BLM

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

Environmental Assessment
DOI-BLM-ID-B030-2012-0010-EA

Black Mountain and Hardtrigger HMA
Wild Horse Capture, Treat, Release, and Removal Plan

U.S. Department of the Interior
Bureau of Land Management
Boise District Office
3948 Development Avenue
Boise, ID 83705

NATIONAL SYSTEM OF PUBLIC LANDS

Environmental Assessment # DOI-BLM-ID-B030-2012-0010-EA
Black Mountain and Hardtrigger Herd Management Area (HMA) Wild Horse Capture, Treat, Release, and Removal Plan

Table of Contents

1.0 Introduction

1.1 Background

The Black Mountain Herd Management Area (HMA) comprises 50,611 acres and Hardtrigger HMA includes 66,063 total acres of public and other land. The HMAs are adjacent to each other in Owyhee County and located south of the Snake River between Murphy and US Highway 95 to the west (Map 1). A detailed description of the HMA and herds can be found in Section 3.1.1.

The Appropriate Management Levels (AMLs) for each HMA were established in 1999 in the Owyhee Resource Management Plan (RMP) following an in-depth analysis of habitat suitability and resource monitoring and population inventory data, with public involvement. Page II-13 of the Owyhee Resource Management Plan EIS states that the AML will be based on the analysis in trend of range condition, utilization, actual use, and other factors which provide for the protection of the public range lands from deterioration. The upper limit of the AML is the maximum number of wild horses that can graze in a thriving natural ecological balance and multiple use relationship on the public lands in the area. The AMLs for wild horses within the Black Mountain and Hardtrigger HMAs are between 30 and 60 horses, and between 66-to 130 horses, respectively. Establishing an AML as a population range allows for the periodic removal of excess animals (to the low range) and subsequent population growth (to the high range) between removals. The term "excess animals" is defined as those animals which must be removed from an area in order to preserve and maintain a thriving natural ecological balance and multiple-use relationship in that area (16 USC § 1332(f)(2)). This definition underscores the need to remove excess animals before damage to the range begins to occur. The excess wild horses (a total population of 366 in 2007), combined with livestock grazing, OHV use and fires, within these allotments contributed to a failure to achieve and/or allow for progress towards achieving the Standards for Rangeland Health. At the current population levels, impacts to the rangeland are occurring (see Section 3 and Appendix F).

Historically the population growth rate (PGR) for both HMAs has averaged 28% per year without treatment. In 2010, a Capture, Treat, and Release (CTR) gather was conducted and all mares over two years of age were treated with an immuno-contraceptive vaccine and released back to the range. The fertility control vaccine does not affect current year foal crop. After the 2010 CTR, post gather populations were estimated by adding the total number of captured and released animals to the known number of un-gathered animals within the HMAs. In Black Mountain and Hardtrigger HMAs post-gather populations were estimated to be 48 and 93 respectively.

During the 2010 CTR operations, hair samples were collected from several individual horses, from both HMAs, with which a genetic study was conducted. The results show that there is a generally high genetic variability in both HMAs. The study reports, which include a discussion of methods, results, and recommendations, are included as Appendix D.

The boundaries of the HMAs are delineated by fencing which is generally effective in limiting wild horse distribution to the HMAs; however, some wild horses have been observed outside of

HMA boundaries. These animals have caused conflicts with adjacent landowners including trespass on private land, breeding with domestic horses, and property damage.

1.2 Purpose of and Need for the Proposed Action

The Wild Free-Roaming Horses and Burros Act of 1971 (WFRHBA) established the framework for managing wild horse and burro populations on public lands. The WFRHBA provides in part, that the Department of Interior "manage wild free-roaming horses and burros in a manner that is designed to achieve and maintain a thriving natural ecological balance on the public lands" (P.L. 92-195 Section 1333 (a) (as amended)). BLM's management of wild, free roaming horses must comply with law and policy pertaining to wild, free roaming horses on public lands.

The purpose of the proposed action is to maintain a thriving, natural ecological balance and multiple use relationship on public lands, pursuant to the WFRHBA, in the Black Mountain and Hardtrigger HMAs.

This proposal is needed here and now because the direct counted population of wild horses is 55 in the Black Mountain HMA and 142 in the Hardtrigger HMA. A breakdown between adult and foal is provided in Section 3.1. Historical census counts of these HMAs have consistently been 15% under population found at gather. Additionally, The HMAs border each other which provides some ingress and egress of horses between the two HMAs. The AMLs for wild horses within the Black Mountain and Hardtrigger HMAs are between 30 and 60 horses, and between 66 to 130 horses, respectively. As horse populations increase to the high AML and above, impacts to resources such as soil, riparian and upland vegetation, and water quality occur. Additionally, there is greater competition with the native wildlife for forage and water, especially during the winter when forage availability is low.

Additionally, the fertility control vaccine treatments are effective for up to three years and population growth rate can be reduced substantially in the short term if the treatments are conducted approximately every two years. The proposed action is needed to ensure the continued effectiveness of the 2010 treatment and to treat mares that were missed at that time or that have since become sexually mature.

1.3 Summary of Proposed Action

The Bureau of Land Management (BLM) is proposing to gather approximately 156 (assuming an 80% capture success rate) to 180 (assuming a 91% capture success rate) wild horses from the Hardtrigger and Black Mountain (HMAs) in Fall of 2012. The intent of this action is to bring the population inside the HMA to as close to low AML as possible in order to more effectively implement two population growth suppression techniques (fertility control and sex ratio adjustment). Approximately 40 mares (over 2-years old) would be treated with the fertility control vaccine PZP-22 (a 22 month, pelleted form of the immunocontraceptive porcine zona pellucida) and released back to the HMA. Treated and un-treated mare population post gather for the two HMAs would be approximately 48. A total of approximately 48 males would also be released back to the range to achieve a post-release sex ratio inside the two HMA's of 50:50 in within the two HMAs. All individuals located outside of the HMA would be gathered and

removed. In response to the genetic study (Appendix D) recommendations, two female horses, less than five years old, from the Hardtrigger HMA would be relocated into the Black Mountain HMA and two Black Mountain female horses would be relocated to the Hardtrigger HMA to improve the genetic variability of the herds.

1.4 Decision to be Made

The authorized officer will determine whether to capture, treat, release, and/or remove wild horses from the Black Mountain and Hardtrigger HMAs. The authorized officer will decide whether to implement the proposed action or an alternative to the proposed action. The authorized officer's decision will not set or adjust AML, or adjust livestock use. These determinations were set in previous decision documents in accordance with the process outlined in 43 CFR Part 1600.or another alternative.

1.5 Conformance with Applicable Land Use Plan

The Proposed Action and alternatives for the Black Mountain and Hardtrigger HMAs is in conformance with the Owyhee RMP (USDI 1999). In this document, objective WHRS #1 states:

> "Maintain wild and free-roaming horses in the Owyhee Wild Horse Herd Management Areas (HMAs) at appropriate management levels (AML) within a thriving natural ecological balance."
>
> With the following applicable management actions (pages 21 and 22):
> 1. "Manage the Hardtrigger and Black Mountain HMAs for wild horse population ranges of 66-130 and 30-60 respectively."
> 4. "Manage wild free-roaming horses as a component of the public lands in a manner that maintains or improves the rangeland ecosystem."

Portions of the Squaw Creek Area of Critical Environmental Concern (ACEC) occur in the Hardtrigger HMA. Objective ACEC-1 (pages 47-48) and Table ACEC-1 (pages 129-131) do not identify specific management actions related to wild horses; however, the area does have restrictions or closures that could be affected by gather activities. Gather activities would be in compliance with the restrictions.

1.6 Relationship to Statutes, Regulations, and Other Guidance

Wild Horses

The Proposed Action and action alternatives are in conformance with the WFRHBA (as amended), applicable regulations at 43 CFR § 4700 and BLM policies because they all would maintain a thriving, natural ecological balance and multiple use relationship on public lands. For example:

- **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. The proposal and alternatives would remove excess horses outside of the HMA.

- **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. Idaho BLM conducted a public hearing on motorized vehicle use in the Management of Wild Horses and Burros on March 7, 2012 in Kimberly, Idaho.

Migratory Birds

Executive Order 13186 requires Federal agencies to evaluate the effects of proposed actions on migratory birds (including eagles); restore and enhance the habitat of migratory birds, as practicable; identify where unintentional take reasonably attributable to agency actions is having, or is likely to have, a measurable negative effect on migratory bird populations; and, with respect to those actions so identified, the agency shall develop and use principles, standards, and practices that would lessen the amount of unintentional take, developing any such conservation efforts in cooperation with the U.S. Fish and Wildlife Service.

Cultural Resource Laws and Executive Orders

BLM is required to consult with Native American tribes to "help assure (1) that federally recognized tribal governments and Native American individuals, whose traditional uses of public land might be affected by a proposed action, would have sufficient opportunity to contribute to the decision, and (2) that the decision maker would give tribal concerns proper consideration" (U.S. Department of the Interior, BLM Manual Handbook H-8120-1). Tribal coordination and consultation responsibilities are implemented under laws and executive orders that are specific to cultural resources which are referred to as "cultural resource authorities," and under regulations that are not specific which are termed "general authorities." Cultural resource authorities include: the National Historic Preservation Act of 1966, as amended (NHPA); the Archaeological Resources Protection Act of 1979 (ARPA); and the Native American Graves Protection and Repatriation Act of 1990, as amended (NAGPRA). General authorities include: the American Indian Religious Freedom Act of 1979 (AIRFA); the National Environmental Policy Act of 1969 (NEPA); the Federal Land Policy and Management Act of 1976 (FLPMA); and Executive Order 13007-Indian Sacred Sites. The proposed action is in compliance with the aforementioned authorities.

Southwest Idaho is the homeland of two culturally and linguistically related tribes: the Northern Shoshone and the Northern Paiute. In the latter half of the 19th century, a reservation was established at Duck Valley on the Nevada/Idaho border west of the Bruneau River. The Shoshone-Paiute Tribes residing on the Duck Valley Reservation today actively practice their culture and retain aboriginal rights and/or interests in this area. The Shoshone-Paiute Tribes assert aboriginal rights to their traditional homelands as their treaties with the United States, the Boise Valley Treaty of 1864 and the Bruneau Valley Treaty of 1866, which would have extinguished aboriginal title to the lands now federally administered, were never ratified.

Other tribes that have ties to southwest Idaho include the Bannock Tribe and the Nez Perce Tribe. Southeast Idaho is the homeland of the Northern Shoshone Tribe and the Bannock Tribe. In 1867 a reservation was established at Fort Hall in southeastern Idaho. The Fort Bridger Treaty of 1868 applies to BLM's relationship with the Shoshone-Bannock Tribes. The northern part of the BLM's Boise District was also inhabited by the Nez Perce Tribe. The Nez Perce signed treaties in 1855, 1863 and 1868. BLM considers off-reservation treaty-reserved fishing, hunting, gathering, and similar rights of access and resource use on the public lands it administers for all tribes that may be affected by a proposed action.

1.7 Conformance with Rangeland Health Standards and Guidelines

Maintenance of wild horse population size within AML avoids the damage to the range that results from wild horse overpopulation. Rangeland health assessments completed for Hardtrigger Allotment in 2007 (total combined population of 366 wild horses in the Hardtrigger and Black Mountain HMAs), East Reynolds/ Rabbit Creek/Peters Gulch allotments in 2003 (total population of 91 wild horses in the Black Mountain HMA), and Rats Nest/ Elephant Butte/ Shares Basin Allotments (total population of 149 wild horses in the Hardtrigger HMA) document the damage caused by overpopulation. The excess wild horses (a total population of 366 in 2007), combined with livestock grazing, OHV use and fires, within these allotments contributed to a failure to achieve and/or allow for progress towards achieving the Standards for Rangeland Health: Standard 1 (Watersheds), Standard 2 (Riparian Areas and Wetlands), Standard 3 (Stream channel/ floodplain, Standard 4 (Native Plant Communities), Standard 7 (Water Quality), and Standard 8 (Threatened and endangered Plants and Animals). By contrast, when wild horse numbers are managed within AML coupled with proper livestock management, rangelands are expected to make significant progress towards meeting the Standards.

1.8 Scoping and Development of Issues

A scoping information letter requesting feedback on the proposed action, possible alternatives, and potential issues that should be addressed in the NEPA process was sent to 61 interested publics, organizations, government agencies, and tribes on December 30, 2011. Comment letters were received from 3,713 individuals and organizations. Of the letters received, 3,679 were form letters. Some of the comments were outside the scope of this EA. Appendix E shows how the comments were addressed.

Based on the comments received, internal scoping, and experience with previous gathers, the following issues have been identified and addressed in this EA:

1. Impacts to individual wild horses and the herd. Measurement indicators for this issue include:
   - Projected population size and annual growth rate (Win Equus (Jenkins, 1996) population modeling.

2. Other impacts to wild horses will be described qualitatively and include:
   - impacts from handling stress;
   - impacts to herd social structure;

- effects to genetic diversity;
- impacts to herd health and condition;
- impacts from the use of planes, motorized vehicles, trucks and trailers.

3. Impacts to vegetation/soils, riparian/wetland, and cultural resources.

4. Impacts to wildlife, migratory birds, and threatened, endangered, and special status species and their habitat. Impacts include the potential for temporary displacement, trampling, or disturbance.

2.0 Description of the 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. Four alternatives are considered in detail.

2.2 Description of Proposed Action and Alternatives

2.2.1 Alternative A Proposed Action - Capture, Treat, Release (CTR) and Removal

Under this alternative the BLM would attempt to gather approximately 190 horses from the two HMA's. The goal is to gather as many horses from the HMA as possible (approximately 163-190). All animals above low AML would be considered excess and would be removed from the range and sent to short term holding facilities and attempted to be adopted or placed in long term holding pastures. Removed mares would not be treated with PZP. A total of 40 mares would be treated with the fertility control vaccine PZP-22 (a 22 month, pelleted form of the immunocontraceptive porcine zona pellucida) and approximately 8 un-treated mares would be returned to the HMA. A total of approximately 48 males would also be released back to the range to achieve a post-release sex ratio inside the two HMA's of 50:50 within the two HMAs. All individuals located outside of the HMA would be gathered and removed.

However, if due to budget, contractor availability, or other constraints, gather operations may occur in the Fall of 2013 or 2014. At such a time, the horse population would be well above high AML. Therefore, the number removed would be higher as all excess horses (those above low AML and those found outside the HMA) would be removed.

Mares would be treated at the catch site with a two-year Porcine Zona Pellucida (PZP-22) or similar vaccine and released back to the range. Treated mares will be freeze marked to facilitate identification of treated mares in future operations. Fertility control treatment would be conducted in accordance with the approved standard operating and post-treatment monitoring procedures (Appendix A).

Post-gather efforts would be made to return the released horses to the same general area from which they were gathered except four mares would be moved to opposite HMAs to increase genetic variability.

Excess horses, horses found with injuries needing treatment, and any wild horses residing outside the HMA boundary would be removed from the range. These animals would be offered for adoption or sale to individuals who can provide good homes, and/or placed in long-term pastures out of state. Horses removed from the range, excepting those outside the HMA, will be removed in the order of the selective removal criteria set forth in IM No. 2010-135, as follows:

- Horses four years and younger are the first priority,
- Animals eleven to nineteen will be removed if management goals cannot be achieved by removing horses 4 years and younger,
- Horses five to ten are the lowest priority, and
- Animals over 20 would not be removed.

The gather would begin in the Fall and take about 10 days to complete. Several factors such as animal condition, herd health, weather conditions, or other considerations could result in adjustments to 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 B).

The primary gather (capture) method would be the Helicopter Drive Trapping method with some limited Helicopter Assisted Roping (from horseback) (as described in Appendix B) if needed to restrain individual horses. Trap sites and temporary holding facilities would be located in previously used sites or other disturbed areas (Map 1) whenever possible. If gather requirements necessitate a new trap site be utilized, it would be selected to avoid sensitive resources (Appendix B).

Public access to the HMAs would be restricted during gather operations to ensure public and horse safety and minimize disruption to the gather process. In accordance with BLM policy (IM 2010-164), public viewing times and locations would be provided.

An Animal and Plant Health Inspection Service (APHIS) or other veterinarian would be on-site during the gather to examine animals and make recommendations to the BLM for care, treatment, and if necessary, euthanasia of captured wild horses. Decisions to humanely euthanize animals would be made in conformance with BLM policy (Washington Office Instruction Memorandum 2009-041).

In the event new BLM policies regarding public access and euthanasia of animals are released prior to the gather, the latest policy will be followed

Data including sex and age distribution, condition class information (using the Henneke rating system), color, size and other information may also be recorded. To maintain and improve genetic variability, as described in the genetic study reports (Cothran, 2011), two female horses, less than five years old, from the Hardtrigger HMA would be relocated into the Black Mountain HMA and two Black Mountain female horses would be relocated to the Hardtrigger HMA. These surveys and actions would be common across Alternatives A, B, and C.

During gather operations, vehicle access along Wilson Creek and Reynolds Creek roads (depending on trap locations) would be allowed but restricted to the accompaniment of a pilot car. Access to all other roads and trails would be temporarily restricted, where necessary, to ensure public and animal safety. Restrictions would only occur in the HMA actively being gathered. Road restrictions would be common across Alternatives A, B, and C.

2.2.2 Alternative B - Removal Gather Only

A gather would occur in accordance with stipulations and methods described in Alternative A. However, no fertility control application would be undertaken to control the population growth rate and populations would be reduced to Low AML. Gather activities would be conducted as described in Alternative A. The post-release sex ratios would approximate 50% females and 50% males.

Excess horses, horses found with injuries needing treatment, and any wild horses residing outside the HMA boundary would be removed from the range. These animals would be offered for adoption or sale to individuals who can provide good homes, and/or placed in long-term pastures out of state.

2.2.3 Alternative C – Capture, Treat, Release Only

A Catch Treat and Release gather would occur in accordance with stipulations and methods described in Alternative A. All horses, excepting those injured and requiring treatment and those found outside the HMA, would be returned to the HMAs. Removed animals would be offered for adoption or sale to individuals who can provide good homes, and/or placed in long-term pastures out of state.

2.2.4 Alternative D – No Action

No gather or fertility treatment would take place in the HMAs at this time.

2.3 Alternatives Considered but Eliminated from Detailed Analysis

2.3.1 Use of Bait and/or Water Trapping

The BLM considered the use of bait or water trapping to capture wild horses. The BLM determined it would not be 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 only to the selected water trap sites. As a result, this alternative was eliminated from detailed analysis.

2.3.2 No Additional Gathers and/or Remove or Reduce Livestock within the HMAs

The BLM considered an alternative that would not gather horses, within the HMAs, now or in the future. To maintain a thriving, natural ecological balance, as wild horse numbers increase, livestock numbers may need to be reduced and wild horses would be moved into areas occupied prior to passage of the WFRHBA. This alternative was not considered in detail because it would be contrary to previous decisions which allocated forage for wild horse and livestock use. The grazing allotments in the HMAs were designated as open to livestock grazing and forage was allocated to both livestock and wild horses (Objective LVST-1 (pages 23-25, USDI 1999) and forage allocations Table LVST-1 (pages 104-112, USDI 1999)). Even with complete removal of

livestock, the carrying capacity of these areas (43 CFR 4700.0-5) would eventually be exceeded for wild horses. A thriving, natural ecological balance would not be maintained which would be inconsistent with the WFRHBA.

2.3.3 Gather Using Non-Motorized Methods

The BLM considered conducting gather operations using riders on horseback. This alternative was eliminated from detailed consideration for several reasons. The level of stress on wild horses would be substantially greater than helicopter gathering because an individual herd is pushed constantly from initial contact to the trap. It is BLM's experience that when gathering on horseback, compared to helicopter use, there is greater risk of death and injury to the wild horses, BLM and/or contractor employees working on horseback, and their domestic horses. Wild horses, when approached by riders on horseback tend to bolt which requires the riders to pursue them at greater speeds as to keep them all moving in the general direction of the trap. This is the case regardless of terrain and distance. Horses (wild and domestic) moving at high speeds across rough and uneven terrain stumble over obstacles and step in holes, which often results in terminal injuries and death. If there are old, injured, or very young horses in the band gathering by helicopter allows the operators to move the band at a slower pace as the helicopter can move away from and allow the band to rest and regroup. Moving by horseback, as explained above, does not allow this. Gather time for each band of horses would be longer and overall disturbance to and stress on wild horses would be greater than for Alternatives A through C.

2.4 Summary Comparison of Impacts between Alternatives

Impacts from gather activities would be similar between Alternatives A, B, and C (Table 1). Objectives of reducing the number of wild horses placed in adoption/sale or long-term pastures would be met by Alternative A to a greater degree than Alternative B and C. Alternatives A and B would maintain a thriving, natural ecological balance. Alternative C would not, over the long term maintain a thriving, natural ecological balance but would meet short term objectives reducing the number of horses placed for adoption and in long-term pasture. Alternative D would not meet long or short-term objectives for managing wild horses.

Table 1: Comparison of Impacts between Alternatives

Resource	Alternative A Proposed Action	Alternative B Removal Gather Only/No Fertility Control	Alternative C Fertility Control Only	Alternative D No Action
Soils	Compaction would occur from concentration of horses and vehicles at trap sites. Limited soil disturbance could occur up to 0.25 mile from trap sites. Soil and watershed conditions could improve over the short term (4 years) because populations would be at the lower end of AML.	Impacts would be similar but slightly less than those as described in Alternative A because there would be fewer horses gathered over the next 11years.	Increased direct and indirect soil impacts would occur in the short and long-terms, as compared to Alternatives A and B. Soil compaction and erosion due to gathering activities would increase, and indirect impacts from wild horse numbers exceeding the AML would lead to poor overall watershed conditions.	Direct impacts from gather activities would not occur, however indirect impacts would be of a greater magnitude when compared to all other Alternatives.
Vegetation Including Noxious Weeds and Special Status Plants	Vegetation could be lost or altered in and around trap sites, but trap sites are generally in previously disturbed areas. Noxious weeds and invasive plants could increase in disturbed areas. Reducing wild horse numbers to the lower end of AMLs would benefit vegetation resources over the short- term (4 years) by reducing vegetation utilization (grazing by horses) and levels of mechanical damage (trampling) in concentrated use areas.	Direct and indirect effects to plant communities, noxious weeds, and special status plants from gather activities at and near the trap sites would be the same as described in Alternative A. Indirect effects from reduced horse numbers (lower end of AMLs) would be similar to Alternative A, except higher growth rates would increase horse numbers more quickly than Alternative A.	Direct and indirect effects to plant communities, noxious weeds, and special status plants from gather activities at and near the trap sites would be same as described in Alternative A. Wild horse numbers above the AMLs would have detrimental indirect effects to vegetation over the short (2-4 years) and long (5+ years) terms.	Alternative D would have no direct gathering effects, and no effects specific to horse trap locations. Indirect effects from Alternative D on vegetation (including noxious weeds and special status plants) would have impacts similar to Alternative C, but because of increased animal numbers would be higher than Alternative C.

Resource	Alternative A Proposed Action	Alternative B Removal Gather Only/No Fertility Control	Alternative C Fertility Control Only	Alternative D No Action
Wetlands/Riparian Zone and Water Quality	Gather operations would have isolated, short-term impacts to wetlands and riparian zones. Riparian impacts would be limited to damage associated with horse movement to the trap sites. Streambank stability would improve. Over the long term, the riparian vegetation would develop and expand, slowing water flows and catching sediment, and eventually narrowing and deepening stream channels. Water quality standards for sediment and temperature would be expected to improve or be attained over the long term (>10 years).	Similar to Alternative A.	Increased direct and indirect impacts to water quality, vegetation, and streambank stability would occur in the short and long-terms, as compared to Alternative A and B.	Indirect impacts would lead to poor overall water quality, vegetation, and streambank stability faster than in Alternative C.
Wildlife/Fisheries	The primary impacts to wildlife would occur from gather activities. Maintaining herd numbers within AMLs would result in benefits to wildlife through slight improvements in habitat conditions and would help limit competition for forage between wildlife and wild horses.	Same as Alternative A.	Short-term impacts would include temporary disturbance and displacement from gather activities as described in Alternative A. As yearlong use by horses increases, mid to long-term impacts would occur to wildlife and fisheries due to habitat loss and competition for resources.	There would be no short-term impacts to wildlife or fisheries Impacts of yearlong use by and increasing populations of wild horses would be similar to those in alternative C but may extend over a longer period of time.

Resource	Alternative A Proposed Action	Alternative B Removal Gather Only/No Fertility Control	Alternative C Fertility Control Only	Alternative D No Action
Wild Horses	Horses would be stressed by gather activities, but would recover quickly. Approximately 101 excess horses would be added to adoption/sales or long-term pastures. Genetic variability would be improved in Black Mountain and Hardtrigger HMAs. A CTR and removal would eliminate the need for another removal gather until 2018.	Population Growth Rate (PGR) would be higher than Alternative A after the gather. This would result in a larger number of horses going to long term pasture in the mid-term (approximately 5 years). Direct impacts from gather would be the same as Alternative A. Another removal gather would likely be needed in 2016.	PGR would be greater than Alternative A due to the high female/male sex ratio. Due to the continued increases in population a point would be reached where the herd exceeds the ecological carrying capacity and both the habitat and the wild horse population would be unhealthy.	PGR would continue to be approximately 28%. Impacts would be similar to Alternative C, but would be evident in a shorter time frame.
Livestock Grazing Management	Impacts associated with individual livestock displacement would be slight, localized per trap site, and only for a short time (up to five days). Maintaining wild horse numbers within AMLs would result in reduced forage utilization levels, Overlap between wild horse and livestock use areas would also be limited resulting in appropriate utilization levels for all allotments.	Impacts to livestock would be similar to those described in Alternative A.	Gather activities would have similar impacts to Alternatives A and B. Vegetation utilization rates would exceed the capacity of the area.	No gather activity impacts. Impacts to vegetation utilization and other resources would be expected to be similar to Alternative C except that they would be evident in a shorter time frame and be of a higher intensity.

Resource	Alternative A Proposed Action	Alternative B Removal Gather Only/No Fertility Control	Alternative C Fertility Control Only	Alternative D No Action
Cultural, and Paleontological Resources	No impacts to cultural resources within the HMAs would be anticipated.	Same as Alternative A.	Gather activity impacts would be same as Alternative A and B. If herd numbers increase to the point that environmental destabilization occurs, this could have some indirect effects on archaeological and paleontological sites in HMAs as stream banks are destabilized, vegetation is denuded, and erosion is accelerated.	No impacts from gather activities. Similar impacts to the natural environment as in Alternative C, but would be evident earlier.
Recreation and Visual Resources	Disruption of hunting, recreation access, and visual resources for up to five days in each HMA would occur during November.	Same as Alternative A.	Same as in Alternative A and B from gather activities. Visual resources negatively impacted from excess horses.	No impacts from gather activities. Visual resource impacts same as Alternative C.

3.0 Affected Environment and Environmental Consequences

This section of the EA briefly discusses the relevant components of the human environment which would be either affected or potentially affected by the alternatives. Direct impacts are caused by the action and occur at the same time and place. Indirect effects are also caused by the action, but are later in time or farther removed in distance, but still reasonably foreseeable.

Assumptions for analysis purposes:

- Based on a median of historic population growth rates in the HMAs and Win Equus population estimates, following fertility treatment, the expected rate of population growth would be normal in 2013, reduced in 2014 and slightly reduced in 2015, and normal in 2016 and beyond.
- Win Equus model predicts population growth rate over 11years. Therefore population estimates as a result of all alternatives are analyzed over 11years.
- The expected rate of population growth would be 28% annually where mares are not treated with fertility control vaccines (based on median population growth rates for the HMAs between 2002 and 2010).
- The upper limits of AMLs are appropriately set to ensure that resource damage would not occur because of wild horses.
- In the future, if populations grow over the high AML, excess horses would be gathered and removed and such actions would be subject to NEPA analysis on a case by case basis (Alternatives A and B).
- Alternatives C and D assume that excess horses would not be removed for 11 years. 11 years was selected because Win Equus bases population estimates up to 11 year intervals.
- 2-4 temporary trap sites would be established or re-established (in areas that avoid sensitive resources).
- Immuno-contraception would be administered every two years, per standard operating procedures for PZP-22 administration, where applicable (Alternatives A and C).

