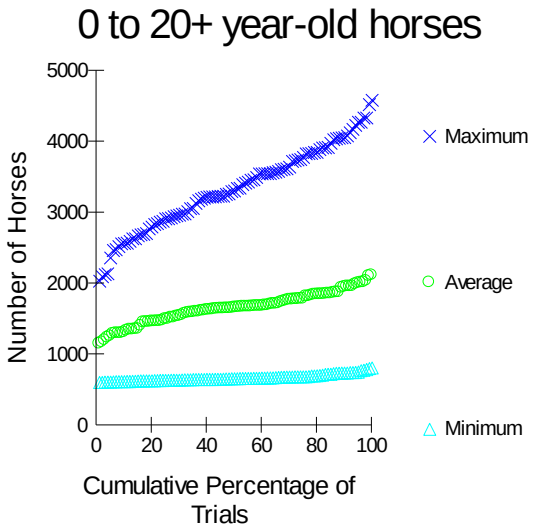
4. A tracking system will be maintained by NPO detailing the quantity of PZP issued, the quantity used, disposition of any unused PZP, the number of treated mares by HMA, field office, and State along with the freeze-mark(s) applied by HMA and date.

APPENDIX C

Population Modeling

Barren Valley Complex – No Action



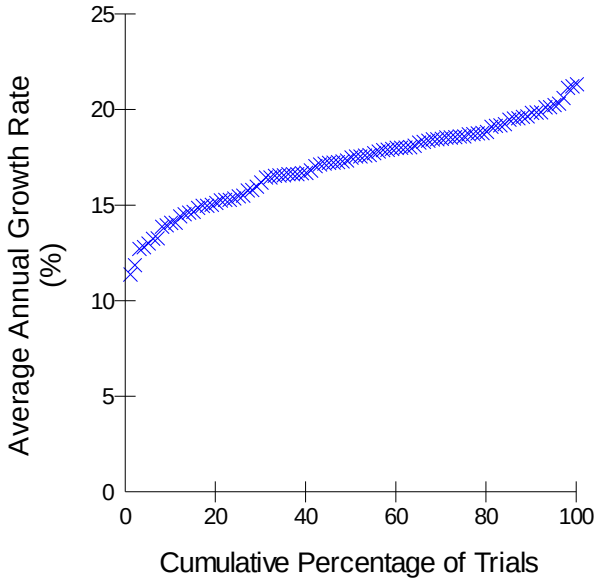


Population Sizes in 11 Years

	Minimum	Average	Maximum
Lowest Trial	606	1148	2037
10th Percentile	620	1321	2572
25th Percentile	637	1497	2918
Median Trial	660	1660	3328
75th Percentile	687	1799	3808
90th Percentile	741	1952	4075
Highest Trial	812	2113	4589

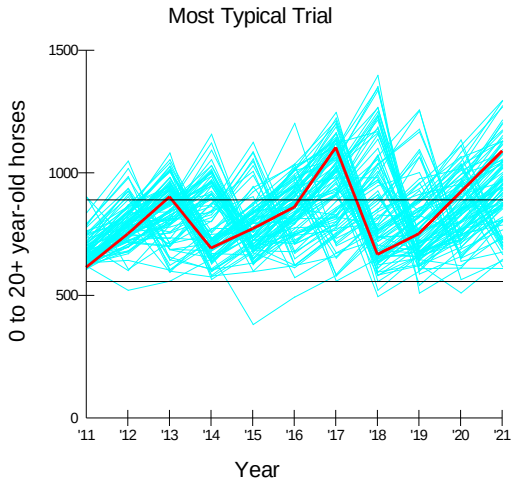
Barren Valley Comples – No Action (cont.)