Relevant components of the human environment include the following:

- Wild Horses,
- Soils,
- Vegetation including Noxious Weeds and Special Status Plants,
- Wetlands/Riparian Zone and Water Quality,
- Wildlife and Fisheries,
- Livestock Grazing Management,
- Cultural and Paleontological Resources, and
- Recreation and Visual Resources.

Agencies apply the rule of reason to ensure that their discussion pertains to the issues that deserve study and deemphasizes issues that are less useful to the decision regarding the proposal, its alternatives, and mitigation options (40 CFR 1500.4(f), (g), 1501.7, 1508.25).
Socio-Economics was not brought forth for analysis as there were either no specific issues related to the proposed action and alternatives or there is no measurable effect of or relation to those actions.

3.1 Wild Horses

3.1.1 Affected Environment – Wild Horses

Through the years, a great deal of information has been gained with the completion of gathers and population inventory flights of the HMAs in the Boise District. A summary of current knowledge is given below.

HMA Description - The Owyhee Front in the Owyhee Field Office includes the Black Mountain and Hardtrigger HMAs. Generally, Black Mountain and Hardtrigger HMAs are located between Murphy, Idaho and US Highway 95 to the west.

The Black Mountain HMA encompasses 50,611 acres with 46,881 acres of public land, 2,550 acres of State land, and 1,180 acres of private land. The Hardtrigger HMA (66,063 acres) contains 60,061 acres of public land, 4,418 acres of State land, and 1,548 acres of private land.

Elevations in the Black Mountain and Hardtrigger HMAs vary from approximately 2,200 feet elevation in the northern portion to 6,700 feet at Black Mountain. Topographic features are mostly rolling hills and flat plateaus within the Snake River Plains and high, steep, rugged ridges. The wide range in elevation and accessible terrain readily accommodates seasonal migration in the HMAs.

Population Growth Rates (PGR) - The percentage of growth annually in a herd varies annually within the HMAs. Population inventory flights have been conducted to compile statistics regarding production in herds. Annual PGRs in the HMAs varied from 22% to 37% (Table 2). The reasons for the variance in years have not been identified.

PZP-22 effectively reduces PGR for three years after treatment when mares are treated during a 3-4 month window prior to foaling (BLM Handbook 4700-1). Fertility control is 92% effective in year 1, 84% effective in year 2, and 68% effective in year 3. Un-born foals are un-affected by PZP-22 and will be carried to term. The 2010 fertility control will continue to be effective for the 2013 foaling season, but without re-application of the fertility control this year's population growth would be un-affected in 2014. To continue a reduced PGR, mares would need to be re treated this year to limit PGR in 2014. If mares were treated in 2013, a normal PGR would be expected in 2014 and reduced in 2015.

Table 2: Population growth rates by herd management areas, Owyhee Co., Idaho.

HMA	2000	2001	2002	2007	2010
Black Mountain	36%	22%	22%	28.1%	36.6%
Hardtrigger	37%	29%	26%	31.6%	23.7%

In general, wild horses are a long-lived species with documented foal survival rates exceeding 95% and adult (15 years) survival rates exceeding 90% (Table 3). Much of this research has been compiled into a population modeling program and is available for use by the BLM to model potential changes to the population with changes in management (Appendix C).

Table 3: Sample survival rates by age class for wild horse herds in Montana and Nevada.

Wild Horse Range	Age/Sex Classes	Survival Rate
Pryor Mountain Wild Horse Range, Montana	Foal	>95%
	15 years and younger, except for foals, both sexes	93%
Granite Range HMA, Nevada	Foal	>95%
	15 years and younger, except for male foals	92%
Garfield Flat HMA, Nevada	Foal	> 95%
	24 years and younger, except for foals, both sexes	92%

Aside from the implementation of PZP-22 in 2010, there are few limits to population growth. Though there are large predators (see Section 3.5) there is very little evidence or occurrence of mountain lion predation on horses in or around these HMAs. The terrain in the HMAs provides very few areas that predators can use as ambush and adult horses that may venture into these areas are often too large for a mountain lion to take down on its own.

Herd Dynamics - Wild horse sex ratio in the HMAs deviates from a target population of 50:50 males to females. Of the adult animals gathered in 2001, 59% were females and 41% were males. During the 2007 gather, it was estimated that 50% of the herds were female. The Catch Treat and Release gather results of 2010 found the sex ratio to be approximately 55% female to 45% male, however PGR of the HMAs estimate a ratio closer to 60% female and 40% male.

Behavior- The population's social structure has year-round breeding groups (bands) with stable adult membership consisting of 1 to 11 mares, 1 to 4 stallions, and offspring. In addition to breeding groups, bachelor groups are formed by studs without mares and have erratic membership. Bands and bachelor males are loyal to undefended home ranges with central core use areas. Wild Horse bands tend to be mobile relative to domestic livestock.

Current Population – An aerial census was conducted for Black Mountain and Hardtrigger HMAs on September 11, 2012. The census found 50 adult horses and 5 foals in Black Mountain HMA. Hardtrigger census counts revealed 125 adult horses and 17 foals. 2012 foals, as of January 1, 2013 (only a few months after the proposed gather) would be considered a member of the herd and part of the population (BLM Handbook 4700-1). Therefore, to provide a complete census for 2013, 2012 foals are being considered as part of the AML. The total counted population is 197 for both adjoining HMAs. Historically census counts have been 15% less than the actual population found during gathers.

Appropriate Management Level (AML) – The AMLs for the Black Mountain and Hardtrigger HMAs range from 30 to 60 and 66 to 130, respectively. The AMLs were established through the 1999 Owyhee RMP Record of Decision (USDI 1999) based on monitoring data and thorough public review. There is a similar dietary overlap between wild horses, wildlife, and livestock. Therefore, AUMS (Animal Unit Months) were allocated to wild horses on a proportional basis with other uses of the allotments (wildlife, livestock) using available utilization data collected within the allotments (Table 4).

Table 4: Wild horse forage allocations and appropriate management levels (AML) for the Black Mountain and Hardtrigger Herd Management Areas, Owyhee County, Idaho.

Herd Management Area	Wild Horse Forage Allocation (AUM)	AML Range
Black Mountain	540	30 - 60
Hardtrigger	1,176	66 - 130

**AUMs are calculated at mid-range AML.

An AML range was established for several reasons. Resource degradation would likely occur when wild horse population levels exceed the upper range of an AML. Yearly gathers would be required to maintain the wild horse population at the AML if a range were not established. An AML range allows flexibility to gather to a lower number and be able to allow the herd to build over time to the higher number. Horses would be within the AML range for a longer period of time and would be disturbed less often.

The current National Wild Horse and Burro Policy states that periodic removals will be planned and conducted to achieve and maintain AML and be consistent with AML establishment and removal decisions (Washington Office Instruction Memorandum No. 2010-135). The established AML ranges would allow for a three or four year gather cycle and maintenance of a thriving natural ecological balance.

Ecological carrying capacity of a population refers to the level at which density-dependent, population regulatory mechanisms would take effect within the herd. At that level, the herd would show obvious signs of ill fitness. These include poor individual animal condition, low birth rates, and high mortality rates in all age classes due to disease and/or increased vulnerability to predation.

Utilization – Utilization levels by wild horses in the Hardtrigger Allotment (Black Mountain and Hardtrigger HMAs) ranged from 0-5% (no use) to 40-60% (moderate use) prior to livestock turnout in 2007. Utilization levels at the end of livestock grazing (2009 – 2012) ranged between 4% and 45.5% in the HMAs (Table 5).

Table 5: Post livestock grazing utilization levels in the Black Mountain and Hardtrigger HMAs, Owyhee County, Idaho.

HMA	Livestock Grazing Allotment	2009	2010	2011	2012
Black Mountain	East Reynold		16-36%	17-28%	
Black Mountain Hardtrigger	Hardtrigger	4-38%		20.6 20.9%	16.9
	Rabbit Creek/Peters Gulch	33-42%	27-33%		
	Elephant Butte		24%	7–28%	18.5-40.7%
Hardtrigger	Hardtrigger	4-38%		4-37%	16.9
	Rats Nest (see Photo 1)		20-27%	6-28%	7.2-45.5%
	Reynolds Creek	12-30%		10-32%	8-21%
	Shares Basin			13-27%	8-34.7%

Please see Appendix F for a discussion of recent utilization monitoring in the Rats Nest Allotment (Hardtrigger HMA).

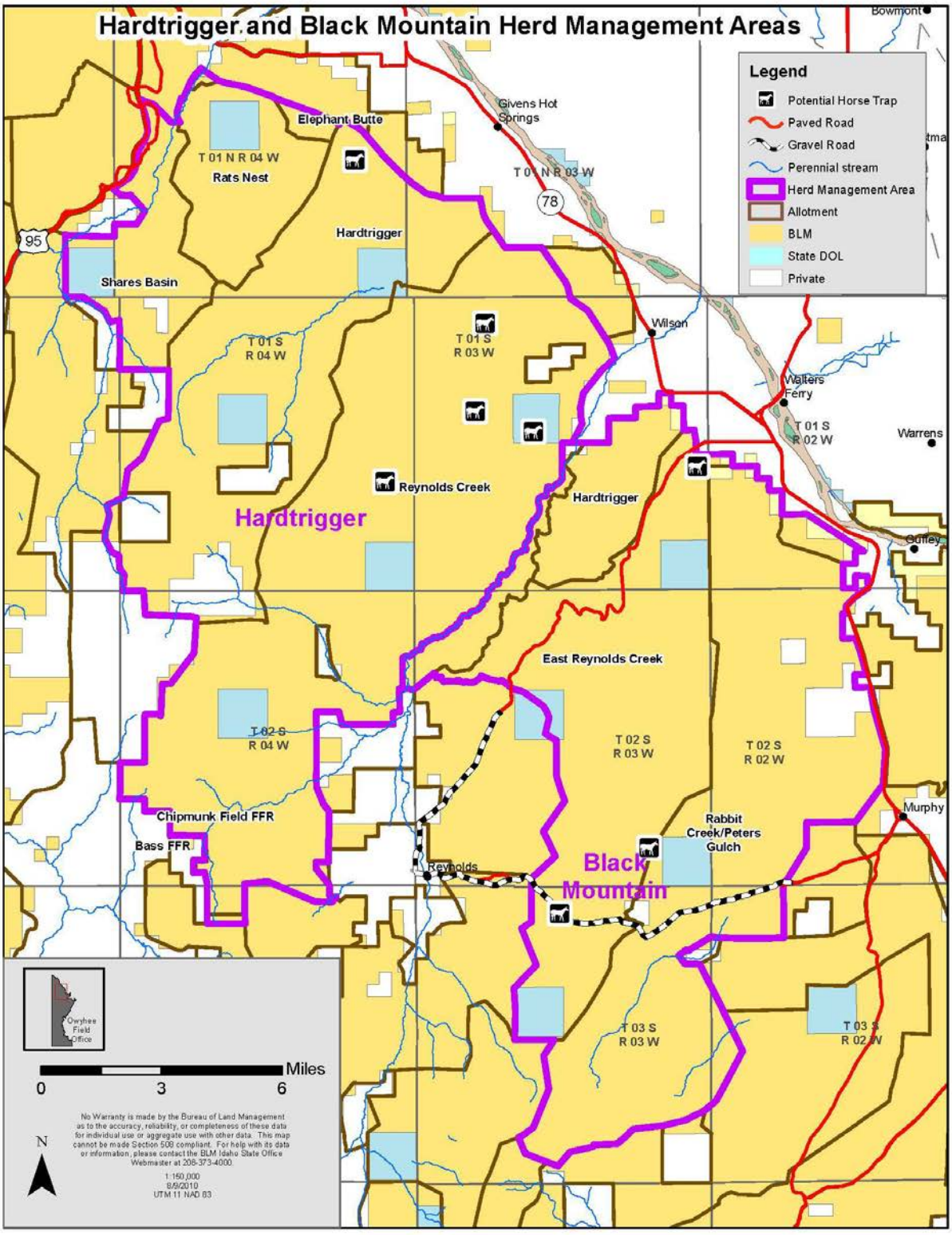
HMA Genetic Diversity and Viability - Blood or hair samples are important to determine genetic diversity and viability of the horse herds to ensure population diversity. After the 2010 CTR gather, hair samples were taken on 55 horses from the Owyhee Front HMAs (Appendix D). The following summarizes current knowledge of genetic diversity as it pertains to the HMAs:

- It is possible that small populations would be unable to maintain self-sustaining reproductive ability over the long term, unless there is a natural or management-induced influx of genetic information from neighboring herds. An exchange of only 2-3 breeding age animals per generation would maintain the genetic resources in small populations of about 100 animals.
- The small sample size and mixed ancestry make it difficult to interpret the population variation levels.
- Both the Black Mountain herd and the Hardtrigger herd should be closely monitored due to high percentage of genetic variability that is at risk.
- By exchanging horses between the Black Mountain and Hardtrigger sufficient diversity can be maintained.
- Naturally occurring ingress and egress occurs between the Black Mountain and Hardtrigger HMAs, but is not significant enough to affect genetic variability.

BLM policy (Handbook 4700-1) states:

> "A minimum population size of 50 effective breeding animals (i.e., a total population size of about 150-200 animals) is currently recommended to maintain an acceptable level of genetic diversity within reproducing WH&B populations (Cothran, 2009). This number is required to keep the rate of loss of genetic variation at 1 percent per generation. Animal interchange between adjacent HMAs with smaller population sizes may reduce the need for maintaining populations of this size within each individual HMA."

Release of mares for increasing genetic variability is a Known Management Action (KMA) and has been implemented in other HMAs nationally. Mares, unlike studs, will be absorbed into bands immediately and would be expected to breed the first year. Studs would not be expected to have a harem of mares for 1 to 4 years, delaying the benefit of introducing new genetics into the gene pool of the HMA. The mares and their offspring would be expected to have a larger and quicker genetic influence on the HMA.



Map 1: Overview of Black Mountain and Hardtrigger Herd Management Areas including potential location of trap sites.

3.1.2 Environmental Consequences – Wild Horses

Impacts to wild horses would occur on either the individual or the population as a whole. Direct impacts include stress or injuries associated with gathering, sorting, and handling of animals. Indirect impacts include changes in herd dynamics or population numbers.

The application of immune-contraception every two years in alternatives A and C would require a greater number of horses to be gathered over 11 years (Table 6). No animals would be available for adoption or placed in long-term pasture in alternatives C and D. Alternative A would place fewer horses in the adoption pipeline and in long-term holding than Alternative B would over 11 years.

3.1.2.1 Alternative A – CTR and Removal

Individual animals would experience moderate levels of physical and psychological stress for short periods of time during gather operations. Heart rates would be elevated, especially during the final move into a trap site. However, animals would be moving at a walk/trot during most of the gather and would not be moving more than seven miles. While wild horses in the HMAs are habituated to low levels of human activity (recreation and livestock management) higher levels of disturbance related to gather operations could cause anxiety in individuals. Because all phases of the process would be carried out according to Bureau policy, individual stress would be minimized. Animals would be expected to recover from stress within 24 hours.

Some injuries would be expected during gather and preparation operations in the HMAs or while at the holding facility. These injuries are typically the result of interactions with other captured wild horses. These altercations usually result in bruises which do not break the skin. Lacerations and other traumatic injuries associated with these activities are rare but do occur. Animals injured during gather and preparation operations are removed from the HMA and are treated at the holding facility. Thus, recovery rates are high.

While foaling does occur year round, the peak foaling period for horses in the HMAs is mid-March to mid-May. Gathering activities in the HMAs more than 6 weeks outside the peak foaling period will minimize stress to a majority of young foals.

Foals could be separated from their mares during capture and treatment. Although efforts would be made to re-form pair bonds in holding pens, it is expected that some foals would be orphaned. Removal of orphaned foals would ensure their long-term welfare.

Implementation of the standard operating procedures related to capture, handling, and transport would result in minimal impacts to individuals over the short and long term. Well-constructed traps, safety-conscious corral construction at the holding facility, well-maintained equipment, and additional pens to isolate aggressive or potentially sick animals would decrease stress and the potential for injury and illness. Previous gathers in the Boise District have resulted in less than 1% mortality of captured animals.

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 would be expected to have long term consequences from the fertility control injections.

Re-application 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 et al. 1995). The vaccine has proven to have no apparent effect on pregnancies in progress, the health of offspring, or the behavior of treated mares (Turner et al. 1997). Mares would foal normally in 2013 (Year 1). Mares treated with the vaccine would have significantly reduced foaling in 2014 (year 2) and 2015 (year 3) (Ransom et al. 2011). Once past the effectiveness of the vaccine, data indicate a lack of effect of PZP contraception on season of birth or foal survival (Kirkpatrick and Turner, 2003).

Population-wide (i.e., wild horses within an HMA) impacts would occur during or immediately following capture activities. They include the displacement of bands during capture and the associated re-dispersal which occurs following release, temporary separation of members of individual bands of horses, re-establishment of bands following releases, and the removal of animals from the population.

During gather operations, individual bands become mixed with other bands. Dominance hierarchies would be temporarily disrupted and would be re-established in the trap and after release. These hierarchies, independent of human interaction, consistently fluctuate. Such is the nature of herd animals as there are individuals lost from or introduced to the band.

Brief skirmishes would occur between mature studs following sorting and release into the stud pen. These interactions generally last less than two minutes and end when one stud retreats. After release from the trap sites, dominant males could establish new bands within the first day.

Mares, less than 5 years old, relocated into the Black Mountain and Hardtrigger HMAs would initially have increased stress from the transport and relocation. The relocated mares would likely be integrated into bands within 2 days.

Population-wide impacts have proven to be temporary in nature, with most impacts becoming unobservable within hours to several days of release. No observable effects associated with these impacts would be expected within one month of release except a heightened awareness of human presence.

Capture related spontaneous abortion events would be rare, but could occur up to three weeks following capture. This would have a negligible effect on population levels in the HMAs over the short term.

Removal of excess horses would have a minor effect on population dynamics over the long term (Alternative A). A substantial reduction in foal production for up to three years after fertility control treatment would result in fewer foals being born over the mid-term (up to six years). The

change in age class herd dynamics would lower the PGR in the mid-term, because the number of breeding age mares would be lower.

Under Alternative A, some captured wild horses would be released back to the range to achieve a normal post-gather sex ratio of 50% males and 50% mares. The re-alignment of sex ratio to this ratio is closer to what is expected in the wild. This sex ratio adjustment would have some population-wide impacts. 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. Though wild horses may breed year round, these behavioral and social conditions would be most evident during breeding season (May –July). Modification of sex ratios for a post-gather population of 50:50 males to females would further reduce growth rates, in combination with fertility control; thus, reducing the number of horses going to short and long term holding from future gathers.

Population levels within HMAs would be reduced moderately over the short term by the removal of approximately 101 excess animals. Based on the expected rate of population growth, total population in the HMAs would be at or above the AMLs by 2024 if immune-contraception is continued every 2 years and 80% of the population is gathered for every retreatment. (Appendix C). However, the percent of population gathered is expected to decrease with every repeat gather. It is expected that horses would get "trap-wise" and become more difficult to catch and, therefore, lower percentage of mares would be treated. Without treatment, populations would continue to increase and would likely put the population at high AML by 2018.

Win Equus population modeling predicts, with implementation of fertility control, a 9.8% annual PGR is expected when the sex ratio is 50% males and 50% females, and a 12.4% PGR at the existing sex ratio (Table 6) (Jenkins 1996). The highest success for fertility control has been obtained when applied between November and February.

The number of animals removed would increase the number of animals available for adoption/sale or placed in long-term pastures. However, reduction in productivity would result in a greater long-term reduction in animals removed relative to other Alternatives. Slight to moderate utilization levels would be expected to continue over the long term when populations are maintained within the AMLs.

The introduction of individual animals from the Hardtrigger herd into the Black Mountain herd and vice versa would improve genetic variability within both HMAs.

Table 6: Summary of Population Modeling Results for the Black Mountain and Hardtrigger HMAs, Owyhee County, ID.

Alternative	Number Gathered (11 years)*	Number Removed (11 years)*	Number treated	Ave. Growth Rate Next 10 Years (%)	Average population (11 Years)	Maximum population level (11 years)
Alt A - Proposed Action	727	188	124	9.8%**	155	210

Alternative	Number Gathered (11 years)*	Number Removed (11 years)*	Number treated	Ave. Growth Rate Next 10 Years (%)	Average population (11 Years)	Maximum population level (11 years)
Alt B - (Removal gather/ no fertility control)	434	344	00	18.7%**	163	228
Alt C - (Fertility control only)	2015	00	621	12.4%	441	687
Alt D - (No Action)	00	00	00	25.3-28%	667	1429

*Figures are provided by WinEquus models. Modeling does not account for horses' learned behavior associated with multiple and frequent gathers. Other assumptions associated with modeling are clarified in Appendix C.
**PGR based on sex ratio of 50% mares to 50% studs.

Approximately 81 wild horses (age 5 and under) would be put up for adoption/sale and 20 would be placed in long-term pastures. The additional wild horses placed for adoption/sales would likely leave 40 horses in short-term corrals one year after the removal gather is conducted and would add to the national overpopulation of wild horses in short-term corrals and long-term pasture.

3.1.2.2 Alternative B

Impacts to wild horses from a removal gather would be similar to those described in Alternative A. The removal would be to the lower ends of the AMLs resulting in a post-gather population of 96 animals. The post-release sex ratios of 50% females and 50% males would help reduce PGR. However, an anticipated PGR of 18.7% would still be greater than the expected 4.9% PGR in Alternative A. Population numbers would reach the upper limits of AMLs in a shorter time frame than Alternative A. This would result in more horses removed, placed for adoption, and entering long-term pasture.

3.1.2.3 Alternative C

Sex ratio would continue to be 60% mares and 40% studs. The high female/male ratio in the wild horse herds would have an expected PGR of approximately 12.4% annually if mares are treated with immune-contraception every two years (Appendix C).

If fertility control is applied and no horses were removed over this 10-year period, the wild horse population in the HMAs would be 520 animals. Over the long term, the population growth of wild horses would result in competition with wildlife and livestock for the available water and forage resources. The areas closest to the water would experience severe utilization and degradation of resources. Over time, the animals would deteriorate in condition as a result of declining forage availability and the increasing distance traveled to forage. The continued increases in population would eventually lead to catastrophic losses to the herd, which would be

a function of the available forage, water, and the degradation of habitat. A point would be reached where the herd exceeds the carrying capacity and would not foster a thriving natural ecological balance.

Ecological carrying capacity of the population would take effect within the herd if horse numbers are not reduced. The herd would show obvious signs of ill fitness, including poor individual animal condition, low birth rates, and high mortality rates in all age classes due to disease and/or increased vulnerability to predation.

A few wild horses already exist outside the boundaries of each HMA. With a larger increase of wild horses above AML, horses would be forced out of the HMA to find forage. Competition from other bands would further force wild horses outside the HMA boundaries.

3.1.2.4 Alternative D

The No-Action Alternative would allow for unrestricted increases in the number of horses in the HMAs over the short term. Wild horse herds would be expected to increase at approximately 25.3 to 28% annually and would have impacts in the short to mid-term similar to the long-term impacts in Alternative C.

3.2 Soils

3.2.1 Affected Environment – Soils

Soils within the HMAs are diverse and formed in alluvium and residuum derived dominantly from welded rhyolitic tuff, basalt and granitic parent materials. These soils occur on foothills, structural benches, and alluvial fan terraces. Soils information was gathered from the Soil Survey of Owyhee County Area Soil, Idaho (NRCS 2003).

Hardtrigger HMA

Soils in the northern end of the HMA are shallow to moderately deep to a duripan (cemented layer) or bedrock (with deeper inclusions) and well drained. These soils have a xeric soil moisture regime and a mesic or mesic bordering on frigid soil temperature regime. The main soil series are best represented by the Duco, Longcreek, and Succor series. These soils are generally more clayey. Most of the soils have a high amount of surface gravels which create a mantle. This condition could be representative of long-term erosional processes.

The risk of wind erosion on these soils is low and the risk of erosion from water is slight to moderate with the exception of the soils that occur on slopes greater than 30 percent. Slopes with a 30 percent grade or higher have a moderate to high risk of erosion from water. The amount of rock fragments present on the surface greatly modifies the risk of erosion. Areas steeply sloped and rocky are less affected by wild horse and livestock use. Evidence of mechanical damage to the soil surface and structure by hoof imprints occurs where wild horses and livestock tend to concentrate, such as water developments, salting sites, and riparian areas. While wild horses do congregate in these areas, their use pattern varies from livestock in that they tend to only stay in these areas for short periods of time.

Major landforms in the central and southern HMA are structural benches and fan terraces. The main body of soils formed in alluvium and residuum derived from welded rhyolitic tuffs with sedimentary influence. An exception is the soils along the central boundary area, which formed in mixed alluvium from various sources with some aeolian influence. In general, the soils are moderately deep to deep and well drained. Soils have a mesic soil temperature regime and a xeric or xeric bordering on aridic soil moisture regime. The main soil series present in the area include the Jump creek, Hardtrigger, Gooding, and Chilcott. Soil water erosion hazard is slight to high (depending on slope and surface texture). The hazard of erosion from wind is moderate. Presently there is no known active erosion, although historic and some more recent localized activity has been observed in the form of pedestalled perennial grasses and water flow patterns.

Black Mountain HMA
Soils in the northern portion (lower elevations in general) of the Black Mountain HMA occur on nearly level to moderately steep foothills and structural benches. These soils formed in alluvium and residuum derived from sedimentary materials and mixed volcanics. They are shallow to very deep and well drained. These soils have an aridic bordering xeric soil moisture regime and a mesic to frigid soil temperature regime. Major soil series in this area are the Arbidge, Arness, Owsel, and Babbington.

Soils in the southern portion (higher elevations in general) occur on undulating to steep foothills and mountains. These soils formed in residuum and alluvium derived from intermediate intrusive rock and welded rhyolitic tuff. They are shallow to deep and well drained. These soils have a xeric soil moisture regime and a mesic or frigid soil temperature regime. Major soil series are the Bauscher, Bedstead, Sharesnout, Bieber, and Hurryback. The erosion potential on the soils derived from granitic materials is moderate to very high and for soils formed in welded ryholitic tuff, low to high, depending on soil surface texture and slope.

In areas where excessive livestock grazing took place (mostly the lower elevation sites where year-long grazing has occurred) a degraded watershed condition is evident. The major change has occurred to the vegetative community where increaser species now dominate, shrub density is high, biologic soil crusts are weakly represented, and invasive annuals are part of the community. Also affecting watershed health is the amount of mechanical disturbance to the soil surface resulting in compaction and structural breakdown of the soil surface. Trampling by livestock and wild horses along with OHV and other recreational use are the major factors, with the most current accelerated erosion problems occurring on the lower elevation areas.

Based on data collected and field observations, most of the current accelerated erosion problems are on the lower elevation areas. Many of these problems stem from historic and current grazing practices, wild horse use, and, in some areas, OHV activities. Other areas are stable or exhibiting various forms and degrees of accelerated erosion but overall watershed health is generally acceptable or approaching acceptable. The areas where accelerated soil erosion and watershed health issues are a concern are East Reynolds allotment (pastures 1, 2, 3, 4, 5, and 7); Rabbit Creek allotment (pastures 1, 2, 3, 4, 5, 6, and 7); Jump Creek allotment (pasture 1); Evans FFR allotment; and the Gaging Station FFR allotment.

3.2.2 Environmental Consequences – Soils

3.2.2.1 Alternative A

Vegetation is the primary factor that influences the spatial and temporal variability of soil processes (USDA 2003), and as vegetation condition changes, so does runoff, erosion, and infiltration. Direct impacts to soils would be mainly due to surface disturbing activity (e.g., trap construction and use, vehicular travel, wild horse movement) during the gather process. Soil would be displaced and/or compacted on approximately two acres at each site in the construction of the trap panels, use of the access routes, and in the round-up and loading of the wild horses. The area of severe surface disturbance is small, and would normally be less than 2 acres per site and consist of trampled vegetation down to bare soil with some compaction. Soils in these areas would remain in a disturbed condition because they would periodically be used for wild horse gathers. Wind and water erosion would be minor because the areas are on some-what level ground, which would decrease runoff potential, and the areas would likely have weedy vegetation cover in the first and second growing season, decreasing potential raindrop impact directly on the soil surface.

Moderate surface disturbance in the form of trampled vegetation would occur on narrow corridors within 0.25 mile of trap sites where bands of horses are moved into traps at an increased rate of speed. Precipitation tends to increase in late October and November and could result in moist or saturated soil conditions during the gather period. Wet soils would be more susceptible to compaction and disturbance from hoof impact than dry soils. However, horse gather operations would likely halt if weather conditions lead to saturated soils. The soil effects from these impacts would be minor because impacts occur on a relatively small proportion of the landscape and are of short durations. These areas would revegetate naturally (within 1-2 growing seasons), and minimal wind and water surface erosion is expected on these disturbed areas. Consequently, the effects are not expected to have lasting soil impacts in the long term (>10 years) within the two HMAs and not negatively affect Standard 1.

Indirect effects of reducing wild horse population to the low end of the AMLs would reduce the overall number of herbivores in the HMAs, thus reducing the amount and magnitude of soil impacts over the short term. Long-term soil effects would include an overall decrease in potential erosion in the HMAs due to wild horse populations remaining within AML. Such decrease in erosion would result in a slightly improved state with an increase in the frequency and diversity of native bunchgrasses and biological soil crusts (Norton et al. 2004).

3.2.2.2 Alternative B

As presented in Table 6, there would be approximately 250 (684-434) fewer wild horses gathered, resulting in less direct hoof impacts with the soil. The same direct impacts described in Alternative A would occur. Short and long-term direct effects to soil resources would be the same as those described in Alternative A.

Indirect effects (short and long-terms) would be the same as those described in Alternative A. Wild horse numbers would be slightly higher (>100 animals) than in Alterative A, and the associated soil impacts with those increased wild horses would be minimal.

3.2.2.3 Alternative C

Direct and indirect effects to soils from gather activities at and near the trap sites would be the same in Alternative C as described in Alternative A, because gathering would occur in the same locations and on the same schedule.

However, increased indirect soil impacts would occur in the short and long-terms, as compared to Alternative A. Wild horse numbers on the HMAs would increase under Alternative C to an estimated average population of 441 animals, which is nearly 2.5 times higher than the combined HMAs' AMLs (190 horses). Increased horses numbers, above the AML, would increase the demand for forage, resulting in heavy utilization of perennial bunchgrasses, decreasing overall litter and ground cover. Wild horse numbers exceeding the AML would lead to poor overall watershed conditions due to less standing vegetation and litter to reduce raindrop impacts, thus increasing the potential for accelerated erosion.

3.2.2.4 Alternative D

There would be no direct effects to soils from trap construction and use, vehicle use, or gather activities because no wild horse gather would occur. However, in the long term, as wild horse populations approach 1,429 animals (as estimated in Table 6), wild horses would consume more forage, reducing the amount of litter protecting soils from erosion and result in indirect soil impacts, similar to those described in Alternative C. Large numbers of wild horses exceeding the AMLs for both HMAs would lead to poor overall watershed conditions due to less standing vegetation and litter to reduce raindrop impacts, increasing the potential for accelerated erosion.

3.3 Vegetation Including Noxious Weeds and Special Status Plants

3.3.1 Affected Environment – Vegetation Including Noxious Weeds and Special Status Plants

Plant Communities

Plant communities within the HMAs are influenced by elevation, soil type, and disturbance history (such as wildfire and grazing). The less disturbed lower elevations consist of salt desert shrub communities of shadscale, bud sagebrush, and four-wing saltbush with Indian ricegrass and/or Thurber's needlegrass on calcareous loam soils, or of Wyoming big sagebrush with annual and perennial grasses (primarily Sandberg bluegrass) on loamy low and mid-elevation sites. Disturbed lower elevation sites within the HMAs are extensively occupied by cheatgrass and other non-native annual grasses and forbs. Upper elevation areas of the HMAs are typically low sagebrush or mountain big sagebrush plant communities, many of which have a larger native perennial grass component than lower elevations, consisting of Sandberg bluegrass, Idaho fescue, and, in some areas, bluebunch wheatgrass.

Potential horse trap sites have been identified (Map 1), most of which have been used in the past; additional sites may be used, but would be selected to avoid sensitive resources (Appendix B). Table 8 shows the potential vegetation, existing vegetation, distance to mapped special status plant occurrences, and distance to mapped noxious weed infestations for each identified potential horse trap site.

The Squaw Creek ACEC (150 acres) was designated in the Owyhee RMP to provide special management for an unusually intact, excellent condition, low elevation Wyoming sagebrush and bluebunch wheatgrass community. Part (about 40 acres) of the Squaw Creek ACEC occurs on the western edge of the Hardtrigger HMA.

Noxious Weeds
Scotch thistle (*Onopordum acanthium*), Canada thistle (*Cirsium arvense*), perennial pepperweed (*Lepidium latifolium*), whitetop (*Cardaria draba*), spotted knapweed (*Centaurea stoebe*), poison hemlock (*Conium maculatum*), puncture vine (*Tribulus terrestris*), rush skeletonweed (*Chondrilla juncea*), Russian knapweed (*Acroptilon repens*), and salt cedar (*Tamarix sp*.) have been recorded primarily in the lower elevation portions of the HMAs. Most of these noxious weeds continue to be treated annually with herbicide (USDI 2007c).

One potential trap site in the Hardtrigger HMA is located adjacent to a whitetop infestation. Monitoring and treatment of this infestation (and others) is ongoing. Another potential trap site in the Hardtrigger HMA was located within 0.25 mile of three small (<0.1 acres) infestations of Scotch thistle. A third potential trap site, in the Black Mountain HMA, is within 0.25 miles of a Russian knapweed infestation. The remaining trap sites are about one mile, or more, away from known weed infestations.

Special Status Plants
No plant species listed under the Endangered Species Act (ESA) are known or suspected to occur in these HMAs (USFWS 2009). Slickspot peppergrass (*Lepidium papilliferum*), listed as Threatened under the ESA, occurs in Owyhee County, but has not been documented in the Owyhee Field Office area, nor has critical or potential habitat (as mapped by Boise District BLM) been identified in the HMAs; this species will not be addressed further. There are many occurrences of BLM special status plant species recorded within the HMAs (Table 7) (IFWIS 2011). During travel management planning in 2006, the BLM conducted systematic surveys for special status plants throughout much of the lower elevation areas of the Hardtrigger HMA. Plant surveys have also been conducted in the past within some of the areas of the HMAs by the Idaho Conservation Data Center and by BLM botanists for various projects.

Table 7: Special Status Plant Species Known to Occur within the Herd Management Areas

Species	Hardtrigger	Black Mountain	Status*	Annual or Perennial
Cusick's false yarrow (*Chaenactis cusickii)*	X		2	Annual
Dimeresia (*Dimeresia howellii*)	X		3	Annual
Desert pincushion (*Chaenactis stevioides*)		X	4	Annual
White-margined waxplant (G*lyptopleura marginata*)	X	X	4	Annual
Stiff milkvetch (*Astragalus conjunctus*)	X		4	Perennial
Packard's desert parsley (*Lomatium packardiae*)	X		2	Perennial
Smooth stickleaf (*Mentzelia mollis*)	X		2	Annual
Malheur phacelia (*Phacelia lutea* var. *calva*)	X	X	3	Annual
Mulford's milkvetch *(Astragalus mulfordiae)*		X	2	Perennial
Janish's penstemon (*Penstemon janishiae*)		X	3	Perennial
White eatonella (*Eatonella nivea*)		X	4	Annual

Species	Hardtrigger	Black Mountain	Status*	Annual or Perennial
Rigid threadbush *(Nemacladus rigidus)*		X	4	Annual
Simpson's hedgehog cactus (*Pediocactus simpsonii*)		X	4	Perennial
Earth Lichen (*Catapyrenium congestum*)		X	4	Lichen
Snake River milkvetch (*Astragalus purshii var. ophiogenes*)		X	4	Perennial
Least snapdragon (*Sairocarpus kingii*)		X	3	Annual

*Status – BLM Type (as of January 2012): 1 – Federally Threatened, Endangered, Proposed and Candidate Species; 2 – Range-wide/Globally Imperiled Species - High Endangerment; 3 – Range-wide or State-wide Imperiled Species - Moderate Endangerment; 4 – Species of Concern

Typically, special status plants in this area are most impacted by off-highway vehicles; however, high concentrations of horses would be expected to impact the plants (through consumption and trampling) and their habitat (introduction of weeds and soil compaction). Most of the potential trap sites have been surveyed, and are located 0.3 miles, or more, from known special status plant populations in the Hardtrigger and Black Mountain HMAs.

Table 8: Potential Horse Trap Sites - Vegetation, Special Status Plants, and Noxious Weeds

Trap Site	Potential Vegetation (Ecological site)	Existing Vegetation (PNNL**)	mapped Special Status Plant occurrence (miles)	mapped Noxious Weed infestation (miles)
1	Not mapped, but likely Wyoming sagebrush/ bluebunch wheatgrass	Big sagebrush/ bunchgrass cheatgrass	1.0	0.28
2	Wyoming sagebrush/ Indian ricegrass	Big sagebrush/ bunchgrass	0.4	0.64
3	Wyoming sagebrush/ bluebunch wheatgrass	Big sagebrush/ cheatgrass	0.7	0.23
4	Wyoming sagebrush/ Indian ricegrass	Big sagebrush/ bunchgrass	3.4	0.02
5	Wyoming sagebrush/ Indian ricegrass	Big sagebrush/ bunchgrass	0.9	0.92
6	Wyoming sagebrush/ Indian ricegrass	Salt desert shrub	0.3	0.94
7	Shadscale - budsage/ Indian ricegrass Thurber's needlegrass	Big sagebrush mix/ bunchgrass cheatgrass	0.4	0.38
8	Wyoming sagebrush/ bluebunch wheatgrass	Big sagebrush/ bunchgrass	1.0	0.17
9	Wyoming sagebrush/ bluebunch wheatgrass	Big sagebrush/ bunchgrass	0.7	1.89

** PNNL= Vegetation mapping done by the Pacific Northwest National Laboratory

3.3.2 Environmental Consequences – Vegetation Including Noxious Weeds and Special Status Plants

3.3.2.1 Alternative A

Plant Communities

Damage to vegetation from gather activities would occur on up to two acres in and around each trap site. Damage or mortality would be greatest in areas with repeated, concentrated ground disturbing activities, such as those associated with trap sites. Concentrated human, vehicle, and wild horse activity would damage, trample, or kill non-sprouting shrubs. Shrub damage would be minimal where trap sites are constructed in previously disturbed areas that are dominated by annuals or perennial grasses and forbs, which is true of most of the potential trap sites. Above ground portions of perennial grasses and forbs would be damaged, but some plants would be expected to survive because disturbance would occur when most species are dormant. Shallow rooted perennials would be most susceptible to mortality. No direct effect on native annual plants would be expected due to the timing of the gather. Native annual plants would be dormant and will have already set seed for the year. Additional damage or mortality to vegetation would occur from hoof activity on narrow corridors within 0.25 mile of trap sites where bands of horses are moved into traps at an increased rate of speed. Because trap sites are localized (< 2 acres per site), use only for a short time (<5days), are most likely in areas of previous disturbance and lacking shrubs, and are used during the dormant season for plants, direct effects to vegetation on a landscape scale would be limited.

Indirect effects from gather activities include the potential for invasive weeds to increase in and around the trap sites. At lower elevations (<5,000 ft), annual invasive species or bare ground are expected to dominate severely disturbed areas over the short and possibly long term (Chambers et. al. 2007). Where perennials dominated areas prior to disturbance, especially at upper elevations, perennial grasses and forbs would be expected to recover within 3-5 years. Where shrub mortality occurs, recovery would be expected within two to 35 years (Baker 2006) if not subsequently disturbed. Vegetative resources at trap sites would be potentially affected every two years (depending on sites selected for operations).

Because of its proximity to perimeter fencing, distance from identified potential horse trap locations, and topographic features, the Squaw Creek ACEC would not be affected by gather activities.

Indirect effects from changes in wild horse numbers as a result of CTR and removal activities would affect vegetation. Wild horse use would not be expected to adversely affect plant communities when population numbers are maintained below the upper level of the AML. Reducing wild horse numbers to the lower end of AMLs would benefit vegetation resources over the short-term (4 years) by reducing vegetation utilization (grazing by horses) and levels of mechanical damage (trampling) in concentrated use areas.

Noxious Weeds

No untreated noxious weed infestations are within the direct disturbance area for gather activities, but areas where substantial vegetation damage or mortality occurs would be susceptible to noxious weed establishment. Noxious weeds could be introduced to these areas

during and after capture operations from vehicles or other sources. Weed populations that become established in these areas could spread into adjacent, less disturbed vegetation communities over the long term. Noxious weed establishment and spread are expected to be limited by successful weed control efforts (USDI 2007c).

Because Alternative A would maintain animal numbers within the AMLs, which is assumed to be appropriate to maintain healthy plant communities, no adverse indirect effects to noxious weeds from reductions in horse numbers is expected.

Special Status Plants
Impacts to special status plants from gather activities would be minimal because of trap site location and timing of the gather. Annual species would have completed their lifecycle for the year, and most perennials would also be dormant by November. Special status plant populations would be most susceptible to damage where perennial species overlap the narrow corridors leading to trap sites. Because all known special status plant occurrences are at least 0.3 miles from proposed trap sites, they would be beyond the area where concentrated disturbances would be expected. More than half of the special status plants in these HMAs are annuals and are not actively growing or producing seed in the fall. Therefore, the majority of special status plants would not be directly affected by fall gather activities.

Indirect negative effects to special status plants from changes in wild horse numbers as a result of CTR and removal are not expected because AMLs would maintain special status plant habitat in suitable condition.

3.3.2.2 Alternative B
Direct and indirect effects to plant communities, noxious weeds, and special status plants from gather activities at and near the trap sites would be the same as described in Alternative A.

3.3.2.3 Alternative C
Direct and indirect effects to, noxious weeds, and special status plants from gather activities at and near the trap sites would be the same in Alternative C as described in Alternative A, because gathering would occur in the same locations and on the same schedule.

Wild horse numbers on the HMAs would increase under Alternative C, which would have negative indirect effects to vegetation over the short (2-4 years) and long (5+ years) terms. Increased horses numbers, above the AML, would increase the demand for forage on the plant communities, which would result in heavy (over 60%) utilization of perennial bunchgrasses, including heavy use during the critical growing period (generally spring and early summer for most plant species); this would reduce plant vigor, leading to mortality of the most palatable plants and changes in the plant community as less palatable plants become dominant.

The predicted over-utilization would eventually lead to continued resource degradation. The utilization would shift to browsing of shrubs, which would become hedged and weak. The overall weakening of native perennial plants would result in increases in invasive and noxious weeds.

High populations of horses would be expected to adversely impact special status plants and their habitat.

3.3.2.4 Alternative D

The No-Action Alternative would have no direct gathering effects, and no effects specific to horse trap locations.

This alternative would also allow for short term unrestricted increases in the number of horses in the HMAs above that expected in Alternative C. Indirect effects from Alternative D on vegetation (including noxious weeds and special status plants) would be similar to Alternative C, but because animal numbers would be higher than Alternative C, utilization would be higher, plant vigor would be lower, plant mortality would be higher, and plant community shifts toward less palatable species would occur faster. Noxious weeds would be expected to increase more rapidly, and special status plants habitat would be degraded.

3.4 Wetlands/Riparian Zone and Water Quality

3.4.1 Affected Environment – Wetlands/Riparian Zone and Water Quality

Wetlands/Riparian Zone

Three watersheds are most affected by activities within the HMAs: Hardtrigger Creek-Snake River, Reynolds Creek, and Rabbit Creek-Snake River. There are approximately 34.2 miles of perennial streams (lotic systems) located throughout the two HMAs (Table 9). Reynolds and Rabbit creeks are the primary perennial streams in the Black Mountain HMA. Perennial streams in the Hardtrigger HMA include Hardtrigger, Little Hardtrigger, Macks, Reynolds, Salmon, and Squaw creeks. In addition, there are numerous intermittent and ephemeral drainages throughout both HMAs. The majority of drainages are spatially oriented southwest to northeast and ultimately drain into the Snake River.

Table 9: Perennial Streams and Tributaries in the Black Mountain and Hardtrigger HMAs. Units measured in miles.

Streams	Black Mountain HMA	Hardtrigger HMA
Cottle Creek		1.1
East Fork Squaw Creek		0.6
Hardtrigger Creek		6.3
Little Hardtrigger Creek		2.6
Macks Creek		2.3
North Fork Macks Creek		1.0
Pole Creek		0.3
Rabbit Creek	2.7	
Reynolds Creek	4.8	2.5
Salmon Creek		3.5
Salmon Creek T15		0.3

Streams	Black Mountain HMA	Hardtrigger HMA
South Fork Macks Creek		0.8
Squaw Creek		3.9
Squaw Creek T14		0.9
West Rabbit Creek	0.4	
West Rabbit Creek T3	0.2	
Grand Total	**8.1**	**26.1**

Both HMAs have numerous springs, meadows, and seeps (lentic systems) that are mostly located in the upper elevations (>5,000 feet). Many springs have been developed and have small exclosures surrounding the springheads. Hardtrigger HMA has approximately 50 springs and Black Mountain HMA has 10 springs (USDI 2010), many of which have been developed and have small exclosures (0.1 to 1 acre) surrounding the springheads.

Riparian vegetation communities in the HMAs are generally comprised of woody vegetation including various willows, cottonwood, and a diversity of other shrubs, with interspersed co-dominant or dominant herbaceous communities consisting of various rushes, sedges and grasses. Woody riparian vegetation tends to occur in upper elevation areas while herbaceous riparian vegetation can occur throughout lotic and lentic areas. Noxious weeds including Canada thistle, Scotch thistle, perennial pepperweed, poison hemlock, tamarisk, and whitetop have been documented on Hardtrigger, Moores, Rabbit, Reynolds, and Squaw creeks.

Characteristics of a properly functioning riparian area include streambanks stabilized by riparian vegetation, accessible floodplains, streambank water storage due to high organic content, high water tables, and the ability to dissipate energy and to trap sediment. Lotic Proper Functioning Condition (PFC) assessments and multiple indicator monitoring (MIM) data collected in the Hardtrigger HMA and one in Black Mountain HMA (Reynolds Creek) in 2010 and 2011 were used to assess stream function (see Table 10). Monitoring data indicate streams are improving in the Hardtrigger HMA, and the Owyhee RMP riparian management actions and allocations are mostly being met (median herbaceous stubble height greater than 4 inches, limit annual streambank trampling impacts to 10% or less, and limit woody browse to less than 35%) on the streams.

Table 10: Stream Assessments and Corresponding Ratings for Hardtrigger HMA.

Stream Name	Year Assessed	Assessment Type	Rating
Cottle Creek	2010	PFC[1]	PFC
East Fork Squaw Creek (T14)	2010	NA[2]	Not livestock accessible
Upper Hardtrigger Creek	2010	MIM	7”SH[4], 2%WB[5], 18%BA[6]
Hardtrigger Creek	2011	MIM[3]	10”SH, 0%WB, 2%BA
Little Hardtrigger Creek	2010	MIM	7”SH, 3%WB, 10%BA
Macks Creek	2010	PFC	PFC
North Fork Macks Creek	2010	PFC	PFC
Reynolds Creek	2010	MIM	10”SH, 8%WB, 0%BA

Stream Name	Year Assessed	Assessment Type	Rating
Salmon Creek	2010	PFC	PFC
South Fork Macks Creek	2010	PFC	PFC
Squaw Creek	2011	NA	Not livestock accessible

1 Proper Functioning Condition

2 Not assessed

3 multiple indicator monitoring

4 median stubble height of herbaceous riparian vegetation in inches

5 Percent woody browse

6Percent streambank alterations

Many springs within the HMAs that are not protected by an exclosure have been impacted by livestock and wild horses. Specifically, out of nine lentic PFCs assessments conducted in 2010 in the Hardtrigger HMA, two were assessed as PFC, and the others were assessed as functional at-risk (FAR) due to excessive hoof action. However, herbaceous vegetation abundance and diversity were usually adequate for the site's potential.

Water Quality

Streams with designated beneficial uses are addressed under the Idaho Administrative Procedures Act (IDAPA) 16.01.02. Waters are designated as impaired when there is a violation of water quality criteria and are placed on the §303(d) list. Idaho's 2010 Intergraded Report (2011) and associated ArcGIS data were used to identify current water quality designations and status. All streams within the Black Mountain and Hardtrigger HMAs have general use designations for secondary contact recreation, agricultural water supply, wildlife habitat, and aesthetics. Additional designated beneficial water uses in Reynolds Creek include primary contact recreation, cold water biota, and salmonid spawning.

Approximately 76% (104 miles) of the stream miles (both perennial and intermittent) are fully meeting their designated beneficial uses and 24% (33 miles) are not supporting their beneficial uses in the Hardtrigger HMA. In Black Mountain HMA, approximately 17% (16 miles) of the stream miles are fully meeting their beneficial uses, 80% (75 miles) have not been assessed, and 3% (3 miles) are not supporting their beneficial uses. Table 11 identifies specific stream reaches, unattained beneficial uses, and the specific impairments of approximately 36 miles of streams not fully meeting their beneficial uses in both HMAs.

Water quality monitoring was implemented in 2003 to determine current data trends, status of beneficial uses, and effectiveness of Best Management Practices (BMPs) in meeting water quality standards and protecting existing beneficial uses as set forth by IDEQ. Water quality data from various stream segments within the HMAs collected between 2007 and 2011 identify no water quality issues based on *E. coli* and total dissolved solid (TDS) concentrations.

Table 11 Water quality limited stream reaches and associated impairments within the Hardtrigger and Black Mountains HMAs

Stream Name	Flow Type	Beneficial Use (Not Supporting)	303 D Listed	TMDL Approved	*Habitat alterations or Habitat/Biota bioassessments*	*Sediment/siltation*	*Flow regime/low flow alterations*	*Water temperature*	*E. coli*
Crows Nest Creek	Perennial	CWAL[1]		X		X	X	X	
Hardtrigger Creek	Intermittent	CWAL	X			X			
Hardtrigger Creek	Perennial	CWAL	X			X			
Little Hardtrigger Creek	Perennial	CWAL	X			X			
Middle Fork Hardtrigger Creek	Perennial	CWAL	X			X			
Reynolds Creek	Perennial	PCR[2]	X						X
Reynolds Creek	Perennial	CWAL, SS[3]	X						
Salmon Creek	Perennial	PCR	X		X				X
Wilson Creek	Intermittent	PCR	X						X
Wilson Creek	Perennial	PCR	X						X

1 Cold Water Aquatic Live Criteria

2 Primary Contact Recreation Criteria

3 Salmonid Spawning Criteria

3.4.2 Environmental Consequences – Wetlands/Riparian Zone and Water Quality

3.4.2.1 Alternative A

Wetlands/Riparian Zone
Gather operations would have isolated, short-term impacts to wetlands and riparian zones. All potential trap sites are more than 0.25 mile from wetlands and streams. Riparian impacts would be limited to damage associated with horse movement to the trap sites. Horses would be moving in small groups primarily across traditional steam crossings and not parallel to streams. Streambank and vegetation impacts at crossings would likely be similar to that occurring during normal activities associated with both livestock and wild horse grazing. Off-trail riparian area crossings would damage relatively short sections of stream (<50 feet). Hoof shearing would damage streambanks, exposing bare soil. Woody and herbaceous vegetation may be damaged, but likely not killed. These areas could be expected to recover within 1-3 years (short-term); however, they could be susceptible to establishment or expansion of noxious weeds.

Maintaining wild horse numbers within AMLs would be expected to promote more seasonality in grazing use patterns by horses and allow livestock management prescriptions designed to enhance riparian and channel conditions to operate as intended. Grazing use patterns that are more seasonal, of shorter duration, and of reduced intensity would improve riparian and channel systems. Over the long term, the riparian vegetation would develop and expand, slowing water flows and catching sediment, and eventually narrowing and deepening stream channels.

Water Quality
Suspended sediments may increase briefly in a short section of stream below established crossings. Depending on the degree of streambank damage at off-trail crossings, eroding streambanks could add sediments to a stream until vegetation stabilizes streambanks. With limited damage (1-2 crossings), water quality would be adversely affected for a short period (days) and limited distance downstream (<0.25 mile). With more substantial damage, effects could last until damage is stabilized.

Water quality standards for sediment and temperature would be expected to improve or be attained over the long term (>10 years) where riparian and channel conditions improve. Improvements in riparian and hydrologic conditions would stabilize streambanks and reduce sediment levels. Shade from overhanging streambanks, riparian vegetation, and deeper stream channels would promote cooler stream temperatures.

3.4.2.2 Alternative B – Removal Only

Wetlands/Riparian Zone
Impacts to wetlands and riparian areas from a removal gather would be the same as described in Alternative A, but adverse impacts to vegetation and streambank stability would be evident earlier.

Water Quality

Impacts to water quality would be the same as those described in Alternative A, but water quality impacts associated with sediment and temperature would be evident earlier.

3.4.2.3 Alternative C

Wetlands/Riparian Zone
Increased direct and indirect impacts would occur in the short and long-terms, as compared to Alternative A. Wild horse gather numbers are estimated to be 2015 animals (Table 6), which is nearly 3 times higher than the number of animals gathered in Alternative A. Additionally, average population is estimated at 441 animals, which is nearly 2.5 times higher than the combined HMAs' AMLs (190 animals). Both direct and indirect impacts, as described in Alternative A, would occur but to a much greater magnitude. Yearlong use by increased wild horse population would increase utilization in riparian areas, preventing root reserves from developing in riparian vegetation to a level that would permit reproduction of the few surviving native hydric species in streams (USDI, 2006). The excessive use would continue to jeopardize the functioning condition of these streams, and would likely result in decreased functioning conditions of streams within both HMAs, over both the short and long-terms (<3 years and >10 years, respectively). Riparian impacts would become increasingly evident with annual increases in wild horse numbers and year-long use. Short-term impacts including streambank and spring damage due to hoof action and riparian vegetation composition changes to less desirable species would occur. Stream segments that are near well-traveled roads would not have the severity of impacts due to occasional human disturbance, but impacts would increase as horse numbers increase.

Long-term impacts would increase due to the increased wild horse numbers. Stream channel and vegetation damage due to increased trampling and more intensive grazing use over prolonged periods (>10 years) would soon reach untenable levels, prompting episodes of channel down cutting and bank caving.

Water Quality
Damage to streambanks due to hoof action and riparian vegetation composition changes to less desirable species would occur. These impacts would increase sedimentation, turbidity, and water temperature. Stream segments that are near well-traveled roads would not have the severity of impacts due to occasional human disturbance, but impacts would increase as horse numbers increase. Long-term impacts would be an overall decline in water quality due to streambank trampling and riparian vegetation composition change to less desirable species due to excessive horse numbers. Overall, Idaho water quality standards would not be attained in the short or long-terms.