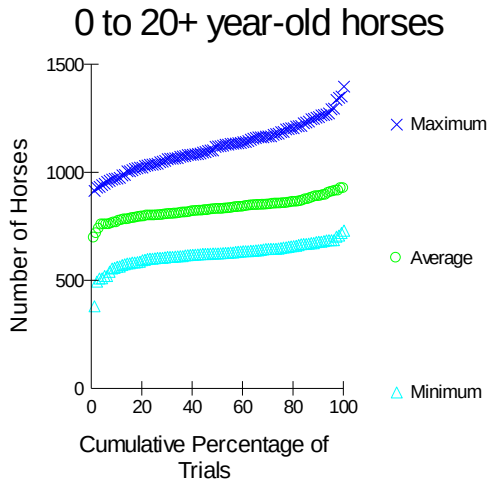
Explanation:
In 11 years and 100 trials, the lowest number of 0 to 20+ year-old horses ever obtained was 606 and the highest was 4589. In half the trials, the minimum population size in 11 years was less than 660 and the maximum was less than 3328. The average population size across 11 years ranged from 1148 to 2113.



Average Growth Rate in 10 Years	
Lowest Trial	11.4
10th Percentile	14.1
25th Percentile	15.5
Median Trial	17.6
75th Percentile	18.7
90th Percentile	19.9
Highest Trial	21.4

Barren Valley Complex – Removal Only





Population Sizes in 11 Years*

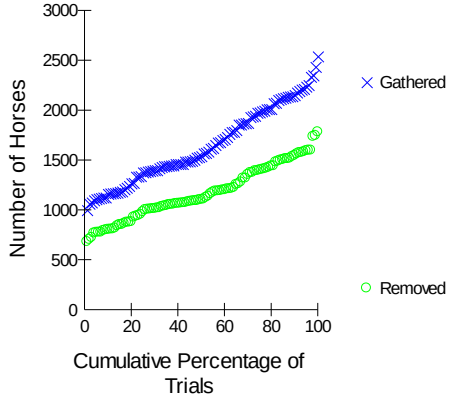
	Minimum	Average	Maximum
Lowest Trial	383	697	917
10th Percentile	566	771	976
25th Percentile	606	800	1042
Median Trial	628	830	1124
75th Percentile	654	856	1190
90th Percentile	682	890	1263
Highest Trial	733	926	1400

* 0 to 20+ year-old horses

Explanation:
In 11 years and 100 trials, the lowest number of 0 to 20+ year-old horses ever obtained was 383 and the highest was 1400. In half the trials, the minimum population size in 11 years was less than 628 and the maximum was less than 1124. The average population size across 11 years ranged from 697 to 926.

Barren Valley Complex – Removal Only (cont.)

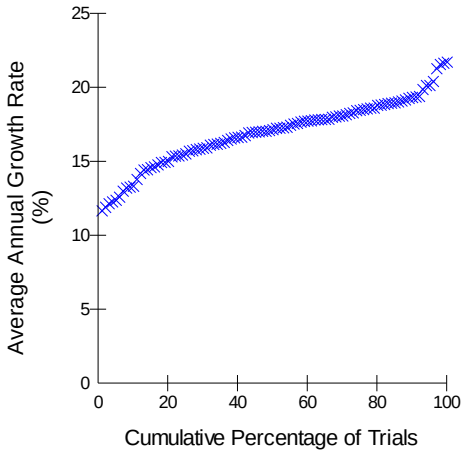
0 to 20+ year-old horses



Totals in 11 Years*

	Gathered	Removed
Lowest Trial	1000	682
10th Percentile	1164	805
25th Percentile	1378	992
Median Trial	1554	1106
75th Percentile	1984	1404
90th Percentile	2166	1553
Highest Trial	2541	1782