3.4.2.4 Alternative D

Direct and indirect effects to riparian areas from not conducting wild horse gathers would be similar to Alternative C. Wild horse populations are estimated to increase by up to 28% annually (Table 6), impact to riparian areas would occur to a greater magnitude because there would be approximately 24% more animals in this alternative compared to Alternative C. This is nearly 3 times more wild horses than the AMLs for both HMAs, and would lead to poor overall riparian

conditions in both streams and springs faster than in Alternative C. Long-term impacts would likely lead to allotments within the HMAs to not meeting Idaho Rangeland Health Standards.

Wetlands/Riparian Zone
The yearlong use of wetlands and riparian zones, by an ever increasing population of wild horses, would likely devoid them of vegetation and greatly reduce streambank stability in the mid to long-term.

Water Quality
Effects are similar to those described in Alternative C, but would occur faster and to a greater magnitude because there would be more wild horses (see previous section). As riparian vegetation is removed and streambank stability is decreased, it is expected that water quality standards for sediment and temperature would be exceeded in the mid to long-terms (5 to 10 years), and Idaho water quality standards would not be attained or maintained.

3.5 Wildlife and Fisheries

3.5.1 Affected Environment – Wildlife and Fisheries

The Hardtrigger and Black Mountain HMAs are located within the Owyhee Uplands and Canyons and Unwooded Alkali Foothills Level IV Ecoregions of Idaho (McGrath et al. 2002). Within the HMAs, these ecoregions are characterized by rolling shrub steppe uplands interrupted by low hills, rocky outcrops, and sandy alkaline deposits. Perennial streams are rare and much less common than in other Ecoregions in the OFO. Wildlife habitats with the Hardtrigger and Black Mountain HMAs include juniper woodlands, sagebrush steppe, salt desert shrub, grassland meadows, riparian areas, and seeps and springs. Upland and riparian vegetation within the HMAs have been discussed in detail in Sections 3.3 and 3.4.

Many wildlife species utilize a variety of habitats in the Hardtrigger and Black Mountain HMAs. These habitats provide forage, nesting substrate, and cover for a variety of bird, mammal, amphibian, reptile, and fish species common to southwestern Idaho and the Northern Great Basin region. Although all of the species are important members of native communities and ecosystems, most are common and have wide distributions within the allotment, state, and region. Consequently, the relationship of most of these species to the wild horse gather is not discussed in the same depth as species upon which the BLM places management emphasis. Special status species, migratory birds, raptors, and other species that may be impacted significantly are discussed here in detail. These include greater sage-grouse, California bighorn sheep, redband trout, mule deer, and pronghorn antelope.

Special Status Animal Species
Although no Threatened and Endangered Species listed under the Endangered Species Act (ESA) occur in the HMAs, several candidate species in consideration for listing were identified from the U.S. Fish and Wildlife Service's Endangered Species Program (USDI-USFWS 2012). BLM, USFWS, and IDFG Idaho Fish and Wildlife System maintain an active interest in other special status species (SSS) that have no legal protection under the ESA. BLM special status species are: 1) species listed or proposed for listing under the ESA, and 2) species requiring special management consideration to promote their conservation and reduce the likelihood and

need for future listing under the ESA (BLM Manual 6840), which are designated as BLM sensitive by the State Director(s). Special status species discussed in this document include those listed on the Idaho BLM State Sensitive Species List (including Watch List Species) (USDI-BLM 2003) for the OFO. Two bird and one amphibian species listed as candidates under the ESA, and 12 mammals, 25 birds, 5 reptiles, 4 amphibians, and one fish with special status occur or have the potential to occur within the HMAs. Special status animal species, their status, and key habitat associations are summarized in Appendix A. ESA candidate species, their status, key habitat associations, and rationale for detailed discussion in this EA are summarized in Table 11.

Table 11: Special Status Animal Species protected under ESA or similar Act in Owyhee County, Idaho.

Species	Status	Habitat	Relation to Proposed Action and Alternatives	Rationale
Greater Sage-Grouse *Centrocercus urophasianus*	ESA Candidate	Sagebrush steppe	Present and discussed in detail	
Yellow-billed Cuckoo *Coccyzus americanus*	ESA Candidate	Mature riparian areas (cottonwood galleries)	Likely not present	Lack of suitable nesting and foraging habitat
Columbia Spotted Frog *Rana luteiventris*	ESA Candidate	Wetlands, rivers and streams	Likely not present	No observations in the affected area.
Bald Eagle *Haliaeetus leucocephalus*	Bald and Golden Eagle Protection Act	Riparian, wetlands	Likely not present	Lack of suitable nesting and foraging habitat
Golden Eagle *Aquila chrysaetos*	Bald and Golden Eagle Protection Act	Cliffs and canyon, shrubsteppe, grasslands	Present and discussed in detail	

With the exception of a few well-studied species, current occurrence and population data for most special status animal species within the HMAs are limited due to a deficiency of targeted surveys and directed research. Although some species' populations are poorly documented, most species that likely occur in the HMAs display broad ecological tolerance and are widely distributed throughout the Great Basin region. Species such as the Yellow-billed Cuckoo, Columbia Spotted Frog, and Bald Eagle have the potential to occur in the area. However, suitable nesting and foraging habitat for the Yellow-billed Cuckoo and Bald Eagle does not occur within the affected area and no observations have been recorded for Columbia Spotted

Frogs in any of the riparian areas in the HMAs. Therefore, these species will not be discussed in further detail.

Greater Sage-Grouse

Greater sage-grouse populations declined across their current distribution area from the 1960s to the mid-1980s and then tended to stabilize (Connelly et al. 2004). In Connelly et al. (2004), there were no clear conclusions about the principal causes of the decline of sage-grouse; instead, there was a discussion of a variety of factors affecting sage-grouse and sagebrush habitats. Sage-grouse numbers were extremely low during 1918-1942, such that wildlife managers feared extinction of the species (Autenreith 1981). Factors such as habitat loss, weather, disease (Autenreith 1981, Connelly et al. 2004) and predation (Coates 2007) are all involved in affecting sage-grouse populations. Aldridge et al. (2008) examined the chances of survival of sage-grouse across its range and developed a model to predict where they are most likely to persist and where they are at risk of disappearing. According to this model, sage-grouse in the OFO likely represent a secure population.

The OFO is within the Great Basin Core population of sage-grouse, one of the five largest across their range (Connelly et al. 2004). The OFO is also contained within the N-Central NV/SE OR/SW ID sage-grouse subpopulation, which has been demonstrated with IDFG telemetry data (IDFG 2011) to be loosely connected to the NE NV/Central ID/NW UT subpopulation. Approximately 130 active or undetermined sage-grouse leks occur within the OFO, all land ownerships included, with four active and three undetermined leks found within 4.0 miles of the proposed wild horse gather sites (IFWIS 2011). Within Idaho, Owyhee County contains the largest remaining unburned, intact sagebrush habitat. The affected area includes approximately 86,014acres mapped as Preliminary Priority Habitat (PPH) (~73% of the affected area, all land ownerships included) and approximately 17,753 acres mapped as Preliminary General Habitat (PGH) (~ 15% of the affected area, all land ownerships included. (Makela and Major 2012)

Sage-grouse are dependent on sagebrush throughout the year, for both food and cover. In the winter, they need areas where sagebrush can be found growing above snow. In the nesting season, they need sagebrush for cover and food, grasses for nesting cover, and forbs for food and nesting cover. In late summer and fall, as the vegetation dries, they use riparian areas, springs, moist meadows, and higher elevations where they can find green forbs to eat (Connelly et al. 2000, Connelly et al. 2004).

On March 23, 2010, the sage-grouse was determined to warrant protection under the Endangered Species Act (ESA) but was precluded from listing due to other species of higher listing priority. Subsequently, interim policy on conservation policies and procedures were published (BLM 2011) to facilitate maintaining and restoring habitat for sage-grouse while the BLM determines how to incorporate long-term measures into their Land Use Plans. These interim measures include direction for land management practices in PPH and PGH, which comprise approximately 103,767acres within the two HMAs (~ 87% of the affected area, all land ownerships included).

California Bighorn Sheep

California bighorn sheep (BHS) typically occur in open areas where rugged topography is readily accessible, generally in desert or canyon habitats. BHS tend to prefer open habitats with an abundance of forage and without vegetation that obstructs visibility (Risenhoover and Bailey 1985). They forage on a variety of grasses, forbs, and shrubs throughout the year. Breeding occurs in the fall and lambs are born April to mid-June. BHS tend to form small groups for the increased vigilance that a herd provides. During the fall breeding period, young bighorn rams are known to disperse through potential habitat in search of breeding opportunities. Currently, California bighorn sheep have been documented within the open canyons of the Reynolds Creek portion of the affected area, with approximately 89,580 acres (~ 75% of the affected area, all land ownerships included) mapped as potential bighorn habitat.

Big Game, Fur-bearing Mammals, and other Special Status Species

The affected area has long supported populations of a wide variety of big game species. Rocky Mountain elk and mule deer use the affected area during spring, summer, and fall. Although elk probably migrate to lower elevations in Oregon for winter, the affected area is also classified as elk and mule deer winter range, with approximately 22,000 acres (~19% of the affected area, all land ownerships included) considered crucial mule deer winter habitat.

Pronghorn use the portions of the affected area that consist mainly of open grassland and shrubs. Currently, pronghorn use the affected area during spring, summer, and fall. Approximately 9,600 acres (~8% of the affected area, all land ownerships included) of the affected area is also considered crucial pronghorn winter habitat.

Large predators that occur within the HMAs include bobcat, coyote, and mountain lion. These predators are quite secretive and elusive. Because of their secretive nature, predator densities are difficult to determine. These predators, including mountain lions, are hunted recreationally in the area. However, over the last several years, hunting quotas have not been reached in Unit 40. In 2010 only 16 mountain lions (Nadeau, 2012) were killed and most of these were taken in the upper elevations of the Owyhee Mountain Range, and outside the HMAs, where their preferred prey (deer and other small mammals) is more readily available.

Historically, beaver ponds were common in low-gradient streams throughout the Owyhee Mountains, but beavers were trapped out in the 1800s. Other common fur-bearing animals including badger, fox, muskrat, otter, raccoon, skunk, and weasel are widespread and relatively common in the region. A variety of small mammal, reptile, and amphibian species also occupy the diverse habitats contained within the HMAs.

Migratory Birds, Raptors, and other Bird Species (including Special Status Species)

A variety of special status migrant bird species occur or are likely to occur within the HMAs (Appendix B). The majority of bird species are associated with shrub steppe, grassland or riparian habitats. Migratory birds depend on the availability of forage and nesting habitat. The habitats available within the affected area include upland and salt desert shrub as well as riparian communities.

Special status raptor species occurring or potentially occurring include bald eagle, golden eagle, prairie falcon, northern goshawk, ferruginous hawk, Swainson's hawk, flammulated owl, short-

eared owl, and western burrowing owl. Both eagle species are afforded additional protection under the Bald and Golden Eagle Protection Act. Bald eagle breeding within the affected area is highly improbable because of the lack of open water and nesting trees. Golden eagles and prairie falcons nest on cliffs and rocky outcrops throughout southwest Idaho. Currently, 64 golden eagle and 36 prairie falcon nests have been documented within the affected area between 1966 and 2011.

Prairie falcons prey on small mammals, especially ground squirrels, but a large portion of their diet also can be comprised of birds. Golden eagles, prairie falcons, ferruginous hawks, and Swainson's hawks prefer open shrub steppe, sagebrush and grassland habitats. There is abundant foraging habitat for these species within the affected area.

Northern goshawks and flammulated owls prefer mixed open forest to more dense forest. Currently, no nests of either species have been documented within the affected area. The expanding juniper woodlands in adjacent allotments may provide suitable foraging habitat for these species.

Short-eared owl and western burrowing owl prefer open habitats. Short-eared owls are ground nesters and need adequate cover for suitable nest sites. Burrowing owls nest in burrows dug by other animals, usually badgers, and they hunt in grasslands and sagebrush steppe areas. There is abundant habitat for these species within the affected area. Four western burrowing owl nests have been documented within the affected area between 1970 and 2011.

Redband Trout

Within the affected area, redband trout have been documented or have the potential to occur in Reynolds, Salmon, and Macks Creek. This trout is the resident form of steelhead trout that historically returned from the ocean to spawn in streams throughout the Owyhee River watershed (now restricted by downstream dams). Overall, streams considered suitable habitat for redband trout have been rated in proper functioning condition (see Section 3.4.1). Riparian conditions and activities in the upper reaches of streams also influence fish and fish habitat downstream of the HMA boundaries.

Fisheries

Other fish species that occur or potentially could occur within the affected area include smallmouth bass (*Micropterus dolomieui*), dace (*Rhinichthys* spp.), redside shiner (*Richardsonius bateatus*), sculpin (*Cottus* spp.) and suckers (*Catostomus* spp.) (IDEQ 2002). Some or all of these species have a high probability of occurrence within Reynolds, Salmon, and Macks Creek. Riparian conditions and activities in the upper reaches of streams also influence fish and fish habitat downstream of the HMA boundaries.

3.5.2 Environmental Consequences – Wildlife and Fisheries

The following general effects of gather activities to wildlife are described in this section; see Section 3.5.2.1 through 3.5.2.4 for discussions of specific alternatives' effects.

The effects of gather activities on wildlife include disturbance (i.e. behavioral) and physical impacts to wildlife species. Physical impacts are separated into direct (e.g. nest trampling) and indirect (e.g. forage competition) effects to wildlife. Gather activities include the following factors that result in impacts to wildlife species:

Disturbance – Horse and Human Presence
Physical, Direct – Trampling
Physical, Indirect – Disease Transmission

Disturbance – Winter Range
Disturbance to big game (elk, mule deer, bighorn sheep and pronghorn antelope) in winter range could be a direct effect of gather activities. However, the large expanses of intact wintering and yearlong use habitat for big game in the affected area (~ 233,371 acres of combined pronghorn, bighorn sheep, and mule deer winter and yearlong use habitat, all land ownerships included) would allow individuals to easily disperse from the short term disturbance caused by the gather activities. Likewise, disturbance to sage-grouse during the winter would be negligible since there is no shortage of this habitat type in the OFO relative to the small footprint (< 2 acres per trap site and narrow corridors within 0.25 mile of trap sites) of gather activities. Consequently, there will be no measurable disturbance to any of the species being analyzed.

Physical, Direct (Trampling) – Changes in Habitat Quality/Structure
Changes in wildlife habitat and structure can be both a direct and indirect impact of gather activities. Concentrated human, vehicle, and wild horse activity would damage, trample, or kill non-sprouting shrubs. Shrub damage would be minimal where trap sites are constructed in previously disturbed areas that are dominated by annuals or perennial grasses and forbs, which is true of most of the potential trap sites. Above ground portions of perennial grasses and forbs would be damaged, but some plants would be expected to survive because disturbance would occur when most species are dormant. No direct effect on native annual plants would be expected due to the timing of the gather. Because trap sites are localized (< 2 acres per site), use only for a short time (<5days), are most likely in areas of previous disturbance and lacking shrubs, and are used during the dormant season for plants, direct effects to wildlife habitat on a landscape scale would be limited.

Gather activities would have isolated, short-term impacts to wildlife habitat in wetlands and riparian zones. All potential trap sites are more than 0.25 mile from wetlands and streams. Riparian impacts would be limited to damage associated with horse movement to the trap sites. Horses would be moving in small groups primarily across traditional steam crossings and not parallel to streams. Streambank and vegetation impacts at crossings would likely be similar to that occurring during normal activities associated with both livestock and wild horse grazing. Off-trail riparian area crossings would damage relatively short sections of stream (<50 feet). Hoof shearing would damage streambanks, exposing bare soil. Woody and herbaceous vegetation may be damaged, but likely not killed. These areas could be expected to recover within 1-3 years (short-term); however, they could be susceptible to establishment or expansion of noxious weeds.

Physical, Direct (Trampling) – Impacts to Animals

Damage to individual animals and wildlife nests and burrows from gather activities is another potential impact. Concentrated wild horse and human activities (e.g., trap sites and horse movement corridors within 0.25 mile of traps) could cause dens or burrows to collapse resulting in the mortality of occupants. Hibernating reptiles and mammals would be most susceptible to mortality from this type of impact. No collisions have been reported between helicopters and birds during previous gathers in the area; therefore, no mortality would be expected to occur to sage-grouse or bald and golden eagles.

Physical, Indirect - Disease Transmission
Gather activities have the potential to result in disease transmission to wildlife through an increase in the likelihood of West Nile virus (WNV) outbreaks via a small increase in habitat for mosquitoes (trampled stream sections of <50 feet). West Nile Virus has acted as an important source of mortality for sage-grouse and other bird species, and the virus was an important new source of mortality in low and mid-elevation Greater Sage-Grouse populations range-wide from 2003–2007 (Walker and Naugle, *in press*).

Curex spp. comprise the primary mosquito genus responsible for WNV transmission (Zou et al. 2006), with *C. tarsalis* representing the dominant vector of WNV in sagebrush habitats (Goddard et al. 2002, Naugle et al. 2004, Doherty 2007). This species of mosquito prefers sites with submerged vegetation on which to oviposit (deposit eggs) and warm, standing water that promotes rapid larval development, including ephemeral puddles, vegetated pond edges, and water-filled hoof prints (Milby and Meyer 1986, Buth et al. 1990, Doherty 2007). Consequently, gather activities that increase trampling in riparian areas and add to the amount of stagnant water where vegetation can persist could increase habitat for *C. tarsalis* and thus the likelihood of WNV outbreaks.

3.5.2.1 Alternative A

The primary impacts to wildlife in Alternative A would occur from gather activities. Maintaining herd numbers within AMLs would result in benefits to wildlife through slight improvements in habitat conditions and would help limit competition for forage between wildlife and wild horses.

Greater Sage-Grouse
Helicopter activity would cause low to moderate disturbances over the short term (1 hour to several days) for sage-grouse occupying fall habitat within the HMAs. Because wild horses could be dispersed throughout the HMAs, sage-grouse would be exposed to single or multiple disturbances during the gather activities. Sage-grouse would be expected to return to normal behavior and habitat use within days of the cessation of gather activities and removal of traps. Disturbances would occur during a period when animals are building reserves for the winter; however, disturbance events would be relatively short in duration and animals would be expected to recover from slight adverse impacts to physiological condition. Disturbances would occur outside of other critical periods (e.g., lekking, nesting, brood-rearing, and winter). Use of helicopters for previous gathers and wildlife surveys (e.g., mule deer, bighorn sheep, sage-grouse) in the area has not been shown to adversely affect long-term survival of those species.

Sage-grouse are habituated to the presence of wild horses in the area; however, localized displacement of individuals could occur as wild horses are moved to trap sites. Sage-grouse

would have adequate time to react to the presence of horses; therefore, mortality would not be expected from wild horse-sage-grouse collisions. Increased human activity would cause sage-grouse to avoid trap sites until traps are removed. Because trap sites are localized (< 2 acres per site), use only for a short time (<5days), are most likely in areas of previous disturbance and lacking shrubs, and are used during the dormant season for plants, direct effects to sage-grouse habitat on a landscape scale would be minute.

California Bighorn Sheep

Helicopter activity would cause low to moderate disturbances over the short term (1 hour to several days) to BHS occupying habitat within the HMAs. Direct impact to BHS would include elevated heart rates, movement to or use of other habitats, or other irregular behaviors (Bleich et al. 1990, USDI 1994). Because wild horses could be dispersed throughout the HMAs, BHS would be exposed to single or multiple disturbances during the gather activities. BHS would be expected to return to normal behavior and habitat use within days of the cessation of gather activities and removal of traps. Disturbances would occur during a period when BHS are mating and building reserves for the winter; however, disturbance events would be relatively short in duration and animals would be expected to recover from slight adverse impacts to physiological condition. Disturbances would occur outside of other critical periods (e.g., lambing, juvenile rearing, and winter). Use of helicopters for previous gathers and wildlife surveys (e.g., mule deer, bighorn sheep, sage-grouse) in the area has not been shown to adversely affect long-term survival of those species.

BHS are habituated to the presence of wild horses in the area; however, localized displacement of individuals could occur as wild horses are moved to trap sites. BHS would have adequate time to react to the presence of horses; therefore, mortality would not be expected from wild horse-BHS collisions. Increased human activity would cause BHS to avoid trap sites until traps are removed.

Big Game, Fur-bearing Mammals, and other Special Status Species

Helicopter activity would cause low to moderate disturbances over the short term (1 hour to several days) for many species of wildlife. Direct impact to larger mammals would include elevated heart rates, movement to or use of other habitats, or other irregular behaviors (Bleich et al. 1990, USDI 1994). Because wild horses could be dispersed throughout the HMAs, wildlife would be exposed to single or multiple disturbances during the gather activities. Wildlife would be expected to return to normal behavior and habitat use within days of the cessation of gather activities and removal of traps. Disturbances would occur during a period when animals are building reserves for the winter; however, disturbance events would be relatively short in duration and animals would be expected to recover from slight adverse impacts to physiological condition. Disturbances would occur outside of other critical periods (e.g., breeding, juvenile rearing, winter). Use of helicopters for previous gathers and wildlife surveys (e.g., mule deer, bighorn sheep, sage-grouse) in the area has not adversely affected long-term survival of those species.

Wildlife species are habituated to the presence of wild horses in the area; however, localized displacement of wildlife could occur as wild horses are moved to trap sites. Wildlife would have adequate time to react to the horses; therefore, mortality would not be expected from wild horse-

wildlife collisions. Increased human activity would cause some wildlife to avoid trap sites until traps are removed.

Gather activities could result in some wildlife mortality. Concentrated wild horse and human activities (e.g., trap sites and horse movement corridors within 0.25 mile of traps) could cause dens or burrows to collapse resulting in the mortality of occupants. Hibernating reptiles and mammals would be most susceptible to mortality from this type of impact. No collisions have been reported between helicopters and birds during previous gathers in the area; therefore, no take would be expected to occur for sage-grouse or golden or bald eagles.

Impacts to vegetation within 0.25 mile of trap sites described in Section 3.2.2.1 would have limited short term adverse effects on wildlife because they would affect relatively small areas. Damage to shrubs would reduce nest habitat for shrub obligate birds. Increases in invasive and noxious weeds would reduce habitat suitability until those areas recover.

Migratory Birds, Raptors, and other Bird Species (including Special Status Species)
Impacts to migratory birds that are present during the gather would be the same as those described for sage-grouse. Neotropical migratory birds would experience slight losses of breeding and foraging habitat where gather activities damage or kill shrubs or result in increases in invasive and noxious weeds. These losses would be isolated and persist until native vegetation recovers. Because trap sites are localized (< 2 acres per site), use only for a short time (<5days), are most likely in areas of previous disturbance and lacking shrubs, and are used during the dormant season for plants, direct effects to sagebrush habitat on a landscape scale would be minute.

Fisheries (including Special Status Species)
Increases in suspended sediment would have short-term adverse impacts to fish immediately below crossing areas. These impacts would occur to fish in the fingerling or adult life-stages and where fish are better able to avoid or survive short-term water quality degradation than if they were ova or juveniles. The impacts could be longer in duration and affect more stream length where wild horse movement causes bank damage and loss of vegetation.

3.5.2.2 Alternative B

Direct and indirect effects to wildlife, migratory birds, and fisheries from gather activities at and near the trap sites would be the same as described in Alternative A.

3.5.2.3 Alternative C

Direct and indirect effects to wildlife, migratory birds, and fisheries from gather activities at and near the trap sites would be the same in Alternative C as described in Alternative A, because gathering would occur in the same locations and on the same schedule.

Greater Sage-Grouse
High populations of wild horses would be expected to adversely impact sage-grouse and their habitat. Wild horse numbers on the HMAs would increase under Alternative C, which would have negative indirect effects to vegetation in sage-grouse PPH and PGH over the short (2-4 years) and long (5+ years) terms. Increased horses numbers, above the AML, would increase the

demand for forage on the plant communities, which would result in heavy (over 60%) utilization of perennial bunchgrasses, including heavy use during the critical growing period (generally spring and early summer for most plant species); this would reduce the perennial grass and forb understory required for sage-grouse to successfully nest and rear their broods.

The predicted over-utilization would eventually lead to continued resource degradation. The utilization would shift to browsing of shrubs, which would become hedged and weak; this would reduce the shrub height and sagebrush canopy cover required for sage-grouse to successfully nest and rear their broods. The overall weakening of native perennial plants would result in increases in invasive and noxious weeds which would further reduce the quality of sage-grouse habitat within the affected area.

California Bighorn Sheep
High populations of wild horses would be expected to adversely impact BHS and their habitat. Wild horse numbers on the HMAs would increase under Alternative C, which would have negative indirect effects to BHS habitat over the short (2-4 years) and long (5+ years) terms. Increased horses numbers, above the AML, would increase the demand for forage on the plant communities, which would result in heavy (over 60%) utilization of perennial bunchgrasses, including heavy use during the critical growing period (generally spring and early summer for most plant species); this would reduce plant vigor, leading to mortality of the most palatable plants and changes in the plant community as less palatable plants become dominant.

The predicted over-utilization would eventually lead to continued resource degradation. The utilization would shift to browsing of shrubs, which would become hedged and weak. The overall weakening of native perennial plants would result in increases in invasive and noxious weeds. These effects to BHS habitat would lead to competition between wild horses and BHS for limited resources and ultimately result in the loss of BHS habitat.

Big Game, Fur-bearing Mammals, and other Special Status Species
Direct and indirect effects to big game, fur-bearing mammals, and other Special Status Species would be the same as described for California bighorn sheep.

Migratory Birds, Raptors, and other Bird Species (including Special Status Species)
Direct and indirect effects to migratory birds, raptors, and other birds (including Special Status Species) would be the same as described for sage-grouse.

Fisheries (including Special Status Species)
Both direct and indirect impacts, as described in Alternative A, would occur but to a much greater magnitude. Yearlong use by increased wild horse population would likely result in decreased functioning conditions of streams within both HMAs, over both the short and long-terms (<3 years and >10 years, respectively). Riparian impacts would become increasingly evident with annual increases in wild horse numbers and year-long use. Short-term impacts including streambank damage due to hoof action and riparian vegetation composition changes to less desirable species would occur.

Damage to streambanks due to hoof action and riparian vegetation composition changes to less desirable species would occur. These impacts would increase sedimentation, turbidity, and water temperature. Long-term impacts would be an overall decline in water quality due to streambank trampling and riparian vegetation composition change to less desirable species due to excessive horse numbers.

Degraded riparian conditions would lead to negative impacts to all fish species, including redband trout, by increasing sedimentation, turbidity, and water temperature and by causing a riparian vegetation composition changes to less desirable species.

3.5.2.4 Alternative D

The No-Action Alternative would have no direct gathering effects, and no effects specific to horse trap locations.

This alternative would also allow for short term unrestricted increases in the number of horses in the HMAs above that expected in Alternative C. Indirect effects from Alternative D on wildlife, migratory birds, and fisheries would be similar to Alternative C, but because animal numbers would be higher than Alternative C, utilization would be higher, plant vigor would be lower, plant mortality would be higher, and plant community shifts toward less palatable species would occur faster. Noxious weeds would be expected to increase more rapidly, and wildlife habitat would be degraded.

3.6 Livestock Grazing Management

3.6.1 Affected Environment – Livestock Grazing Management

The rangeland management program includes seven grazing allotments within the HMAs currently under deferred or rest rotation grazing systems with use periods of spring, summer, fall and winter (Table 13). Livestock compete with wild horses (and wildlife) for forage and water resources. Water for livestock and wild horses is mainly available from springs and reservoirs during late winter to early summer. Throughout the summer, spring flow and reservoir storage diminish. By the late part of the grazing season most water resources become dry, thus causing some excessive use in and around perennial riparian areas.