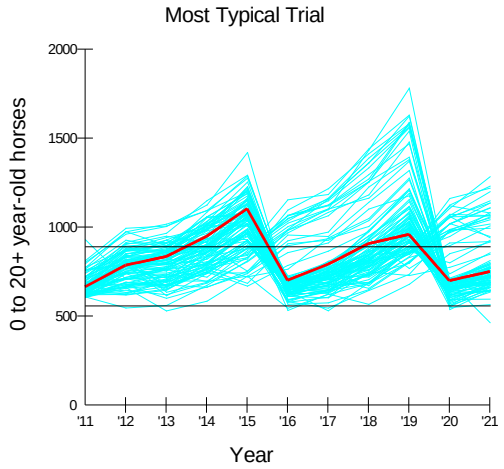
* 0 to 20+ year-old horses

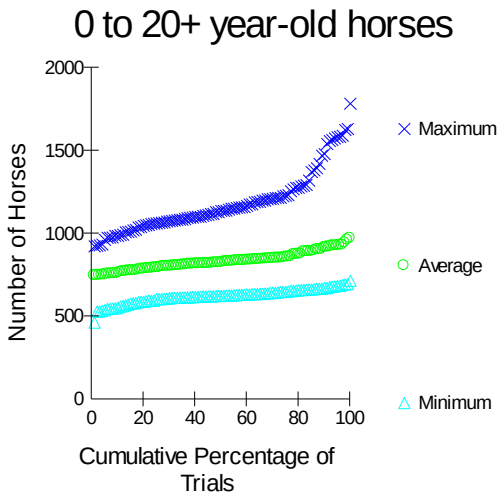


Average Growth Rate in 10 Years

Lowest Trial	11.7
10th Percentile	13.6
25th Percentile	15.6
Median Trial	17.2
75th Percentile	18.5
90th Percentile	19.4
Highest Trial	21.8

Barren Valley Complex – Removal and Fertility Control and Removal with Fertility Control and Sex Ratio Skew





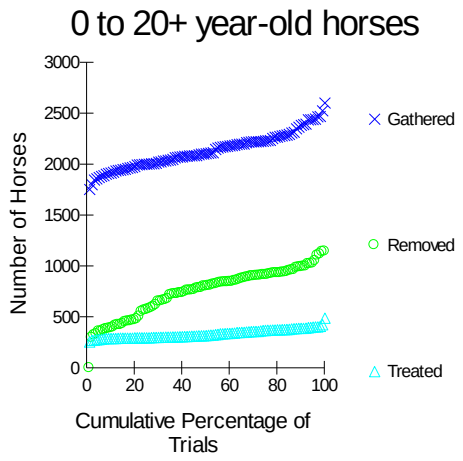
Population Sizes in 11 Years*

	Minimum	Average	Maximum
Lowest Trial	464	746	924
10th Percentile	557	763	990
25th Percentile	605	793	1064
Median Trial	626	826	1138
75th Percentile	651	858	1232
90th Percentile	672	916	1511
Highest Trial	716	971	1784

* 0 to 20+ year-old horses

Explanation:
In 11 years and 100 trials, the lowest number of 0 to 20+ year-old horses ever obtained was 464 and the highest was 1784. In half the trials, the minimum population size in 11 years was less than 626 and the maximum was less than 1138. The average population size across 11 years ranged from 746 to 971.

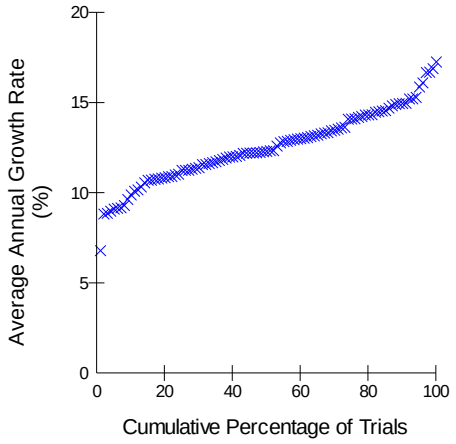
Barren Valley Complex – Removal and Fertility Control and Removal with Fertility Control and Sex Ratio Skew (cont.)



Totals in 11 Years*

	Gathered	Removed	Treated
Lowest Trial	1758	0	259
10th Percentile	1923	396	293
25th Percentile	2007	576	300
Median Trial	2110	806	322
75th Percentile	2236	917	373
90th Percentile	2391	996	392
Highest Trial	2607	1145	492