Livestock are permitted to trail across portions of the allotments within the HMA in the fall, beginning as early as September 1 and running through December 31. Most are one-day trails, but some permittees are permitted up to two days to move livestock across some routes. Cattle are overnighted on non-BLM administered lands as they move along the permitted route.

Table 12: Livestock Grazing Allotments within the Black Mountain and Hardtrigger HMAs

HMA	Allotment	Season of Use	Avg. Actual Use for allotment (AUM)	Active Preference
Black Mountain	East Reynolds (0651)	04/05 – 06/30	1,833	1,981
	Rabbit Cr./Peters Gulch (0517)	05/01 – 08/08 11/01 – 02/28	1,127	2,193
	Hardtrigger (0516)	04/01 – 10/31	1,340	1,560
Hardtrigger	Rats Nest (0522)	04/01 – 05/27	398	557
	Shares Basin (0556)	04/01 – 11/30	1,686	2,838
	Hardtrigger (0516)	04/01 – 10/31	1,340	1,560
	Reynolds Creek (0508)	03/15 – 02/28	3,647	3,874
	Elephant Butte (0513)	03/15 – 05/31 11/01 – 12/31	Not Calculated	390

3.6.2 Environmental Consequences – Livestock Grazing Management

3.6.2.1 Alternative A

Livestock could be present in the HMA portions of the Rabbit Creek/Peters Gulch, Shares Basin, and Elephant Butte allotments during the gather. Because gates would be opened between allotments to facilitate movement of wild horses to trap sites, livestock could move between allotments during the gather. To prevent accidental trespass of livestock, permittees may be asked to move livestock out of the pasture from which horses are being gathered. Livestock may experience some level of stress or may be displaced when the helicopter is in the area. This would put an additional burden on the livestock operator to ensure cattle are out of the area. Impacts from humans and horses at trap locations to livestock would be slight, localized per trap site, and only for a short time (up to three days).

Livestock trailing could occur while horses are being gathered. To prevent potential conflict between trailing livestock and horses being gathered, permittees would be contacted and informed as far in advance of known gather dates as possible. Permittees could then trail on a different day, or adjust their trailing time to avoid conflict with gather operations. This mitigation would minimize the potential for conflict, as well as stress levels on livestock, between livestock trailing and gather operations.

Maintaining wild horse numbers within AMLs would result in slight reductions in forage utilization levels, around water developments, over a four year period. Overlap between wild horse and livestock use areas would also be limited resulting in appropriate utilization levels for each of the above allotments.

3.6.2.2 Alternative B

Impacts to livestock would be similar to those described in Alternative A. Reductions of wild horses to the lower end of AMLs would reduce competition for forage over the short term and would reduce use area overlap between livestock and wild horses (USDI 2007a).

3.6.2.3 Alternative C

There would be similar impacts to livestock grazing management as described in Alternative A, because horses would still be gathered.

Increased horse numbers would result in increased competition for water and forage. This would result in vegetation utilization rates that would exceed the capacity of the area, further degrading the forage resource and deteriorating the habitat. As the productivity and composition of desirable forage species decreases, an increase in the invasion of undesirable species would occur. This would result in greater competition for desirable forage between livestock and wild horses. It may also result in livestock traveling to more sensitive areas looking for more desirable forage. This decline would continue to the point that there would be both insufficient plant cover for range site protection and insufficient forage for all rangeland users, which in turn would reduce stocking rates and may result in closure of the allotments.

3.6.2.4 Alternative D

Impacts to vegetation utilization and other resources would be expected to be similar to Alternative C except that they would be evident in a shorter time frame and be of a higher intensity. Thus, livestock stocking rates may have to be reduced as the wild horse populations increase.

3.7 Cultural and Paleontological Resources

3.7.1 Affected Environment – Cultural and Paleontological Resources

Class III inventories were conducted at all but one of the horse trap sites between 2005 and 2010 and no cultural or paleontological resources were identified. A full inventory of the chosen trap site will take place before horse gathers. Some prehistoric and historic cultural resources are recorded within the HMAs, generally including Native American sites spanning thousands of years and historic sites that are generally less than 150 years old. Additional archaeological sites are likely to be present in unsurveyed areas, especially adjacent to natural water sources. No cultural sites or fossil localities exist at surveyed locations at trap sites. The BLM is not aware of any traditional cultural properties in the HMAs.

Although fossil-bearing geologic formations outcrop within the HMAs, no paleontological finds have been reported near any of the existing trap sites.

3.7.2 Environmental Consequences – Cultural and Paleontological Resources

3.7.2.1 Alternative A

Minimal effects to cultural resources within the HMAs could occur and effects to paleontological resources are unlikely due to the limited extent of gather activities. Cultural site disturbance would be likely at horse trap sites where more intensive horse and human activity could churn soils, particularly if soils were saturated. In order to avoid potential disturbance of cultural sites and paleontological finds, the partially surveyed trap site and any additional potential trap sites would be surveyed, and would be moved away from significant resources under Alternatives A through C.

Surface cultural resources that may occur in riparian area crossings or in the narrow corridors of horse movement within 0.25 mile of trap sites would be susceptible to hoof impacts such as minor vertical and horizontal artifact displacement, and possibly artifact breakage, as herds are pushed in more concentrated groups across the range. However, such impacts would be similar to those sustained under normal circumstances by horses, other wildlife, and livestock utilizing the range. Such surface impacts have been ongoing since the formation of archaeological sites, and generally do not affect significant elements such as subsurface deposits or sites' eligibility for the National Register of Historic Places. Likewise, the action of horses simply traveling over fossils, if any are present, is unlikely to cause increased exposures or impacts.

Reducing wild horse numbers to low AMLs would help improve soil, vegetation, and riparian resources, thus reducing erosion and providing slight benefits (continued protection as a result of resources being buried) to cultural and paleontological resources as long as populations are maintained within the AML.

No historic properties would be affected by this undertaking.

3.7.2.2 Alternative B

Impacts to cultural and paleontological resources from a removal gather would be as described in Alternative A.

3.7.2.3 Alternative C

Impacts to cultural and paleontological resources from gather activities for a fertility control only gather would be similar to Alternatives A and B.

Over the long term, if herd numbers increase to the point that environmental destabilization occurs, this could have some negative indirect effects on archaeological and paleontological sites in HMAs as stream banks are destabilized, vegetation is denuded, and erosion is accelerated. As vegetation is removed from an area or soils are eroded, cultural resources may be exposed and vulnerable to illegal collection by recreationists and trampling by horses and livestock.

3.7.2.4 Alternative D

In the No Action Alternative, the wild horse gather would not take place. Therefore, no ground disturbances would occur and no cultural or paleontological resources would be directly affected.

Over the long term, if herd numbers increase to the point that environmental destabilization occurs, this could have some negative indirect effects on archaeological and paleontological sites in HMAs as stream banks are destabilized, vegetation is denuded, and erosion is accelerated.

3.8 Recreation and Visual Resources

3.8.1 Affected Environment – Recreation and Visual Resources

The level of recreational use from motorized and non-motorized recreationists in the HMAs varies, depending upon the season. Currently the spring and fall seasons attract more visitors to

these areas than do the summer and winter seasons, due to the more desirable weather conditions. Recreationists visit the two HMAs on occasion to view and photograph the wild horses in their natural environment and for sightseeing.

There are a number of trailheads located within the proposed project areas. The Black Mountain HMA contains Hemmingway Butte, Rabbit Creek, Chalky Butte, Kane Springs, and the "45" trailheads/parking areas. The Hardtrigger HMA contains the Wilson Creek trailhead. All trailheads provide parking, information, and access to the existing trail system. Off-highway vehicles (OHVs) are a major component of recreation in this area, especially in the Rabbit Creek and Hemmingway Butte trailheads. An increasing amount of OHV and motorized use is occurring in the area. The Wilson Creek travel management area receives some motorized use as well; however this area was developed primarily for the non-motorized community such as hikers, mountain bikers, and equestrian users. There are approximately 62 miles of designated roads and trails in the Hardtrigger HMA, 347 miles in the Black Mountain HMA, and 533 miles in the remainder of the Owyhee Front.

The HMAs are included in Idaho Department of Fish and Game (IDFG) big game management Unit 40. The unit extends from the Snake River south to the Owyhee Upland Backcountry Byway and west to the Oregon border and includes approximately 1.45 million acres of public, private, and State lands. The unit is close to a major population area and is popular with hunters. The unit supports a variety of hunts for big game, furbearer, and upland game species.

Table 13: Idaho Department of Fish and Game 2012 hunting season by species for Unit 40

Species	Type of Hunt	2010 Seasons
Mule deer	Archery	8/30 – 9/30
	General	10/10 - 10/24
	Controlled [a]	11/1 – 11/24
	Controlled[c]	10/10-11/24
Elk	Controlled	8/15 – 11/24
	Antlerless	10/15 – 11/24
Pronghorn	General	9/25 – 10/24
Mountain lion	General	8/30 – 3/31
California quail	General	9/15 – 1/31
Sage-grouse	General	10/1 – 10/31[b]
Chukar	General	9/15 – 1/31
Mourning dove	General	9/1 – 9/30
Rabbit	General	8/30 – 2/28

[a] 195 permits within unit 40.
[b] Seasons for these species have not been set, these dates are from the 2011 season and would be expected to be similar for 2012.
[c] 100 youth permits for region within unit 40.

Public lands within the Black Mountain and Hardtrigger HMA's are categorized as VRM class III and IV. The VRM class III objective is to partially retain the existing character of the landscape and the level of change to the characteristic of the landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features or

the characteristic landscape. This classification occurs where the amount of use is relatively high and scenic quality is generally good. Maintenance, construction, and reconstruction of rangeland facilities, roads, and vegetation treatment projects are permitted. In this classification emphasis is placed on construction techniques that will reduce the projects visual impacts to the natural landscape (1999).

The objective of class IV is to provide for management activities which require major modifications of the existing character of the landscape. The level of change to the characteristic of the landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location and minimal disturbance (1999).

3.8.2 Environmental Consequences – Recreation and Visual Resources

3.8.2.1 Alternative A

Access restrictions would adversely affect recreationists during the 10-day gather. Access to trailheads in the HMAs would be restricted; therefore, OHV and non-motorized trail users could be displaced to other areas in the Owyhee Front for the duration of the gather. Because only one HMA would be gathered at a time, 7% to 37% of the total designated trails could be restricted. Access to areas south of the HMAs could occur on the Reynolds Creek Road, but travelers could expect minor delays of up to 30 minutes. As a result of the gather, horses will be more fearful of human interaction for several weeks. Their flightiness and potential reduction to the low AML would increase the difficulty for the public to view wild horses in the HMAs. This may cause some recreationists to increase their search time for the horses. Wildlife could also be more wary of human disturbance and would be more difficult to view over the short term.

Gather activities would limit hunting access to small portions (<5%) of Unit 40 for up to five days in each HMA. Hunters seeking mule deer (controlled permit), upland game, and furbearers would be affected. Because gather activities could increase mule deer sensitivity to human activity, hunters may have more difficulty locating animals for up to a week following gather activities.

With the exception of aerial operations occurring during the gather, there would be no impacts expected to other recreation opportunities in these areas. Short term impacts to recreation as a result of the proposed project would be minimal. There are no long term impacts expected as a result of the proposed action. OHV use generally occurs near the trailheads, areas that wild horses do not typically utilize.

As vegetative conditions improve as a result of the reduced grazing pressure from horses, visual resources could slightly improve in some areas, under this alternative. In areas where trap sites are located, some negative visual effects would occur by creating areas of disturbance. The proposed project and minimal impacts associated with the project are considered acceptable with the VRM objectives for this area.

3.8.2.2 Alternative B

Impacts from a removal gather would be similar to Alternative A.

3.8.2.3 Alternative C

Impacts from a fertility control gather would be similar to Alternatives A and B.

Heavy horse use from excess wild horse numbers would have negative impacts to the character of the landscape scenic quality of the visual resources. Additionally, the increase in population over the short to mid-term would increase the ability of recreationists to view wild horses.

3.8.2.4 Alternative D

If the wild horse gather did not take place, recreationists would not be affected by gather activities. Additionally, the increase in population over the short to mid-term would increase the ability of recreationists to view wild horses. However, as horse populations increase annually by 28% the effects to wildlife would reduce the ability of hunters and wildlife viewers to find wildlife species in these areas.

Impacts to visual and natural resources over the mid- and long-term would be similar to Alternative C.

4.0 Cumulative Impacts

Cumulative impacts are impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Table 15: Cumulative Actions within the HMAs and common to all affected resources.

Action	Activity	Past, Present, Ongoing, or Reasonably Foreseeable
Livestock Grazing	7 livestock grazing allotments overlap the HMAs. Two are currently under review for potential renewal. Permit objectives would maintain or improve rangeland health conditions.	Past and Ongoing
Livestock Trailing	Herding livestock between private and public lands as well as between grazing allotments.	Past and Ongoing
OHV and Motorized Recreation Management	Murphy, Wilson Creek, and Hemingway Butte Travel Management Plans were completed in 2009. Planning for the rest of the area is currently underway.	Ongoing

Action	Activity	Past, Present, Ongoing, or Reasonably Foreseeable
Wildfire	8,300 acres have been burned by wildfire since 1958.	Past and Reasonably Foreseeable
Boardman to Hemingway (B2H) transmission line.	8.3 miles of proposed powerline within project area.	Reasonably Foreseeable

- The HMAs include all or parts of seven grazing allotments which have been grazed for many decades and continue to be grazed. Between 2002 and 2006, Standards and Guidelines assessments and determinations were completed for many of the grazing allotments in the analysis area. Where standards were not being met and livestock grazing was a significant factor, new grazing systems are being considered within the cumulative effects analysis area to help make progress toward meeting standards. Most systems also included rangeland management projects such as changes in fencing (e.g., new construction, repair, removal) and maintenance or development of water sources.
- Wild horses have also been using these HMAs for decades, managed to maintain numbers within the AMLs.
- The lower elevation areas of the HMAs are used heavily by OHVs, particularly in the Hemmingway Butte area. The Wilson Creek and Murphy Subregions travel management plans (TMP) were completed in 2007 and 2009 respectively. The plans designated 975 miles of roads and trails for various uses and closed 468 miles in a 262,000-acre area. Approximately two-thirds of the analysis area is covered by these TMPs. Route designation and planning for the remaining area is currently under way and should be completed within a few years. The BLM, Owyhee County, and private landowners regularly maintain some roads within the analysis area. OHV and other vehicle use are anticipated to continue to increase within the analysis area.
- Seven large wildfires have burned approximately 8,300 acres of the approximately 117,000 acres comprising the HMAs between 1958 and 2009.
- The Boardman to Hemingway (B2H) powerline is proposed to run along the north-northeast edge of the Hardtrigger HMA for about 8.3 miles within the analysis area. Construction is planned to begin in 2013.

4.1 Wild Horses

4.1.1 Scope of Analysis – Wild Horses

The analysis area, approximately 131,251 acres, includes the three HMAs in the Owyhee Front (Black Mountain, Hardtrigger, Sands Basin). These HMAs represent all herds identified in the Owyhee RMP (USDI 1999). Horses are not known to naturally move between the Sands Basin HMA and the Black Mountain/Hardtrigger HMAs; however, horses may be moved between HMAs during gathers to increase genetic variability. The time period analyzed includes the period 1997 through 2016 when the impact of gather activities is most apparent.

4.1.2 Current Conditions – Wild Horses

Nationally, there are approximately 12,000 excess wild horses and burros above AML. Removal gathers place these horses up for adoption/sales and into the long term pastures. Currently there are 47,000 horses in short term corrals and long term pastures. The annual cost to feed and care

for horses held in corrals or pastures is 35.7 million dollars. Additionally, adoption numbers are down nationally and a greater number of adoptable age (0-4 years old) excess wild horses are being held in short term corrals.

Horses in the Owyhee Front HMAs are regularly exposed to livestock grazing, hunters, OHVs, mountain bikes, and other recreational activities. Pressure from recreation occurs primarily in spring and in late fall. The horses have become habituated to these activities which generally result in a low degree of stress.

4.1.3 Cumulative Impacts - Wild Horses

The number of horses added to long term pastures from the proposed action would be negligible relative to typical yearly additions. The addition of approximately 101 horses to short term corrals and long term pastures from Alternatives A and B would also be negligible at the national level. In the short term, Alternatives C and D would not add any horses to long-term pasture.

Changes in grazing management that would result in improvements in habitat conditions would have negligible (lower elevations) to slight (upper elevations) benefits to wild horses over the long term. Changes in OHV management would not be expected to occur in the Sands Basin area before 2014; therefore, benefits from improved OHV management would be as described in Section 3.8.

Wild horses in the HMAs are habituated to low levels of human activity (e.g., from recreationists, livestock trailing); however, higher levels of disturbance related to gather operations could cause anxiety in individuals. Because all phases of the process would be carried out according to Bureau policy, individual stress would be minimized. Animals would be expected to recover from gather-related stress within 24 hours. The impact to horses from the gather would last approximately 2-weeks. BLM would minimize public interaction during the gather by restricting access so the only stress would be from the gather. Since future actions would have minimal effects and outside stressors would be reduced during the gather, there would not be a cumulative effect to horses from this gather.

4.2 Soils/Vegetation Resources

4.2.1 Scope of Analysis – Soils/Vegetation Resources

The cumulative effects analysis area for soils and vegetation is the extent of the Hardtrigger and Black Mountain HMAs, totaling nearly 117,000 acres (all ownerships). This is an appropriate scale for soils and vegetation because direct effects from gather activities will affect only a subset of the land within those HMAs, and additive effects of other activities within this area apply at this landscape scale. The time period considered begins in 1997 when Idaho Standards and Guidelines were initiated and ends in 2014 when all grazing permits within the area should be implementing changes required by the Standards and Guidelines. Grazing permit terms were selected as an appropriate time scale because livestock grazing represents a major impact to soils and vegetation resources in the analysis area.

4.2.2 Current Conditions – Soils/Vegetation Resources

Soil and vegetation conditions throughout the analysis area are similar to those described in sections 3.2 and 3.3 and are generally related to elevation, precipitation, and animal use levels.

Livestock grazing and wild horse use has affected vegetation and soils across virtually the entire analysis area, with effects most noticeable in animal concentration areas such as near water sources, salt grounds, and animal trails. Direct effects include trampling and grazing, which affect soils and vegetation as described previously, and result in current conditions of highly altered lower elevation plant communities and watersheds, and more intact soils and plant communities at higher elevations within the analysis area.

Soil and vegetation disturbance from OHVs and other vehicles have affected roughly 20% of the analysis area. Proliferation of unauthorized OHV routes has been responsible for loss of vegetation, accelerated soil erosion, and establishment and spread of invasive and noxious weeds in the analysis area. Although travel management planning and enforcement has reduced this proliferation, effects to soils and vegetation continue along the Owyhee Front.
Wildfires have affected soil and vegetation to varying degrees. Lower elevation wildfires (about half of the acres) have resulted in vegetation shifted almost entirely to invasive annuals, while areas of the higher elevation fires (most of which are older) are generally occupied by plant communities dominated by native bunchgrasses and young shrubs.

4.2.3 Cumulative Impacts – Soils/Vegetation Resources

Alternatives A and B:

Cumulative effects from Alternatives A and B, when combined with past, present, and reasonably foreseeable future activities, would be minor. The direct effects from gather activities are localized in time and space at the landscape scale, and when added to construction disturbance expected from the B2H powerline, would amount to soil and vegetation disturbance on a very small proportion (less than 5%) of the analysis area. Ongoing livestock grazing and OHV activity would also affect vegetation and soils across most of the analysis area, but overall soil and vegetation conditions would be expected to be maintained or improved over the long term. Changes in grazing systems would result in slight (lower elevations) to moderate (upper elevations) increases in the cover and vigor of desirable plants which would help stabilize soils and reduce the potential for noxious weed establishment and spread. The alteration or loss of soil and vegetation associated with the construction and use of rangeland management projects would continue to occur in small, localized areas throughout the analysis area. Continued OHV use would impact vegetation and soils on roads and trails in the analysis area. As vehicle routes are closed and rehabilitated, vegetation would help stabilize soils and reduce the potential for noxious weeds. Limited amounts of vegetation (mostly invasive species) would be removed during road maintenance activities and the disturbed areas would be susceptible to noxious and invasive weeds.

Maintaining horse numbers within AMLs would be expected to result in only slight indirect effects to soils and vegetation and maintain a healthy ecological system, so these effects would have virtually no cumulative effect, when considered with other activities.

Alternative C and D:

Because Alternative C includes gather activities, the cumulative effects of adding the direct effects from gathering activities to other activities would be the same as described for Alternatives A and B. Alternative D would not have these direct or cumulative effects of gather activities.

Alternatives C and D, as they would not manage wild horse numbers within the AML range, would represent an additive impact to the current condition and the effects of current grazing practices and motorized recreation to the soils and vegetation. Effects from higher horse numbers would, along with livestock grazing and OHV use, cumulatively result in more bare ground and a higher proportion of the vegetation altered by reducing bunchgrasses and creating unhealthy shrub or annual grass communities which are poorer at holding soil, resulting in higher erosion at the landscape scale.

4.3 Wetlands/Riparian Zone and Water Quality

4.3.1 Scope of Analysis - Wetlands/Riparian Zone and Water Quality

The cumulative effects analysis area encompasses most of three watersheds (Hardtrigger Creek-Snake River, Reynolds Creek, and Rabbit Creek-Snake River watersheds) and ends at the Snake River. The cumulative effects analysis area is 252,460 acres with 113 miles of perennial and 384 miles of intermittent streams. Approximately 290 miles of streams are supporting their beneficial uses, 150 miles of streams are not assessed, and 60 miles of streams are not supporting their beneficial uses and have limited water quality. The cumulative effects analysis area was selected because it covers a landscape scale large enough to capture watershed and ecological processes relevant to the HMAs. The time period considered begins in 1997 when Idaho Standards and Guidelines were initiated and ends in 2014 when all grazing permits within the area should be implementing changes required by the Standards and Guidelines.

The primary past and present activities/events that have affected riparian and water quality in the analysis area are livestock grazing, wild horse grazing, off highway vehicle (OHV) use, and wildfires. Reasonably foreseeable future activities include continued livestock grazing, increased OHV use, and construction of the B2H powerline.

4.3.2 Current Conditions - Wetlands/Riparian Zone and Water Quality

Riparian and water quality throughout the analysis area are described in Section 3.4 and are generally related to elevation, precipitation, and animal use levels and other disturbances.

Livestock grazing and wild horse use has affected riparian vegetation, stream channels and water quality across virtually the entire analysis area, with effects most noticeable in animal concentration areas such as near water sources. Direct effects include trampling and grazing, which affect riparian areas and water quality as described previously, and result in the current conditions.

Proliferation of unauthorized OHV routes has been responsible for loss of vegetation, stream channel degradation, accelerated soil erosion, and establishment and spread of invasive and noxious weeds in the analysis area. Although travel management planning and enforcement has

reduced this proliferation, effects to riparian areas from OHV travel in stream channels and through springs continue to occur.

Wildfires have indirectly affected riparian areas and water quality. Lower elevation wildfires have resulted in vegetation shifted almost entirely to invasive annuals, while areas of the higher elevation fires (most of which are older) are generally occupied by plant communities dominated by native bunchgrasses and young shrubs. Lower elevation areas tend to have a decreased riparian buffering capacity, thus allowing more sediment from the uplands to erode into the streams, reducing water quality.

4.3.3 Cumulative Impacts - Wetlands/Riparian Zone and Water Quality

Cumulative effects to riparian areas and water quality from wild horse gathers as proposed in Alternative A and B combined with the effects of all the other identified (past, present, reasonably foreseeable future) activities would be minor. Alternatives A and B would represent eventual improvements in streambank stabilization and water quality as horse numbers would be managed within the AMLs. It is expected that livestock grazing would be managed to meet Idaho Standards and Guidelines for Livestock Grazing and recreation impacts to these areas would be minimized by the implementation of Travel Management Plans in the short and long-terms.

Alternatives C and D, as they would not manage wild horse numbers within the AML range, would represent an additive impact to the current condition and the effects of current grazing practices and motorized recreation riparian areas and water quality. Effects from higher horse numbers would, along with livestock grazing and OHV use, cumulatively result in more stream channel and vegetation damage due to increased trampling and more intensive grazing use over prolonged periods that would soon reach untenable levels, prompting episodes of channel down cutting and bank caving. Sediment and water temperature problems would increase in streams that were supporting their beneficial uses, and worsen in streams that are water quality limited.

4.4 Wildlife/Fisheries

4.4.1 Scope of Analysis – Wildlife/Fisheries

The area considered for cumulative effects can vary greatly by species and their distribution across the landscape. The analysis area for wildlife and fisheries encompasses a ten mile area surrounding the Hardtrigger and Black Mountain HMAs, totaling nearly 742,000 acres (all land ownerships included). The cumulative effects analysis area is appropriate for analyzing effects to wildlife and fisheries (including special status species) because relevant disturbances, such as fire and livestock grazing, affect ecological processes at a landscape scale within this area. Ten miles greatly exceeds the range of many species, but may encompass only some habitat types and partial annual ranges for large and/or highly mobile species (e.g., big game, raptors, and migratory birds). The time period considered begins in 1997 when Idaho Standards and Guidelines were initiated and ends in 2014 when all grazing permits within the area should be implementing changes required by the Standards and Guidelines.

The primary past and present activities/events that have affected wildlife and fisheries in the analysis area are livestock grazing, wild horse grazing, off highway vehicle (OHV) use, and

wildfires. Reasonably foreseeable future activities include continued livestock grazing, increased OHV use, and construction of the B2H powerline.

4.4.2 Current Conditions – Wildlife/Fisheries

The analysis area provides habitat for a variety of wildlife species. Elevations range from 2,500 feet along the Snake River to over 8,000 feet in the Owyhee Mountains. Habitat types represented are as described in Section 3.5.1. Vegetation conditions generally are poor to fair below 5,000 feet and fair to excellent above 5,000 feet.

Livestock grazing and wild horse use has affected wildlife habitat across virtually the entire analysis area, with effects most noticeable in animal concentration areas such as near water sources. Direct effects include trampling and grazing, which affect soils, vegetation, and riparian areas as described previously, and result in current conditions of highly altered lower elevation plant communities and watersheds, and more intact plant communities and watersheds at higher elevations within the analysis area.

Proliferation of unauthorized OHV routes has been responsible for loss of vegetation, stream channel degradation, accelerated soil erosion, and establishment and spread of invasive and noxious weeds in the analysis area. Although travel management planning and enforcement has reduced this proliferation, effects to wildlife habitat from OHV travel continue along the Owyhee Front.

Wildfires have affected wildlife habitat to varying degrees. Lower elevation wildfires have resulted in vegetation shifted almost entirely to invasive annuals, while areas of the higher elevation fires (most of which are older) are generally occupied by plant communities dominated by native bunchgrasses and young shrubs.

4.4.3 Cumulative Impacts - Wildlife/Fisheries

Alternatives A and B:

Cumulative effects from Alternatives A and B, when combined with past, present, and reasonably foreseeable future activities, would be minor. The direct effects from gather activities are localized in time and space at the landscape scale, and when added to construction disturbance expected from the B2H powerline, would amount to wildlife habitat disturbance on a very small proportion (less than 5%) of the analysis area. Ongoing livestock grazing and OHV activity would also affect wildlife habitat across most of the analysis area, but overall habitat conditions would be expected to be maintained or improved over the long term. Changes in grazing systems would result in slight (lower elevations) to moderate (upper elevations) increases in the cover and vigor of desirable plants which would help stabilize soils and reduce the potential for noxious weed establishment and spread; thereby increasing the quality of available wildlife habitat. The alteration or loss of wildlife habitat associated with the construction and use of rangeland management projects would continue to occur in small, localized areas throughout the analysis area. Continued OHV use would impact wildlife populations near roads and trails in the analysis area. As vehicle routes are closed and rehabilitated, OHV caused disturbances to wildlife populations would decrease, and growing vegetation would help stabilize soils and reduce the potential for noxious weeds. Limited

amounts of vegetation (mostly invasive species) would be removed during road maintenance activities and the disturbed areas would be susceptible to noxious and invasive weeds.