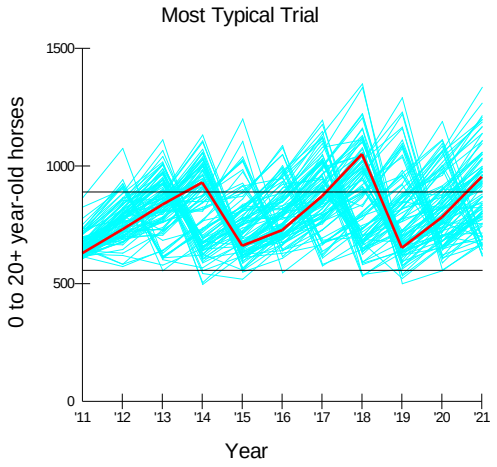
* 0 to 20+ year-old horses

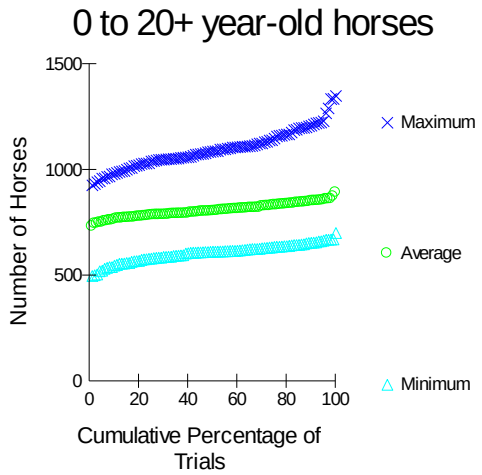


Average Growth Rate in 10 Years

Lowest Trial	6.8
10th Percentile	10.0
25th Percentile	11.3
Median Trial	12.3
75th Percentile	14.1
90th Percentile	15.0
Highest Trial	17.3

Barren Valley Complex – Removal and Sex Ratio Skew





Population Sizes in 11 Years*

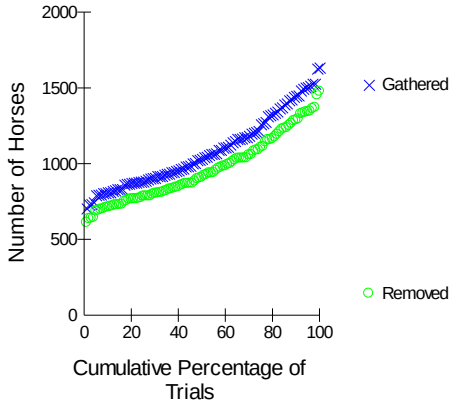
	Minimum	Average	Maximum
Lowest Trial	499	732	928
10th Percentile	550	767	984
25th Percentile	582	786	1042
Median Trial	614	805	1088
75th Percentile	636	833	1154
90th Percentile	656	852	1213
Highest Trial	702	892	1351

* 0 to 20+ year-old horses

Explanation:
In 11 years and 100 trials, the lowest number of 0 to 20+ year-old horses ever obtained was 499 and the highest was 1351. In half the trials, the minimum population size in 11 years was less than 614 and the maximum was less than 1088. The average population size across 11 years ranged from 732 to 892.

Barren Valley Complex – Removal and Sex Ratio Skew (cont.)