Maintaining horse numbers within AMLs would be expected to result in only slight indirect effects to wildlife and their habitats and maintain a healthy ecological system, so these effects would have virtually no cumulative effect, when considered with other activities.

Alternative C and D:
Because Alternative C includes gather activities, the cumulative effects of adding the direct effects from gathering activities to other activities would be the same as described for Alternatives A and B. Alternative D would not have these direct or cumulative effects of gather activities.

Alternatives C and D, as they would not manage wild horse numbers within the AML range, would represent an additive impact to the current condition and the effects of current grazing practices and motorized recreation to wildlife and their habitats. Effects from higher horse numbers would, along with livestock grazing and OHV use, cumulatively result in more bare ground and a higher proportion of the vegetation altered by reducing bunchgrasses and creating unhealthy shrub or annual grass communities, resulting in a greater loss of wildlife habitat at the landscape scale.

4.5 Livestock Grazing Management

4.5.1 Scope of Analysis - Livestock Grazing Management

The area of analysis associated with Livestock Grazing Management is the extent of the grazing allotments overlapped by the HMAs. This analysis area is appropriate as wild horses are limited to the HMAs and there should not be temporal or spatial overlap of effects outside of the allotments. Livestock grazing allotments overlapped by, or adjacent to, the HMAs are described in Table 12 13.

4.5.2 Current Conditions - Livestock Grazing Management

The current condition of livestock grazing management is the result of past actions and current permit terms and conditions. These are described briefly in Section 3.6.1. Two of the allotments (Rats Nest, Elephant Butte) are currently under review for grazing permit renewals. Decisions regarding these actions are not specifically known except that their objectives are to improve resource conditions within the allotments through the implementation of Standards and Guidelines for Livestock Grazing. These are expected to be completed and begin implementation in 2014.

Factors affecting livestock grazing management include past wildfires, regulatory restraints relative to wildlife (Threatened and Endangered Species), weed infestations and the results of past land management, grazing practices and livestock trailing. As past grazing practices and wildfires have removed native vegetation from the landscape, invasive annuals have established especially in the lower elevation portions of the analysis area. This degrades forage availability for livestock. .

4.5.3 Cumulative Impacts - Livestock Grazing Management

Alternatives A and B do not represent incremental measureable adverse impacts, in combination with the identified cumulative actions, to livestock grazing management as horse populations would be managed within their associated AMLs. Impacts from gather activities are also not expected to incrementally increase or decrease the effects of cumulative actions.

Alternatives C and D, as horse populations increase over AMLs, would expect to add some impacts to livestock grazing management in the short-term (<3 years) by competition for water and forage. If horses are left un-gathered for the long term (>5 years) there may be greater impacts to forage for livestock. Specifically, increased competition for forage may result in permittees reducing livestock numbers to comply with utilization requirements in their respective allotments. There is also potential for further removal of native vegetation resulting in increased annual weeds which may also reduce the number of livestock in these allotments. These effects when combined with improved livestock grazing management, continued weed treatments and short term disturbance from livestock trailing within these HMAs would result in slightly greater cumulative impacts than alternatives A and B.

4.6 Cultural and Paleontological Resources

4.6.1 Scope of Analysis - Cultural and Paleontological Resources

The area of analysis associated with Cultural and Paleontological Resources is the extent of the grazing allotments overlapped by the HMAs. These are described in Table 13.

4.6.2 Current Conditions - Cultural and Paleontological Resources

The grazing allotments contain a number of cultural resources, mainly in the form of surface lithic scatters that were used prehistorically as camps, lithic sources, or hunting sites. Historic sites are less frequent and include mining sites, camps, and artifact scatters. Many of these sites have significant attributes that make them potentially eligible to the National Register of Historic Places. Commonly, individual sites are recommended based on their ability to yield data important to our understanding of regional prehistory or history and are also important for maintaining cultural identity and heritage.

Paleontological resources such as vertebrate fossils can help scientists understand plant and animal adaptation in the context of long-term environmental change. Several paleontological finds have been reported within the area.

Surface components of some cultural sites have been impacted in the past by natural weathering, grazing, and fires. More intensive activities such as roads, fences, dams, or other constructions have the potential to impact resources more severely; however, current laws and policies generally result in mitigation of such impacts.

4.6.3 Cumulative Impacts - Cultural and Paleontological Resources

Alternatives A and B will not contribute, incrementally, to any adverse effects related to any of the cumulative actions summarized in Table to cultural and paleontological resources. Considered with all other potential direct and indirect effects to sites, the minor effects associated with these alternatives are unlikely to have any measureable influence on cultural

heritage, our ability to understand prehistoric or historic cultural patterns, or the paleontological record within HMAs.

Alternative C may have a negligible effect on sites directly through herd movements during gathering activities and possibly through increased erosion, vegetation use, and other environmental destabilization caused by larger herd sizes. However, these effects, when combined with other past, present, and reasonably foreseeable actions, will not have any significant effect on cultural heritage, our ability to understand prehistoric or historic cultural patterns, or the paleontological record within the HMAs.

Under Alternative D, there would be no direct effects from the proposed action, but increased herd sizes could eventually lead to increased erosion at certain sites due to environmental instability. However, when considered along with other past, present, and reasonably foreseeable actions in these allotments, this alternative will not have any significant effect on cultural heritage, our ability to understand prehistoric or historic cultural patterns, or the paleontological record.

4.7 Recreation and Visual Resources

4.7.1 Scope of Analysis – Recreation and Visual Resources

The analysis area is the same as that described for Wildlife/Fisheries (Section 3.9.2.1).

4.7.2 Current Conditions – Recreation and Visual Resources

Travel management planning is the primary activity that affects recreation access in the analysis area. The Hemingway Butte Play Area Mitigation Project (USDI 2006), the Wilson Creek TMP (USDI 2007b), and the Murphy TMP (USDI 2009b) are recent planning documents affecting the Owyhee Front. The Omnibus Public Lands Management Act of 2009, Title I, Subtitle F, Owyhee Public Land Management, requires BLM to complete: (1) a transportation plan for the Owyhee Front by no later than one year after enactment of the Act; and (2) a transportation plan for BLM land in the county outside the Owyhee Front by no later than three years after enactment of the Act.

Travel management planning would limit motorized and mechanized uses to designated routes and in some cases reduce the current mileage available; however, over the long-term travel planning would help protect and ensure recreational access to the area. Routes are closed primarily because they require a seasonal or permanent closure to protect sensitive resources. There are relatively few activities that restrict access across public lands for short periods of time (e.g., road maintenance, construction, mineral material hauling on the Silver City Road).

4.7.3 Cumulative Impacts – Recreation and Visual Resources

By improving OHV management through route designation, the BLM would maintain a wide range of OHV and recreation opportunities over the short and long term. The actual number of miles of available routes could be reduced from current levels, but the quality of experience would be maintained or enhanced. Route closures in the Murphy and Wilson Creek subregions would overlap with gather operations; however, none of the short term access restrictions would overlap. Because of their short duration and limited extent, restrictions to recreation access

caused by the gather activities would not add substantially to overall changes in access in the analysis area.

Travel management planning objectives include minimizing impacts to wildlife/wild horse habitat, reducing the introduction of invasive weeds, and decreasing the conflicts among the various motorized and non-motorized recreation users and adverse interactions between recreationists and livestock. Travel planning and route designation would also improve visual resources throughout the area and prevent damage to natural and cultural resources resulting from the unauthorized proliferation of roads and trail on public lands.

5.0 Consultation and Coordination

5.1 List of Preparers

Steve Leonard	Wild Horse and Burro Specialist, Team Lead
Seth Flanigan	NEPA Specialist
Beth Corbin	Botanist/Ecologist
Kelli Barnes	Archaeologist
Peter Torma	Rangeland Management Specialist
Brad Jost	Wildlife Biologist
Rich Jackson	Hydrologist
Ryan Homan	Outdoor Recreation Planner

5.2 List of Agencies, Organizations, and Individuals Consulted

Animal Welfare Institute
Friends of Mustangs
Idaho Fish and Game
Owyhee County
Owyhee County Natural Resources Committee
Resource Advisory Council
Sabrina Amidon – Friends of the Wild Horse
Shoshone-Paiute Tribes
Shoshone-Bannock Tribes

5.3 Public Participation

Initial notification of the general public occurred on December 30, 2011 when a web page was posted on the online BLM NEPA Register that summarized the proposed action and how members of the public could become involved in the process.

A general information letter requesting feedback on the proposed action, possible alternatives, and potential issues that should be addressed in the NEPA process was sent to 61 interested publics, organizations, and government agencies on December 30, 2011. Tribal consultation meetings with the Shoshone-Paiute Tribe and Shoshone-Bannock Tribe were completed in the winter and spring of 2012.

6.0 Literature Cited

Aldridge, C. L., S. E. Neilsen, H. L. Beyer, M. S. Boyce, J. W. Connelly, S. T. Knick, and M. A. Schroeder. 2008. Range-wide patterns of greater sage-grouse persistence. Diversity and Distributions 14:983-994.

Autenrieth, R. E. 1981. Sage grouse management in Idaho. Idaho Department of Fish and Game Wildlife Bulletin No. 9. 238 pp.

Baker, W. L. 2006. Fire and restoration of sagebrush ecosystems. Wildl. Soc. Bull. 34:177-185.

Bleich, V. C., R. T. Bowyer, A. M. Pauli, R. L. Vernoy, and R. W. Anthes. 1990. Responses of mountain sheep to helicopter surveys. Calif. Fish and Game 76:197-204.

Buth, J. L., R. A. Brust, and R. A. Ellis. 1990. Development time, oviposition activity and onset of diapause in *Culex tarsalis*, *Culex restuans* and *Culiseta inornata* in southern Manitoba. Journal of the American Mosquito Control Association 6:55–63.

Chambers, J. C., B. S. Roundy, R. R. Blank, S. E. Meyer, and A. Whittaker. 2007. What makes Great Basin sagebrush ecosystems invasible by *Bromus tectorum*? Ecol. Monogr. 77:117-145.

Coates, P. S. 2007. Greater sage-grouse (*Centrocercus urophasianus*) nest predation and incubation behavior. Ph.D Dissertation, Idaho State University, Pocatello, Idaho. 181 pp.

Connelly, J. W., M. A. Schroeder, A.R. Sands, and C.E. Braun. 2000. Guidelines to manage sage sage-grouse populations and their habitats. Wildlife Society Bulletin 28(4):967-985.

Connelly, J. W., S. T. Knick, M. A. Schroeder, and S. J. Stiver. 2004. Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats. Western Association of Fish and Wildlife Agencies. Cheyenne, Wyoming.

Doherty, M. K. 2007. Mosquito populations in the Powder River Basin, Wyoming: a comparison of natural, agricultural and effluent coal-bed natural gas aquatic habitats. M.S. thesis, Montana State University, Bozeman, MT.

Goddard, L. B., A. E. Roth, W. K. Reisen, and T. W. Scott. 2002. Vector competence of California mosquitoes for West Nile virus. Emerging Infectious Disease 8:1385–1391.

Idaho Department of Environmental Quality (IDEQ). 2002. *Implementation plan for the North and Middle Fork of the Owyhee River.* Final implementation plan compiled in association with the Bureau of Land Management, Idaho Department of Lands, Idaho Soil Conservation Commission, and the North and Middle Fork Owyhee Watershed Advisory Group. February 2002. Available online: http://www.deq.idaho.gov/media/455309-water_data_reports_surface_water_tmdls_owy

hee_river_nf_mf_owyhee_river_nf_mf_implementation_plan.pdf [accessed April 5, 2012].

Idaho Department of Fish and Game (IDFG). 2011a. 2002-2011 Owhyhee county sage-grouse telemetry. Geographic Information System Point Shapefile. Nampa, Idaho.

Idaho Fish and Wildlife Information System (IFWIS). August 2011. *Animal Conservation Database.* Idaho Department of Fish and Game, Boise, Idaho.

Jenkins, S. H. 1996. Wild horse population model: Version 3.2. Dept. of Biology. Univ. of Nevada. Reno, NV. 42 pp.

Kirkpatrick, J. F., W. Zimmermann, L. Koller, K. M. Liu, and J. W. Turner. 1995. Immunocontraception of captive exotic species. I. Przewalski's horses (*Equus prezwalskii*) and banteng (*Bos javanicus*). Zoo Biol. 14: 403-416.

Kirkpatrick, Jay F.; Turner, Allison 2003. Absence of Effects From Immunocontraception on Seasonal Birth Patterns and Foal Survival Among Barrier Island Wild Horses. J. of Applied Animal Welfare Science, 6: 301-308.

Makela, P.D. and D. J. Major. 2012. A Framework to Identify Greater Sage-grouse Preliminary Priority Habitat and Preliminary General Habitat for Idaho. U.S. Bureau of Land Management. Idaho State Office, Boise Idaho.

McGrath, C. L., A. J. Woods, J. M. Omernik, S. A. Bryce, M. Edmondson, J. A. Nesser, J. Shelden, R. C. Crawford, J. A. Comstock, and M. D. Plocher. 2002. Ecoregions of Idaho. U.S. Geological Survey, Reston, VA.

Milby, M.M., and R. P.Meyer. 1986. The influence of constant versus fluctuating water temperatures on the preimaginal development of *Culex tarsalis*. Journal of the American Mosquito Control Association 2:7–10.

Nadeau, S. 2012. Personal Communication with Steve Nadeau, Southwest Region, Idaho Department of Fish and Game. August 29, 2012

Naugle, D. E., C. L. Aldridge, B. L. Walker, T. E. Cornish, B. J. Moynahan, M. J. Holloran, K. Brown, G. D. Johnson, E. T. Schmidtmann, R. T. Mayer, C. Y. Kato, M. R. Matchett, T. J. Christiansen, W. E. Cook, T. Creekmore, R. D. Falise, E. T. Rinkes, and M. S. Boyce. 2004. West Nile virus: pending crisis for greater sage-grouse. Ecology Letters 7:704-713.

Norton, J.B., T.A. Monaco, J.M. Norton, D.A. Johnson, and T.A. Jones. 2004. Soil morphology and organic cheatgrass and sagebrush-steppe plant communities. Journal of Arid Environments 57:445-466.

Perkins, J. M. and J. R. Peterson. 1997. Bat distribution in the juniper woodlands of the Idaho Owyhee Mountains summer 1996. Idaho Bureau of Land Management, Technical Bulletin No. 94.

Ransom, J., Roelle, J.E., Case, B.S., Coates-Markel, L., Kane, A.J. *Foaling Rates in Feral Horses Treated With the Immunocontroceptive Porcine Zona Pellucida*. 2011. Wildlife Society Bulletin. 35(4): 343-352.

Risenhoover, K.L., and J.A. Bailey. 1985. Foraging ecology of mountain sheep: implications for habitat management. The Journal of Wildlife Management 43(3): 797-804.

Turner, J. W., I. K. M. Liu, A. T. Rutberg, and J. F. Kirkpatrick. 1997. Immunocontraception limits foal production in free-roaming feral horses in Nevada. J. Wildl. Manage. 61:873-880.

USDA (US Department of Agriculture, Natural Resource Conservation Service). 2003. *Soil Survey for Owyhee County Area, Idaho.* http://soildatamart.nrcs.usda.gov/Manuscripts/ID675/0/Owyhee%20Text.pdf

USDI (US Department of the Interior, Bureau of Land Management). Wildlife responses to helicopter disturbances: A review. 1994. USDI, Bureau of Land Management.

USDI (US Department of the Interior, Bureau of Land Management). 1999. Proposed Owyhee Resource Management Plan and Final Environmental Impact Statement. USDI, Bureau of Land Management, Lower Snake River District, Boise, ID.

USDI (US Department of the Interior, Bureau of Land Management). 2003. Idaho Bureau of Land Management Sensitive Species List. Instruction Memorandum ID-2003-057. Idaho State Director, BLM, Boise, ID.

USDI (US Department of the Interior, Bureau of Land Management). 2006. Environmental Assessment of Hemingway Butte Play Area Mitigation Project. ID-130-2006-EA-3065. USDI, Bureau of Land Management, Boise District, Boise, ID. 38 pp

USDI (US Department of the Interior, Bureau of Land Management). 2007a. Environmental Assessment of Black Mountain and Hardtrigger HMAs Wild Horse Gather. ID-130-2007-EA-3428. USDI, Bureau of Land Management, Boise District, Boise, ID. 68 pp.

USDI (US Department of the Interior, Bureau of Land Management). 2007b. Environmental Assessment of Wilson Creek Subregion Travel Management Plan. ID-130-2006-EA-1927. USDI, Bureau of Land Management, Boise District, Boise, ID. 95 pp.

USDI (US Department of the Interior, Bureau of Land Management). 2007c. Environmental Assessment of Noxious and Invasive Weed Treatment in the Boise District and Jarbidge Field Offices. ID-100-2005-EA-265. USDI, Bureau of Land Management, Boise District, Boise, ID. 97 pp.

USDI (US Department of the Interior, Bureau of Land Management). 2007d. Final Hardtrigger Allotment Evaluation and Determination.

USDI (US Department of the Interior, Bureau of Land Management). 2007 unpublished data A. Lotic and Lentic PFCs and Multiple Indicator Monitoring data from 2007 riparian sampling season in Reynolds Creek Allotment. Owyhee Field Office, Marsing Idaho.

USDI (US Department of the Interior, Bureau of Land Management). 2007 unpublished data B. Lentic PFC data from 2007 riparian sampling season in East Reynolds Creek Allotment. Owyhee Field Office, Marsing Idaho.

USDI (US Department of the Interior, Bureau of Land Management). 2009a. Environmental Assessment of Four-mile HMA and Sands Basin HMA Wild Horse Gathers. ID-130-2009-EA-3686. USDI, Bureau of Land Management, Boise District, Boise, ID. 85 pp.

USDI (US Department of the Interior, Bureau of Land Management). 2009b. Environmental Assessment of Murphy Subregion Travel Management Plan. ID-130-2007-EA-3431. USDI, Bureau of Land Management, Boise District, Boise, ID. 151 pp.

USDI (US Department of the Interior, Bureau of Land Management). 2009c, Euthanasia of Wild Horses and Burros for Reasons Related to Health, Handling and Acts of Mercy. Instructional Memorandum WO-2009-041. Washington Office BLM. Washington D.C. http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/2009/IM_2009-041.html

USDI (US Department of the Interior, Bureau of Land Management). 2010a. Gather Policy, Selective Removal Criteria, and Management Considerations for Reducing Population Growth Rates. Instructional Memorandum WO-2010-135, Washington Office BLM. Washington, D.C, http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/2010/IM_2010-135.html

USDI (US Department of the Interior, Bureau of Land Management). 2010b. Public Observation of Wild Horse and Burro Gathers. Instructional Memorandum WO-2010-164. Washington Office, BLM. Washington, D.C. http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/2010/IM_2010-164.html

USDI (US Department of the Interior, Bureau of Land Management). 2010c. Wild Horses and Burros Management, Handbook 4700-1. Washington, D.C.

USDI (US Department of the Interior, Bureau of Land Management). 2011. Greater sage-grouse interim management policies and procedures. Information Bulletin ID-2012-043, Washington Office BLM. Washington, D.C.

http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/2012/IM_2012-043.html

USDI-USFWS. 2012. Endangered Species Candidate Species Report. Environmental Conservation Online System. Endangered Species Program, U.S. Fish and Wildlife Service. Available online: http://ecos.fws.gov/tess_public/pub/SpeciesReport.do?listingType=C&mapstatus=1 [accessed April 04, 2012].

USFWS 2009. Semi-annual Species List Update 14420-2010-SL-0081. Memorandum from Idaho Fish and Wildlife Service Office to Idaho State Director, BLM. December 30, 2009.

Walker, B. L., and D. E. Naugle. In Press. West Nile virus ecology in sagebrush habitat and impacts on greater sage-grouse populations. Studies in Avian Biology manuscript.

7.0 Appendices

Appendix A – Standard Operating Procedures for Population-level Fertility Control Treatments
Appendix B – Standard Operating Procedures for Wild Horse (or Burro) Gathers
Appendix C – Population Modeling
Appendix D – Genetic Analysis
Appendix E – Responses to Comments
Appendix F – Utilization in Rats nest Allotment May and August 2012

7.1 Appendix A - **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 would 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 would 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 would 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 would 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 would 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 would 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 would submit a PZP Application Report and accompanying narrative and data sheets would be forwarded to the NPO (Reno, Nevada). A copy of the form and data sheets and any photos taken would be maintained at the field office.
4. A tracking system would 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.

7.2 Appendix B - Standard Operating Procedures 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 would be conducted in conformance with the *Wild Horse Aviation Management Handbook* (January 2009).

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

All trap and holding facility locations must be approved by the Authorized Officer prior to construction. All traps and holding facilities not located on public land must have prior written approval of the landowner.

Trap sites would be located to cause as little injury and stress to the animals, and as little damage to the natural resources of the area, as possible. Sites would be located on or near existing roads. Additional trap sites may be required, as determined by the Authorized Officer, to relieve stress to the animals caused by specific conditions at the time of the gather (i.e. dust, rocky terrain, temperatures, etc.).

New trap sites would also meet the following criteria:

Wildlife

- Avoid new disturbance in productive sage-grouse habitat (i.e., 10-30% cover, 25-35” height)
- Avoid new disturbance in big game preferred browse habitat (i.e., bitterbrush, mtn. shrub vegetation communities)
- >0.25 0.25 mile from documented pygmy rabbit occurrences

Botany

- >0.25 0.25 mile from known special status plant occurrences
- >0.25 0.25 mile from known noxious weed infestations
- Preferably in a previously surveyed location and/or previously disturbed location
- >0.25 0.25 mile from Squaw Creek ACEC

Cultural and Paleontological Resources

- >0.25 0.25 mile from known NRHP eligible archaeological sites
- >0.25 0.25 mile from known significant paleontological finds

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 would 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 would 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 would be made without authorization from the COR/PI. The Contractor shall be responsible for restoration of any fence modification which he has made.

5. When dust conditions occur within or adjacent to the 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 would require that animals be restrained for the purpose of determining an animal's age, sex, or other necessary procedures. In these instances, a portable restraining chute may be necessary and would be provided by the government. Alternate pens shall be furnished by the Contractor to hold animals if the specific gathering requires that animals be released back into the 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 would 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 would 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 would determine if animals must be euthanized and provide for the destruction of such animals. The Contractor may be required to humanely euthanize animals in the field and to dispose of the carcasses as directed by the COR/PI.

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 would 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, 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 would consider terrain, physical barriers, weather, condition of the animals and other factors.

C. Use of Motorized Equipment

1. All motorized equipment employed in the transportation of 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 would be instructed to adjust speed.

D. Treatment of Injured or Sick; Disposition of Terminal Animals

The contractor would restrain sick or injured animals if treatment is necessary. A veterinarian may be called to make a diagnosis and final determination. Destruction would be done by the most humane method available. Authority for humane destruction of wild horses is provided by the Wild Free-Roaming Horse and Burro Act of 1971, Section 3(b)(2)(A), 43 CFR 4730.1, BLM Manual 4730 - Destruction of Wild Horses and Burros and Disposal of Remains, and is in accordance with BLM policy as expressed in Instructional Memorandum No. 98-141.

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

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

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

E. 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 would 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 would be notified in writing to furnish replacement personnel or equipment within 48 hours of notification. All such replacements must be approved in advance of operation by the Contracting Officer or his/her representative.

    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 would apply:

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

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

F. 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 would conduct all necessary clearances (archaeological, T&E, etc). All proposed site(s) must be inspected by a government archaeologist. Once archaeological clearance has been obtained, the trap or temporary holding facility may be set up. Said clearance shall be arranged for by the COR, PI, or other BLM employees.

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

G. 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.

H Public Participation

Opportunities for public viewing (i.e. media, interested public) of gather operations would be made available to the extent possible; however, the primary considerations would be to protect the health, safety and welfare of the animals being gathered and the personnel involved. The public must adhere to guidance from the on-site BLM representative. It is BLM policy that the public would not be allowed to come into direct contact with wild horses 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 any time or for any reason during BLM operations.

I. Responsibility and Lines of Communication

Contracting Officer's Representative
Steve Leonard – Boise District BLM Wild Horse and Burro Specialist

Project Inspector
Kent Benson – Burley Field Office BLM Range Technician

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 Owyhee Field Manager would 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 would keep the best interests of the animals at the forefront at all times.

All publicity, formal public contact and inquiries would be handled through the BLM Public Affairs Office. These individuals would be the primary contact and would coordinate with the COR/PI on any inquiries.

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

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

7.3 Appendix C - Population Modeling

The Wild Horse Population Model Version 3.2 developed by Dr. Steve Jenkins was used to estimate the population growth and size of herds five years after the gather. The data used in the statistical analysis of the Black Mountain and Hardtrigger HMAs was extrapolated from the census, and age and sex structure of the November 2010 CTR gather.

The environmental and demographic model option was selected as a means to project population growth while weighing both environmental and demographic variables during "good" and "bad" years. Results of the Jenkins population model are not considered a "prediction" of what will happen to the herds in the future. Results of the model are being used as an aid to evaluate the management practices that are identified in this document and to project population growth.

The modeling analysis made the following assumptions:

1. The current age selection policy would continue through the lifetime of the modeling analysis. The model was run on a 10 year cycle to see what the population would do in out years.
2. Mares would be treated with fertility control in Alternative A and released back into the HMAs. Gathers would be completed every two years with the herds and mares would be treated again. In alternative B the HMAs would be gathered when high end of AML is reached and lowered to the low AML limit. Alternative C would have fertility control only and alternative D would not be gathered at this time.
3. Foals are included in the appropriate management level.
4. 80% of the herd can be located during gather operations; 20% are not found.
5. Fertility control only is being used as a management tool in Alternative A and C.
6. Fertility control is 92% effective in year 1, 84% effective in year 2, and 68% effective in year 3.

Population Size Graph

The population size summary graph shows cumulative frequency distributions across trials of minimum population sizes, average population sizes, and maximum population sizes. Suppose you ran 100 trials in a simulation. The minimum population size in each trial is the smallest number of horses that were present in the population in any year of that trial. This might have been the first year, or the last, or some intermediate year, and the year in which the minimum occurs is not the same for all trials. The graph will show 100 points in a light blue color, each point representing the minimum for one trial. These points are arranged in order from smallest to largest, so the leftmost point of this sequence is the minimum of the population sizes, or the smallest population size ever seen in five years of 100 trials.

Growth Rate Graph

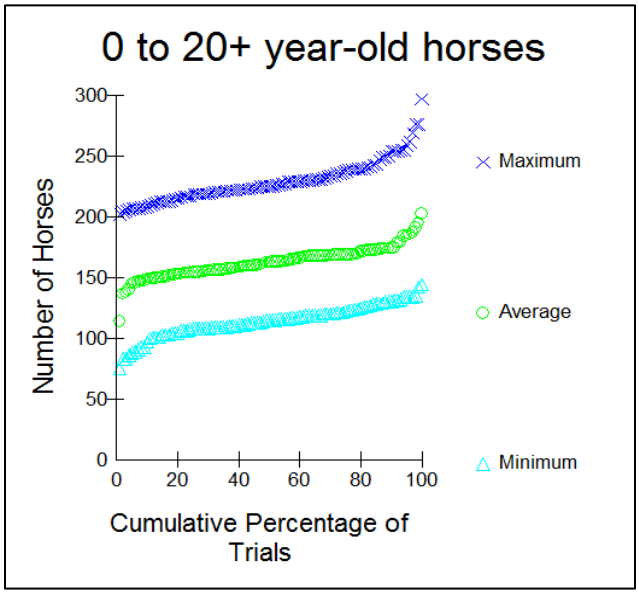
The growth rate graph shows the distribution of average growth rate across all trials in graphical format. The direct effects of removals are not counted in computing annual growth rates, although a selective removal may change the average foaling rate or survival rate of individuals in the population and may indirectly affect the growth rate.

A. Black Mountain and Hardtrigger HMAs

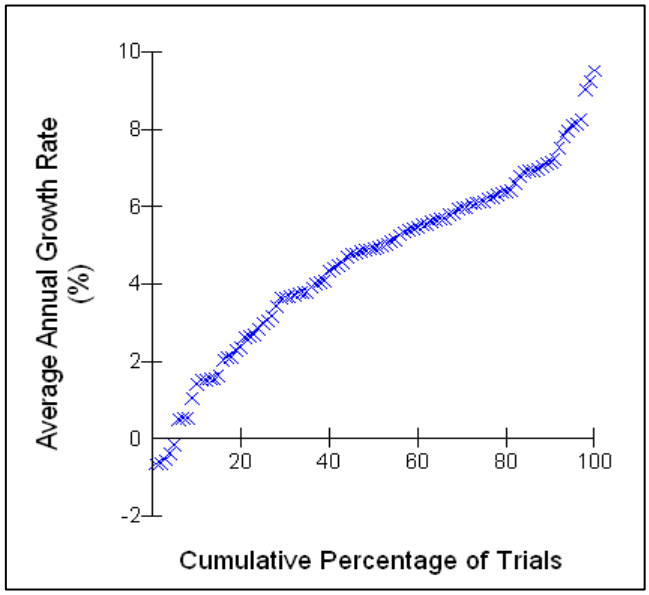
1. Proposed Action (Alternative A)

With removal of excess animals, sex ratio adjustment, and immuno-contraception, in 100 trials, the average population size across eleven years ranged from 75 to 297 with an average population size of 163.

The population growth graph indicates the average growth rate over eleven years. In 100 trials, the tenth percentile growth rate was 1.2%, while the 90th percentile growth rate was 14.6%. The median growth rate was 9.8%.



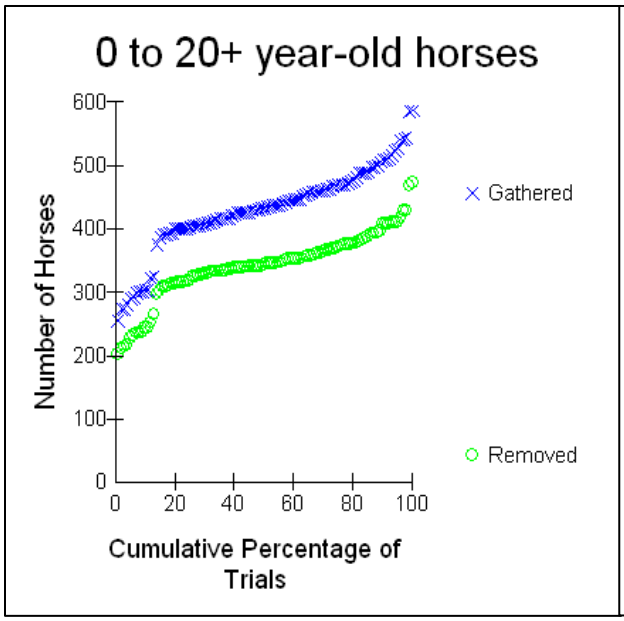
Alternative A Population



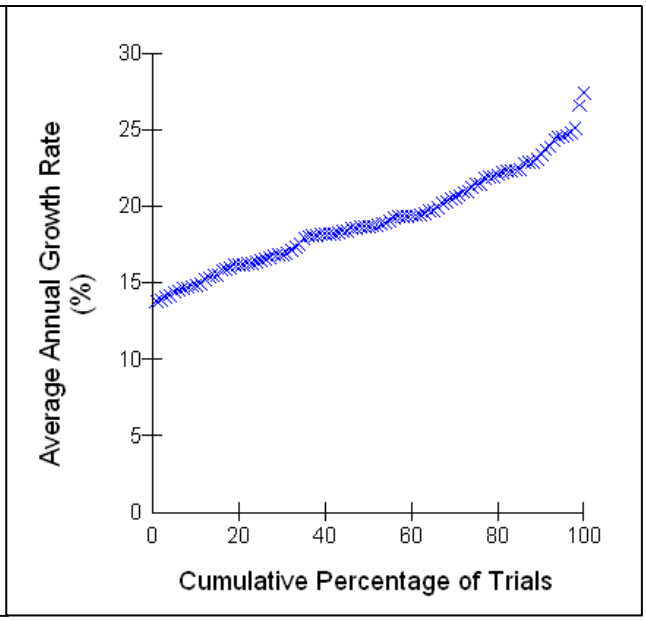
Alternative A Population Growth Rate

2. Alternative B - Removal Gather Only

With removal of excess horses and sex ratio adjustment, in eleven years and 100 trials, the minimum tenth percentile of 0 to 20+ year old horses removed was 255 and the maximum 90th percentile was 472.
The population growth graph indicates the average growth rate over eleven years in 100 trials; the tenth percentile growth rate was 13.8%, while the 90th percentile growth rate was 27.4%. The median growth rate was 18.7%. The calculated annual population gain rate historically has been 22% to 28% for the two HMAs.



Alternative B Population

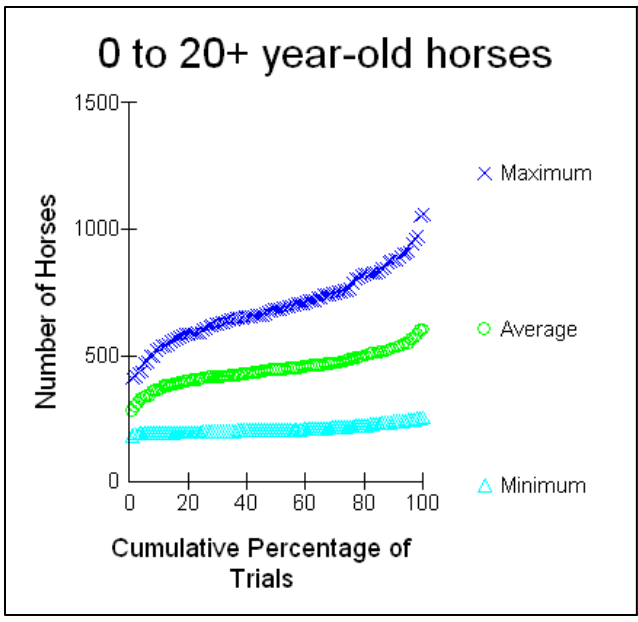


Alternative B Population Growth Rate

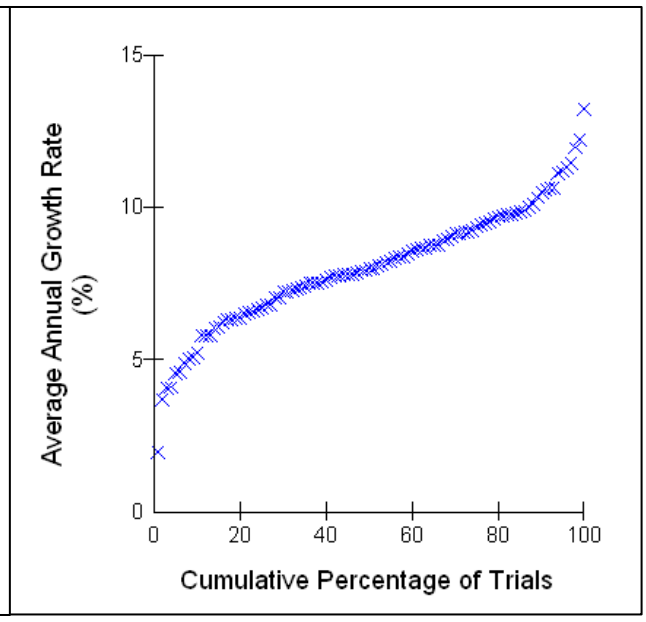
3. Alternative C Fertility Control Only

In eleven years and 100 trials, the minimum tenth percentile of 0 to 20+ year old horses in the HMA was 181 and the maximum 90th percentile was 1058 with a median trial high of 687.

The population growth graph indicates the average growth rate over eleven years, in 100 trials the tenth percentile growth rate was 2%, while the 90th percentile growth rate was 13.2%.



Alternative C Population

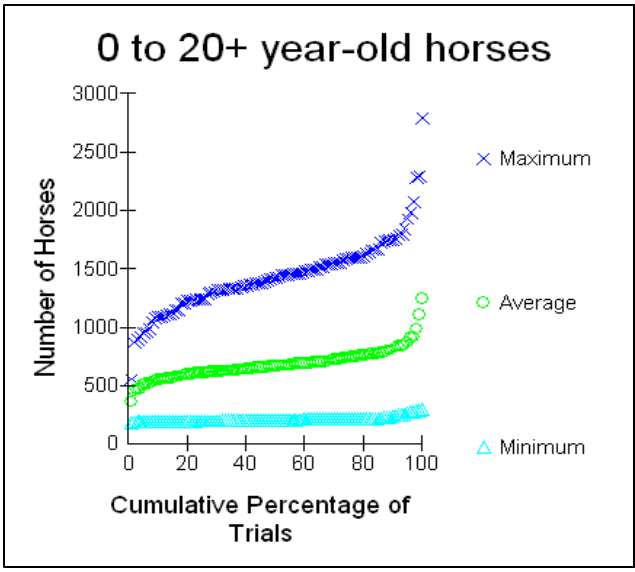


Alternative C Population Growth Rate

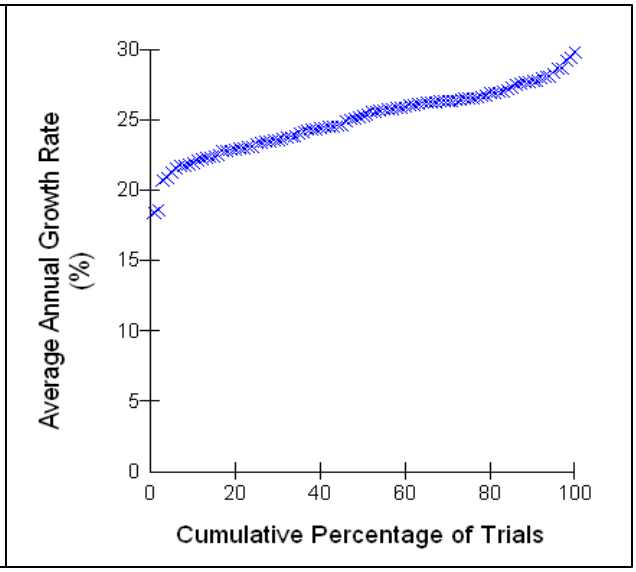
3. Alternative D No Action

In eleven years and 100 trials, the minimum tenth percentile of 0 to 20+ year old horses in the HMA was 174 and the maximum 90th percentile was 2787 with a median trial high of 1429.

The population growth graph indicates the average growth rate in 100 trials at the tenth percentile growth rate was 18.4%, while the 90th percentile growth rate was 29.8% with a median growth rate of 25.3%.



Alternative D Population



Alternative D Population Growth Rate

Summary

Wild horse populations would be maintained within AML in both Alternatives A and B, but not in Alternatives C and D.

PGR predictions from the population model would be reduced in Alternative A, B and C. The reduction of PGR in Alternatives A and C is from the immune-contraception applied to female horses above the age of 2. Alternatives A and B would have PGR reduction from adjusting the sex ratio to 50% female and 50% males. The use of fertility control in alternative A would have an expected further reduction to PGR for an estimated median PGR of 4.9 versus 18.7 without the use of fertility control (Alternative B).

The population model predicts a median population growth rate of 12.4% with fertility control only in Alternative C and 25.3% PGR with no management in Alternative D. The observed median population growth rate was 28% between 2002 and 2011 for the two HMAs.

Based on the model, Alternative A would have a lower average population over 11 years and lower growth rate over 10 years than other Alternatives.

7.4 Appendix D - Genetic Analysis

Genetic Analysis of the Hardtrigger HMA, ID

E. Gus Cothran

March 1, 2011

Department of Veterinary Integrative Bioscience
Texas A&M University
College Station, TX 77843-4458

The following is a report of the genetic analysis of the Hardtrigger HMA, ID.

A few general comments about the genetic variability analysis based upon DNA microsatellites compared to blood typing. The DNA systems are more variable than blood typing systems, thus variation levels will be higher. Variation at microsatellite loci is strongly influenced by allelic diversity and changes in variation will be seen in allelic measures more quickly that at heterozygosity, which is why more allelic diversity measures are calculated. For mean values, there are a greater proportion of rare domestic breeds included in the estimates than for blood typing so relative values for the measures are lower compared to the feral horse values. As well, feral values are relatively higher because the majority of herds tested are of mixed ancestry which results in a relatively greater increase in heterozygosity values based upon the microsatellite data. There are no specific variants related to breed type so similarity is based upon the total data set.

METHODS

A total of 30 samples were received by Texas A&M University, Equine Genetics Lab on November 23, 2010. DNA was extracted from the samples and tested for variation at 12 equine microsatellite (mSat) systems. These were *AHT*4, *AHT*5 *ASB*2, *ASB*17, *ASB*23, *HMS*3, *HMS*6, *HMS*7, *HTG*4, *HTG*10, *LEX*33, and *VHL*20. These systems were tested using an automated DNA sequencer to separate Polymerase Chain Reaction (PCR) products.

A variety of genetic variability measures were calculated from the gene marker data. The measures were observed heterozygosity *(Ho)* which is the actual number of loci heterozygous per individual; expected heterozygosity *(He),* which is the predicted number of heterozygous loci based upon gene frequencies; effective number of alleles *(Ae)* which is a measure of marker system diversity; total number of variants *(TNV)*; mean number of alleles per locus (*MNA*); the

number of rare alleles observed which are alleles that occur with a frequency of 0.05 or less (*RA*); the percent of rare alleles (*%RA*); and estimated inbreeding level *(Fis)* which is calculated as 1-*Ho/He*.

Genetic markers also can provide information about ancestry in some cases. Genetic resemblance to domestic horse breeds was calculated using Rogers' genetic similarity coefficient, *S*. This resemblance was summarized by use of a restricted maximum likelihood (RML) procedure.

RESULTS AND DISCUSSION

Variants present and allele frequencies are given in Table 1. No variants were observed which have not been seen in horse breeds. Table 2 gives the values for the genetic variability measures of the Hardtrigger HMA herd. Also shown in Table 2 are values from a representative group of domestic horse breeds. The breeds were selected to cover the range of variability measures in domestic horse populations. Mean values for feral herds (based upon data from 126 herds) and mean values for domestic breeds (based upon 80 domestic horse populations) also are shown.

Mean genetic similarity of the Hardtrigger HMA herd to domestic horse breed types are shown in Table 3. A dendrogram of relationship of the Hardtrigger HMA herd to a standard set of domestic breeds is shown in Figure 1.

Genetic Variants: A total of 78 variants were seen in the Hardtrigger HMA herd which is above the mean for feral herds and slightly below the mean for domestic breeds. Of these, 22 had frequencies below 0.05 which is a high percentage of variants at risk of future loss but not especially high for this total number. Allelic diversity as represented by *Ae* is somewhat above the average for feral herds while *MNA* also is greater than the mean.

Genetic Variation: Observed heterozygosity in the Hardtrigger HMA herd is well above the feral mean as is He. *Ho* is a good bit higher than *He.* Differences such as this can indicate a recent reduction in population size, within the past few generations, but this not possible to confirm by DNA data alone.

Genetic Similarity: Overall similarity of the Hardtrigger HMA herd to domestic breeds was about average for feral herds. Highest mean genetic similarity of the Hardtrigger HMA herd was with Light Racing and Riding breeds, followed by the Oriental and Arabian breeds. As seen in Fig. 1, however, the Hardtrigger HMA herd clusters with the Shetland Pony within a group of "cold blood" horse breeds. This does not indicate direct ancestry to the Shetland but rathere a herd with mixed origins with no clear indication of primary breed type. As with most trees involving feral herds, the tree is somewhat distorted.

SUMMARY

Genetic variability of this herd in general is on the high side but there is a high percentage of variation that is at risk. There is a possibility that this herd has seen a recent loss of population size which would increase the risk to genetic diversity. However, the herd likely has diverse ancestry as genetic similarity results suggest a herd with mixed ancestry.

RECOMMENDATIONS

Current variability levels are high enough that no action is needed at this point but the herd should be monitored closely due to the high proportion of rare alleles. This is especially true if it is known that the herd size has seen a recent decline.

Table 1. Allele frequencies of genetic variants observed in Hardtrigger HMA feral horse herd.

VHL20										
I	J	K	L	M	N	O	P	Q	R	S
0.300	0.000	0.000	0.233	0.133	0.033	0.117	0.100	0.050	0.033	0.000

HTG4									
I	J	K	L	M	N	O	P	Q	R
0.000	0.000	0.267	0.150	0.283	0.000	0.150	0.150	0.000	0.000

AHT4										
H	I	J	K	L	M	N	O	P	Q	R
0.283	0.050	0.267	0.250	0.000	0.000	0.000	0.150	0.000	0.000	0.000

HMS7									
I	J	K	L	M	N	O	P	Q	R
0.000	0.033	0.017	0.217	0.083	0.383	0.017	0.250	0.000	0.000

AHT5									
I	J	K	L	M	N	O	P	Q	R
0.000	0.783	0.100	0.033	0.000	0.083	0.000	0.000	0.000	0.000

HMS6									
I	J	K	L	M	N	O	P	Q	R
0.000	0.000	0.267	0.183	0.133	0.017	0.033	0.367	0.000	0.000

ASB2										
B	I	J	K	L	M	N	O	P	Q	R
0.000	0.150	0.000	0.283	0.000	0.017	0.133	0.133	0.017	0.217	0.050

HTG10												
H	I	J	K	L	M	N	O	P	Q	R	S	T
0.000	0.117	0.000	0.000	0.000	0.283	0.017	0.167	0.150	0.000	0.217	0.050	0.000

HMS3											
H	I	J	K	L	M	N	O	P	Q	R	S
0.000	0.000	0.000	0.000	0.000	0.250	0.050	0.300	0.250	0.033	0.117	0.000

ASB17															
D	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
0.000	0.000	0.067	0.000	0.000	0.000	0.083	0.000	0.000	0.483	0.083	0.033	0.017	0.167	0.067	0.000

ASB23															
G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
0.050	0.000	0.100	0.233	0.067	0.017	0.000	0.000	0.000	0.000	0.000	0.000	0.167	0.000	0.367	0.000

LEX33											
F	G	K	L	M	N	O	P	Q	R	S	T
0.000	0.017	0.083	0.450	0.133	0.000	0.083	0.000	0.167	0.067	0.000	0.000

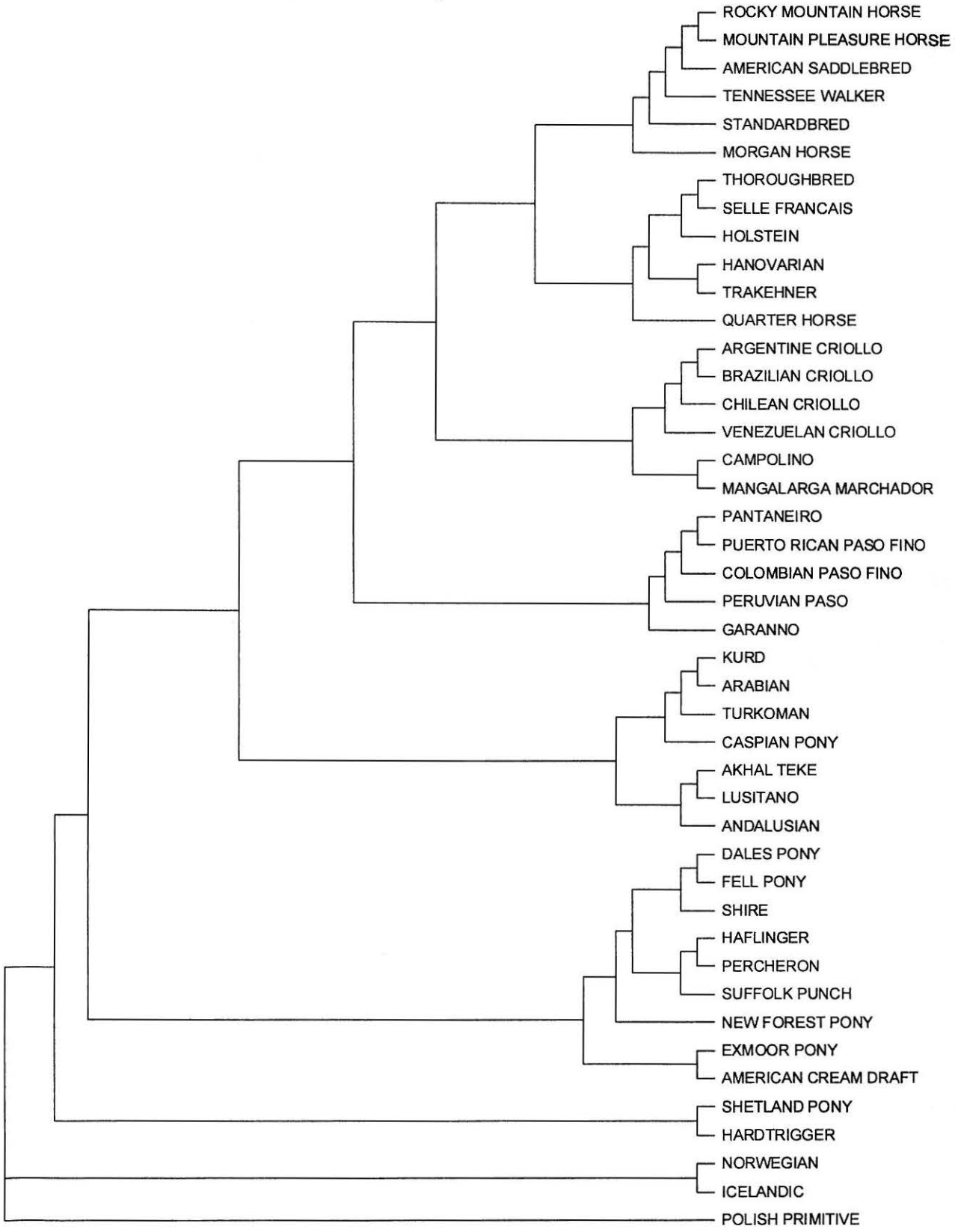
Table 2. Genetic variability measures.

	N	*Ho*	*He*	*Fis*	*Ae*	*TNV*	*MNA*	*Ra*	*%Ra*
HARDTRIGGER ID	30	0.764	0.733	-0.042	4.13	78	6.50	22	0.282
Cleveland Bay	47	0.610	0.627	0.027	2.934	59	4.92	16	0.271
American Saddlebred	576	0.740	0.745	0.007	4.25	102	8.50	42	0.412
Andalusian	52	0.722	0.753	0.041	4.259	79	6.58	21	0.266
Arabian	47	0.660	0.727	0.092	3.814	86	7.17	30	0.349
Exmoor Pony	98	0.535	0.627	0.146	2.871	66	5.50	21	0.318
Friesian	304	0.545	0.539	-0.011	2.561	70	5.83	28	0.400
Irish Draught	135	0.802	0.799	-0.003	5.194	102	8.50	28	0.275
Morgan Horse	64	0.715	0.746	0.041	4.192	92	7.67	33	0.359
Suffolk Punch	57	0.683	0.711	0.038	3.878	71	5.92	13	0.183
Tennessee Walker	60	0.666	0.693	0.038	3.662	87	7.25	34	0.391
Thoroughbred	1195	0.734	0.726	-0.011	3.918	69	5.75	18	0.261
Feral Horse Mean	126	0.716	0.710	-0.012	3.866	72.68	6.06	16.96	0.222
Standard Deviation		0.056	0.059	0.071	0.657	13.02	1.09	7.98	0.088
Minimum		0.496	0.489	-0.284	2.148	37	3.08	0	0
Maximum		0.815	0.798	0.133	5.253	96	8.00	33	0.400
Domestic Horse Mean	80	0.710	0.720	0.012	4.012	80.88	6.74	23.79	0.283
Standard Deviation		0.078	0.071	0.086	0.735	16.79	1.40	10.11	0.082
Minimum		0.347	0.394	-0.312	1.779	26	2.17	0	0
Maximum		0.822	0.799	0.211	5.30	119	9.92	55	0.462

Table 3. Rogers' genetic similarity of the Hardtrigger HMA feral horse herd to major groups of domestic horses.

	Mean *S*	Std	Minimum	Maximum
Light Racing and Riding Breeds	0.745	0.026	0.710	0.783
Oriental and Arabian Breeds	0.733	0.038	0.680	0.772
Old World Iberian Breeds	0.719	0.011	0.711	0.739
New World Iberian Breeds	0.732	0.024	0.702	0.769
North American Gaited Breeds	0.716	0.030	0.675	0.745
Heavy Draft Breeds	0.711	0.044	0.673	0.788
True Pony Breeds	0.684	0.043	0.624	0.736

Figure 1. Partial RML tree of genetic similarity to domestic horse breeds.



Appendix 1. DNA data for the Hardtrigger HMA, ID herd.

AID	VHL20	HTG4	AHT4	HMS7	AHT5	HMS6	ASB2	HTG10	HMS3	ASB17	ASB23	LEX33	LEX3
48780	IO	KP	JK	MN	JJ	LM	KQ	OR	MR	OR	JJ	KL	HL
48781	LO	MM	IO	NO	JJ	LM	KR	OR	MP	NN	JJ	MQ	MM
48782	LQ	KO	KO	NP	JK	KL	NN	MM	NO	GN	KU	KM	LL
48783	IP	KM	HK	LL	JN	LP	KO	IS	MR	NO	KU	LR	HM
48784	IO	KL	JK	MN	JJ	LP	IQ	OR	MR	NO	JJ	LO	HL
48785	LP	MM	HI	LN	JK	LM	IR	MN	MP	NP	GJ	QQ	HL
48786	II	KP	HK	LP	JJ	KP	KQ	MO	OP	NR	UU	LL	FF
48787	MP	KK	HJ	NP	JJ	KP	IK	PR	PR	KN	UU	LM	LL
48788	IM	KO	HJ	LP	JJ	NP	KO	PS	PP	KN	SU	LQ	OO
48789	LL	MP	HJ	NN	JN	KM	OO	MP	OP	NR	IU	LQ	MM
48790	LQ	OP	JO	PP	JJ	LP	NQ	MO	OO	GN	KU	MR	OO
48791	LN	MO	JO	KL	JN	PP	KR	PS	MP	PR	IS	KQ	MM
48792	LR	LP	KO	MN	KN	KP	IK	IR	NO	NN	SS	MO	FF
48793	IQ	MO	HJ	LN	JL	PP	OQ	MP	OP	GK	JS	LM	FF
48794	MP	KL	JK	JN	JJ	OP	KQ	IR	MO	RS	JU	LL	HH
48795	OP	KL	JK	JN	JJ	LP	IK	RR	MR	NN	JU	MO	LL
48796	IM	LL	HJ	MN	JJ	LP	QQ	RR	OR	NS	JS	OQ	HH
48797	IM	KO	JK	NP	JJ	KP	IO	IO	MM	KR	IS	LL	LL
48798	IM	MO	HO	NP	JJ	MM	IQ	MM	MP	GN	GJ	QQ	HL
48799	OP	LM	HI	NP	JL	KP	NN	IO	OO	NQ	KS	GL	IL
48800	IO	MO	HJ	NN	JJ	LP	NQ	MO	MO	NS	IU	KQ	FO
48801	LL	MP	HO	NN	KN	KM	KK	MM	OP	NN	GI	LO	FF
48802	II	KM	JK	LP	JJ	KP	OQ	MP	MP	NR	UU	LL	OO
48803	IO	LP	HK	LM	JJ	LP	KP	OR	OR	OO	JL	LL	FL
48804	LL	KL	OO	NP	JK	KM	IQ	IP	OP	NN	SU	MR	FM
48805	MN	KO	HJ	NP	JJ	KP	IK	IP	MP	KR	IU	LL	LM
48806	LR	KM	HK	NP	JK	OP	NN	MM	NO	NN	JS	KL	LL
48807	IL	MP	HK	LL	JJ	KP	KM	MR	OQ	NR	UU	LL	FN
48808	IM	MP	HJ	LP	JJ	KK	KO	MO	MO	NR	UU	LL	NO
48809	II	KM	KK	LP	JJ	KK	KQ	PR	PQ	NS	UU	LR	NO

Genetic Analysis of the Black Mountain HMA, ID

E. Gus Cothran

March 3, 2011

Department of Veterinary Integrative Bioscience
Texas A&M University
College Station, TX 77843-4458

The following is a report of the genetic analysis of the Black Mountain HMA, ID.