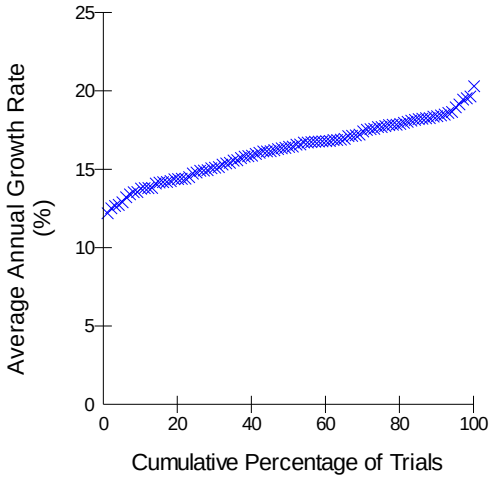
0 to 20+ year-old horses



Totals in 11 Years*

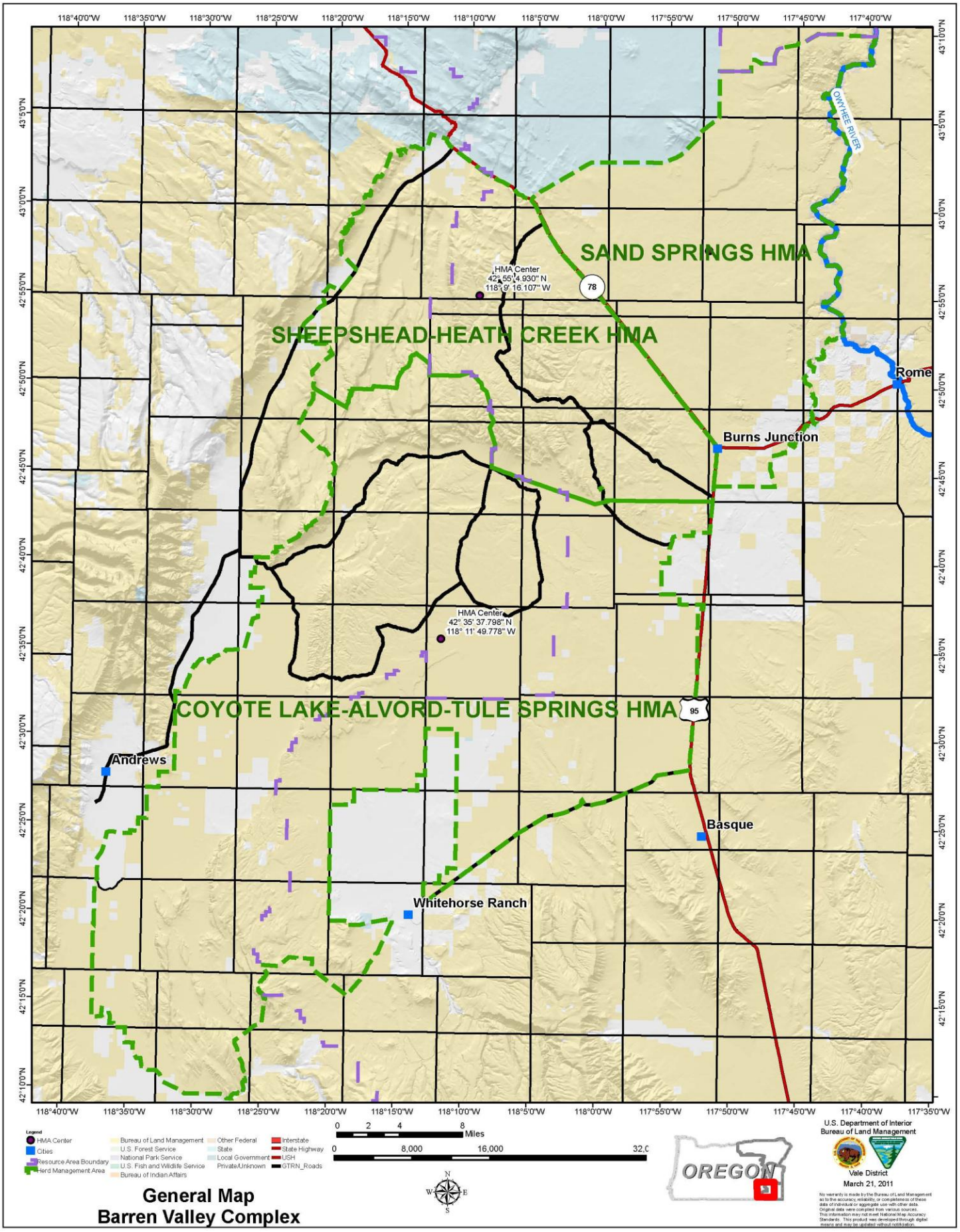
	Gathered	Removed
Lowest Trial	705	612
10th Percentile	812	716
25th Percentile	886	786
Median Trial	1038	916
75th Percentile	1264	1110
90th Percentile	1450	1292
Highest Trial	1635	1477

* 0 to 20+ year-old horses



Average Growth Rate in 10 Years

Lowest Trial	12.2
10th Percentile	13.8
25th Percentile	14.9
Median Trial	16.5
75th Percentile	17.8
90th Percentile	18.5
Highest Trial	20.3



General Map
Barren Valley Complex