A few general comments about the genetic variability analysis based upon DNA microsatellites compared to blood typing. The DNA systems are more variable than blood typing systems, thus variation levels will be higher. Variation at microsatellite loci is strongly influenced by allelic diversity and changes in variation will be seen in allelic measures more quickly that at heterozygosity, which is why more allelic diversity measures are calculated. For mean values, there are a greater proportion of rare domestic breeds included in the estimates than for blood typing so relative values for the measures are lower compared to the feral horse values. As well, feral values are relatively higher because the majority of herds tested are of mixed ancestry which results in a relatively greater increase in heterozygosity values based upon the microsatellite data. There are no specific variants related to breed type so similarity is based upon the total data set.

METHODS

A total of 25 samples were received by Texas A&M University, Equine Genetics Lab. Thirteen samples were received on November 23, 2010 and twelve on January 12, 2011. DNA was extracted from the samples and tested for variation at 12 equine microsatellite (mSat) systems. These were *AHT*4, *AHT*5 *ASB*2, *ASB*17, *ASB*23, *HMS*3, *HMS*6, *HMS*7, *HTG*4, *HTG*10, *LEX*33, and *VHL*20. These systems were tested using an automated DNA sequencer to separate Polymerase Chain Reaction (PCR) products.

A variety of genetic variability measures were calculated from the gene marker data. The measures were observed heterozygosity *(Ho)* which is the actual number of loci heterozygous per individual; expected heterozygosity *(He),* which is the predicted number of heterozygous loci based upon gene frequencies; effective number of alleles *(Ae)* which is a measure of marker

system diversity; total number of variants *(TNV)*; mean number of alleles per locus (*MNA*); the number of rare alleles observed which are alleles that occur with a frequency of 0.05 or less (*RA*); the percent of rare alleles (*%RA*); and estimated inbreeding level *(Fis)* which is calculated as 1-*Ho/He*.

Genetic markers also can provide information about ancestry in some cases. Genetic resemblance to domestic horse breeds was calculated using Rogers' genetic similarity coefficient, *S*. This resemblance was summarized by use of a restricted maximum likelihood (RML) procedure.

RESULTS AND DISCUSSION

Variants present and allele frequencies are given in Table 1. No variants were observed which have not been seen in horse breeds. Table 2 gives the values for the genetic variability measures of the Black Mountain HMA herd. Also shown in Table 2 are values from a representative group of domestic horse breeds. The breeds were selected to cover the range of variability measures in domestic horse populations. Mean values for feral herds (based upon data from 126 herds) and mean values for domestic breeds (based upon 80 domestic horse populations) also are shown.

Mean genetic similarity of the Black Mountain HMA herd to domestic horse breed types are shown in Table 3. A dendrogram of relationship of the Black Mountain HMA herd to a standard set of domestic breeds is shown in Figure 1.

Genetic Variants: A total of 77 variants were seen in the Black Mountain HMA herd which is above the mean for feral herds and slightly below the mean for domestic breeds. Of these, 21 had frequencies below 0.05 which is a high percentage of variants at risk of future loss.

Allelic diversity as represented by *Ae* is slightly below the average for feral herds while *MNA* is greater than the mean.

Genetic Variation: Observed heterozygosity in the Black Mountain HMA herd is above the feral mean while He is slightly lower than average. *Ho* is higher than *He.* The difference is not great enough to be of significance for analysis of the diversity of the herd.

Genetic Similarity: Overall similarity of the Black Mountain HMA herd to domestic breeds was about average for feral herds. Highest mean genetic similarity of the Black Mountain HMA herd was with Light Racing and Riding breeds, followed by the Oriental and Arabian breeds. As seen in Fig. 1, however, the Black Mountain HMA herd clusters with The Exmoor Pony and is not placed within any well defined breed group. These results indicate a herd with mixed origins with no clear indication of primary breed type and not direct relationship to the Exmoor. As with most trees involving feral herds, the tree is somewhat distorted.

SUMMARY

Genetic variability of this herd in general is on the high side but there is a high percentage of variation that is at risk. Genetic similarity results suggest a herd with mixed ancestry.

RECOMMENDATIONS

Current variability levels are high enough that no action is needed at this point but the herd should be monitored closely due to the high proportion of rare alleles. The herd should be tested again in about five years.

Table 1. Allele frequencies of genetic variants observed in Black Mountain HMA feral horse herd.

VHL20										
I	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**	**S**
0.077	0.000	0.000	0.115	0.154	0.154	0.346	0.115	0.038	0.000	0.000
HTG4										
I	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**	
0.000	0.000	0.192	0.000	0.500	0.077	0.000	0.231	0.000	0.000	
AHT4										
H	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**
0.269	0.115	0.192	0.038	0.000	0.000	0.000	0.385	0.000	0.000	0.000
HMS7										
I	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**	
0.000	0.000	0.231	0.077	0.154	0.423	0.038	0.077	0.000	0.000	
AHT5										
I	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**	
0.000	0.500	0.115	0.000	0.038	0.308	0.038	0.000	0.000	0.000	
HMS6										
I	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**	
0.000	0.000	0.077	0.077	0.385	0.000	0.000	0.462	0.000	0.000	
ASB2										
B	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**
0.000	0.077	0.000	0.269	0.000	0.038	0.308	0.000	0.000	0.231	0.077
HTG10										
H	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**	**S**	**T**
0.000	0.077	0.000	0.038	0.308	0.077	0.115	0.231	0.077	0.000	0.038	0.038	0.000
HMS3										
H	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**	**S**
0.000	0.038	0.000	0.000	0.000	0.000	0.000	0.500	0.308	0.000	0.154	0.000
ASB17										
D	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**	**S**	**T**
0.000	0.000	0.077	0.000	0.000	0.038	0.000	0.077	0.000	0.538	0.115	0.000	0.000	0.115	0.038	0.000
ASB23										
G	**H**	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**	**S**	**T**	**U**	**V**
0.000	0.000	0.192	0.077	0.269	0.077	0.000	0.000	0.000	0.000	0.000	0.077	0.154	0.038	0.115	0.000
LEX33										
F	**G**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**	**S**	**T**
0.000	0.038	0.269	0.462	0.115	0.000	0.038	0.000	0.000	0.077	0.000	0.000

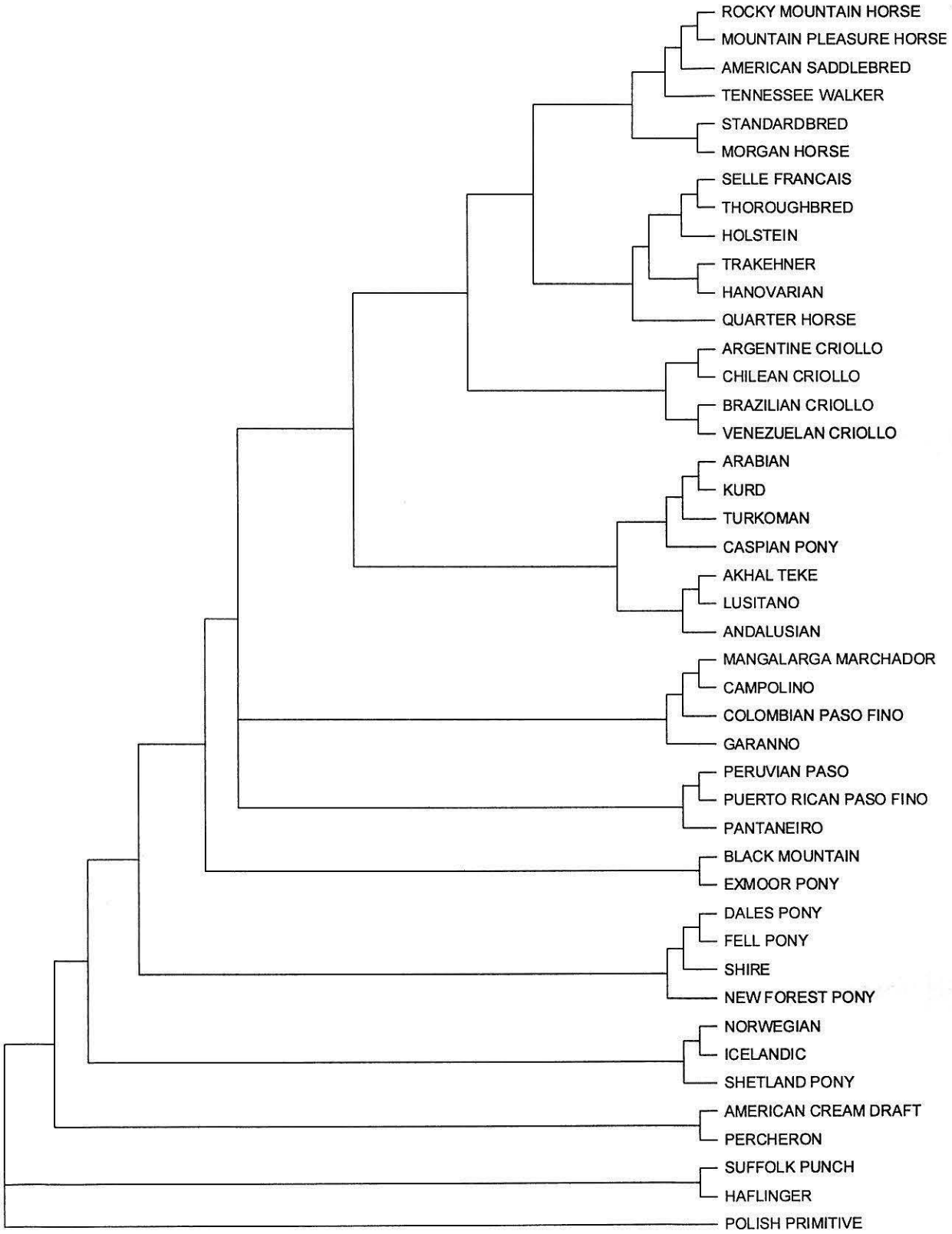
Table 2. Genetic variability measures.

	N	*Ho*	*He*	*Fis*	*Ae*	*TNV*	*MNA*	*Ra*	*%Ra*
BLACK MOUNTAIN ID	25	0.720	0.704	-0.023	3.57	77	6.42	21	0.273
Cleveland Bay	47	0.610	0.627	0.027	2.934	59	4.92	16	0.271
American Saddlebred	576	0.740	0.745	0.007	4.25	102	8.50	42	0.412
Andalusian	52	0.722	0.753	0.041	4.259	79	6.58	21	0.266
Arabian	47	0.660	0.727	0.092	3.814	86	7.17	30	0.349
Exmoor Pony	98	0.535	0.627	0.146	2.871	66	5.50	21	0.318
Friesian	304	0.545	0.539	-0.011	2.561	70	5.83	28	0.400
Irish Draught	135	0.802	0.799	-0.003	5.194	102	8.50	28	0.275
Morgan Horse	64	0.715	0.746	0.041	4.192	92	7.67	33	0.359
Suffolk Punch	57	0.683	0.711	0.038	3.878	71	5.92	13	0.183
Tennessee Walker	60	0.666	0.693	0.038	3.662	87	7.25	34	0.391
Thoroughbred	1195	0.734	0.726	-0.011	3.918	69	5.75	18	0.261
Feral Horse Mean	126	0.716	0.710	-0.012	3.866	72.68	6.06	16.96	0.222
Standard Deviation		0.056	0.059	0.071	0.657	13.02	1.09	7.98	0.088
Minimum		0.496	0.489	-0.284	2.148	37	3.08	0	0
Maximum		0.815	0.798	0.133	5.253	96	8.00	33	0.400
Domestic Horse Mean	80	0.710	0.720	0.012	4.012	80.88	6.74	23.79	0.283
Standard Deviation		0.078	0.071	0.086	0.735	16.79	1.40	10.11	0.082
Minimum		0.347	0.394	-0.312	1.779	26	2.17	0	0
Maximum		0.822	0.799	0.211	5.30	119	9.92	55	0.462

Table 3. Rogers' genetic similarity of the Black Mountain HMA feral horse herd to major groups of domestic horses.

	Mean *S*	Std	Minimum	Maximum
Light Racing and Riding Breeds	0.744	0.017	0.727	0.767
Oriental and Arabian Breeds	0.729	0.035	0.674	0.766
Old World Iberian Breeds	0.717	0.020	0.682	0.732
New World Iberian Breeds	0.726	0.024	0.695	0.768
North American Gaited Breeds	0.724	0.034	0.672	0.758
Heavy Draft Breeds	0.696	0.040	0.644	0.754
True Pony Breeds	0.675	0.039	0.633	0.731

Figure 1. Partial RML tree of genetic similarity to domestic horse breeds.



Appendix 1. DNA data for the Black Mountain HMA, ID herd.

2010 Nov. 23													
AID	VHL20	HTG4	AHT4	HMS7	AHT5	HMS6	ASB2	HTG10	HMS3	ASB17	ASB23	LEX33	LEX3
48767	LO	KM	JO	NN	JJ	PP	KN	LO	OP	GR	KU	KK	LO
48768	OO	MM	JK	MO	KN	MM	KM	LO	PP	NN	KS	GL	MM
48769	MN	MM	HJ	KN	KN	MP	IN	LM	OO	NN	IK	LL	NO
48770	LO	KP	OO	NN	JM	MP	KQ	OR	OO	RS	SU	KL	HL
48771	OP	MP	IO	LN	JN	MP	KK	KS	OP	NN	JL	LM	HH
48772	IN	MP	OO	KP	JJ	MP	QQ	IP	OP	GO	KR	KK	HH
48773	IM	NP	IO	KM	JJ	LP	NQ	LP	OP	LO	RS	KR	HM
48774	MO	KM	HH	KN	JN	KP	NR	MO	OR	NN	II	LM	IN
48775	OP	KM	HH	MP	JN	MM	KN	LN	PR	NN	KU	LL	MM
48776	MP	NP	IO	KM	JJ	LM	KN	LN	OR	JL	ST	OR	LM
48777	OO	MM	HO	LN	KN	PP	NQ	LO	PR	NR	KL	LL	LL
48778	LQ	MP	JO	KN	NO	MP	NQ	IN	OO	NO	IJ	KM	LL
48779	NN	KM	HJ	NN	JN	KP	IR	LO	IO	NN	IK	LL	IN
2011 Jan. 13													
AID	VHL20	HTG4	AHT4	HMS7	AHT5	HMS6	ASB2	HTG10	HMS3	ASB17	ASB23	LEX33	LEX3
50535	NO	MP	OO	LN	JK	MP	IN	LL	OP	NR	JK	KK	NN
50536	MO	MM	HO	NN	JJ	PP	RR	IO	OR	NR	II	LL	HH
50537	NO	LM	HJ	LN	JJ	OP	KQ	KM	OO	RS	IJ	LO	FF
50538	LO	MP	OO	KP	JJ	KP	NQ	IO	PP	NO	KR	KK	HH
50539	IO	KK	IO	NP	JJ	KP	QQ	IO	OP	RS	IU	LL	MM
50540	OR	MM	OO	NN	JJ	LM	NQ	IO	OP	NN	IK	KK	HH
50541	NR	MP	HO	NN	JK	LP	NQ	IL	OP	NN	KK	KL	FH
50542	MO	MP	JO	NN	JJ	MM	KN	LM	NP	OS	IK	LO	HO
50543	OP	KM	IK	LL	JN	PP	IK	LN	PR	NP	KU	LQ	HM
50544	OO	MP	HK	MO	KN	MM	NN	LO	NP	NN	KS	GK	MM
50545	LO	MP	OO	NN	JM	MM	KQ	MR	NO	GS	IS	KL	FH
50546	LN	MM	HO	KN	MN	PP	IN	LM	OP	NO	II	KL	NO

7.5 Appendix E - Responses to Comments Received

No.	Commenter	Comment	BLM Response
1	Multiple commenters	I oppose the dangerously low "appropriate management levels" (AMLs) for the two HMAs.	This issue was previously decided as part of the Land Use Planning process and is outside the scope of this environmental analysis (see also comment number 11).
2	Multiple commenters	The Proposed Action will jeopardize the herd's long-term genetic viability.	The genetic variability of the HMAs was analyzed in 2010 (Appendix D). *The EA has been modified to address low genetic variability in the Black Mountain HMA* moving horses between the two HMAs.
3	Multiple commenters	Horse population numbers are kept so low to accommodate livestock grazing.	AMLs are established in an effort to maintain a "thriving, natural ecological balance". The area is available to livestock grazing as established by the Owyhee Resource Management Plan (Objective LVST-1 (pages 23-25, USDI 1999) and forage allocations Table LVST-1 (pages 104-112, USDI 1999)) and is outside the scope of this environmental analysis.

No.	Commenter	Comment	BLM Response
4	Multiple commenters	I oppose the use of a helicopter or any other motorized vehicles used in conducting roundups and treatment of herds in the absence of a written policy that addresses distance, speed, temperature, and protocol for reprimand.	The BLM has developed refined and implemented standard operating procedures (SOPs) over the past 35 years. These SOPs are designed to minimize stress and impacts to wild horses during implementation of gather operations. Among these is a requirement that helicopters be used to herd wild horses in a manner that allows foals to remain with their mares whenever possible (BLM Manual Section 4740.11). The use of non-motorized methods was considered and dismissed due to increased stress on horses, and/or impractical for large scale gathers (page 8). The use of helicopters for gathering horses allows horses to be moved at a slower rate. This reduces the stress level on animals and fewer injuries occur.
5	Comment Form Letter	Use the agency's adaptive management mandate and its discretion through 43 C.F.R. 4710.3-2 and 43 C.F.R. 4710.5(a), which allows for the reduction or elimination of grazing for privately-held animals in order to improve conditions and forage availability for wild horses.	BLM's mandate is to promote multiple use on public lands. Livestock grazing permits are issued in multiple year terms under 43 CFR 4100. Adjustments to such permits are not within the scope of this analysis.
6	Multiple commenters	Remove cattle from the land.	The area is available to livestock grazing as established by the Owyhee Resource Management Plan (Objective LVST-1 (pages 23-25, USDI 1999) and forage allocations Table LVST-1 (pages 104-112, USDI 1999)) and is outside the scope of this environmental analysis.

No.	Commenter	Comment	BLM Response
7	Multiple commenters	An alternative for returning horses who have moved outside the HMAs back within the HMA boundaries.	Such an alternative does not comply with the Purpose and Need for the project. It is BLM policy to remove excess horses in accordance with 43 CFR 4720.1 and BLM Handbook 4720.12 wherein animals outside the HMAs are considered excess. Furthermore, horses moving outside the HMA, as individuals, are evidence of the HMA reaching capacity as young studs will wander in an attempt to establish territory. Returning them to the HMA would cause greater conflict among bands. Additionally, once a horse has learned to get through a fence, it is difficult to keep them from doing it again.
8	Multiple commenters	A full disclosure of predator management in an around the HMA.	This issue is outside the scope of this environmental analysis. Management of predators is the responsibility of the Idaho Fish and Game and APHIS. This is therefore outside of the scope and authority of the BLM and this document. Information regarding predator management can be requested from the above agencies according to their regulations.
9	Multiple commenters	Disclosure of Cost and an Economic Analysis of CTR and removal	NEPA does not require an analysis of cost. It does however require an analysis of economic impacts. Impacts to the socio-economic aspects of the human environment in relation to wild horse and burro management are difficult to measure as there is very little direct relation between the horse population levels and the economy of this area.
10	Multiple commenters	Request a full explanation and scientific documentation that support the premise that AMLs are sufficient to maintain genetic viability.	See previous responses regarding genetic viability and establishment of AMLs.

No.	Commenter	Comment	BLM Response
11	Multiple commenters	Request a full disclosure of all fencing in and around the HMAs.	Rangeland management facilities, such as fences, are proposed and implemented through the livestock grazing permit renewal process. The scope of this analysis does not include such actions.
12	Multiple commenters	Consider an alternative that incorporates Standard Operating Procedures (SOPs) that implement humane standards such as those submitted by the Wild Horse Preservation Campaign which would maintain the integrity of social bands during all aspects of the operation.	The SOPs submitted by WHPC suggest the gathering of horses through the use of water trapping and other methods that are not economically feasible and result in a longer duration of disturbance to the animals. Additionally, the social behaviors of wild horses include the natural disruption and separation of social bands as males fight for breeding rights and leadership of harems. Horses are accustomed to such interactions and therefore would incorporate the imposed disturbance with minimal stress. The disruption and separation of social bands, as a result of natural behaviors or the proposed action, increase genetic viability and gene flow among the herds and would therefore be beneficial to their overall welfare. Additionally, the availability of forage and water in these areas does not present enough of a limiting factor to attract horses into the trap area.

No.	Commenter	Comment	BLM Response
13	Multiple commenters	BLM has no mandate to remove horses merely because they are at, near, or above the arbitrarily set AML.	The Act mandates the BLM to manage Herd Areas effectively to maintain a thriving and natural ecosystem balance. This often requires the reduction of herd population by the removal of horses. Alternatives that propose no removal, no gather, and PZP only are considered in the EA. As is referred to in comment response #11, the AMLs for these areas were set in the Owyhee Resource Management Plan, 1999.
14	Comment Form Letter	BLM must end the unsustainable cycle of roundups and removals of horses from public lands which have resulted in the stockpiling of more than 45,000 mustangs in government holding facilities.	This is a position statement. The agency's policy regarding the removal and care of wild horses on public lands is not within the scope of this analysis.
15	Multiple commenters	Support for efforts to effectively, humanely, and economically manage wild horses and burros which include motorized vehicles where it is most necessary and effective. Also concerned about helicopter safety.	Comments supporting the use of helicopters and other motorized tools are noted. Helicopter flight safety, though, is addressed as part of the contract, is monitored by the Contracting Officer, and is outside of this decision space and analysis.
16	Multiple commenters	If the PZP treatments administered in 2010 were done correctly the true results (reduced production rate) it is not likely that the success would be evident until several years after the initial treatment.	See BLM's response to Comment 3 above.
17	Multiple commenters	All dangerous and detrimental types of fertility control should be eliminated.....	There are no dangerous or detrimental methods of fertility control proposed. PZP is not a hormonal fertility control.

No.	Commenter	Comment	BLM Response
18	Eileen Hennessy	Wild horses can and do regulate their numbers naturally. Allow nature to take its course.	Allowing nature take its course is not within the purpose of and need for this action. Neither does it meet the agencies requirements to maintain a thriving natural ecological balance.
19	Eileen Hennessy	Hire wild horse experts and advocates to the Wild Horse and Burro Advisory Board.	This action is outside the scope of this analysis and proposed action. Additionally, it is outside the authority of this office.
20	Karen Steenhof	I urge the BLM to use the contractor who conducted the 2010 gather and not the contractor who ran the 2007 gather.	The contracting decision is outside the scope this analysis and outside the authority of this office. However, all contractors are held to a standard and regulations established by the BLM National Office.
21	Lisa Griffith	There needs to be some study on the effects of PZP-22 given in 2010.	Population estimates are established through WinEquus Modeling and a pre-gather census. The modeling parameters are based on the expected population growth rate as has been experienced in other treatments. The fertility control requires retreatment every two years. Additionally, the proposed action would treat mares that were missed in the 2010 treatment.
22	Lisa Griffith	There needs to some way to ensure mares treated in 2010 will not be treated again.	Mares treated in 2010 were freeze branded specifically for identification during this and subsequent treatments. The same will occur as part of the proposed action and alternatives that include fertility control.
23	Multiple commenters	Mares could be darted from the air which would decrease the need for gathers in the future.	Darting mares from helicopters is not a safe or effective method to administer fertility control and therefore will not be analyzed as an alternative or proposal.

No.	Commenter	Comment	BLM Response
24	Multiple commenters	Rather than remove horses at this time, allow the previous fertility control treatment to take effect and guide management actions in the future.	The fertility control administered in 2010 requires gathers and treatment every few years. Additionally, the herd populations were, at the time of the last gather, already close to the high AMLs for these HMAs.
25	Multiple commenters	The adjustment of sex ratios in herds can result in impacts to the behavioral and social structure of these herds.	Adjustments to sex ratio are proposed as part of alternative A. Such would help the BLM meet their objectives of slowing population growth and increasing genetic diversity. The proposal to adjust sex-ratios to favor males has been changed to a ratio of 50:50 which is more representative of natural herd population ratios. The impacts of such have been analyzed in Alternatives A and B.
26	Idaho Department of Fish and Game	Feral Horses compete heavily against native wildlife for forage and habitat. Studies have shown that areas where feral horses were removed or reduced provide better wildlife habitat than areas where horses persist at the upper levels of associated AMLs.	Alternative A (conditionally) and Alternative B proposed removing horses to the low AML and managing horse populations as to maintain a thriving, natural ecological balance.
27	Comment Form Letter	The EA does not adequately address the effects of gathering horses during the late winter months when mares are pregnant.	No gather operations are proposed for late winter or spring. Section 2, describes, as applicable to all action alternatives, that gather operations will occur in the fall.
28	The Cloud Foundation	Census numbers should not include this year's foals.	During the aerial census, foals were counted as part of the population. This was done because, as of January 1, 2013, all foals will be considered one year old, and thus members of the herd.

No.	Commenter	Comment	BLM Response
29	Multiple commenters	Concerns regarding genetic viability	The genetic variability of the HMAs was analyzed in 2010 (Appendix D). The EA has been modified to address low genetic variability in the Black Mountain HMA moving horses between the two HMAs. Please see section 3.1.1 and 3.1.2.
30	The Cloud Foundation	Herds should be managed as "self sustaining".	With the lack of large predators, whose management is not within the jurisdiction of the BLM, the only limiting factors in these HMAs is the ecological balance.
31	The Cloud Foundation	The EA does not specify the age ranges of the horses that will be considered for removal from or return to the HMA.	Horses removed from the range will be removed in the order of the selective removal criteria set forth in IM No. 2010-135, unless they are outside the HMA. Horses four years and younger are the first priority, animals eleven to nineteen will be removed if management goals cannot be achieved by removing horses 4 years and younger, horses five to ten are the lowest priority, and animals over 20 would not be removed.
32	Sherry Oster and Craig Downer	Integrate the Reserve Design into the management of these HMAs.	The Reserve Design does not meet the purpose and need for this action and is not within the scope of this analysis. Designating such is a land use planning decision.
33	Marybeth Devlin	Using helicopters to gather horses can have impacts to riparian areas and encourage mosquito populations.	Trap sites are not located near or adjacent to riparian areas. The movement of horses by the helicopter drive method would not push horses into riparian areas any more than their normal activity.

7.6 Appendix F – Rangeland Monitoring in Rats Nest Allotment, 2012

Hardtrigger HMA

Rangeland Utilization monitoring in the Rats Nest Allotment (Hardtrigger HMA) was completed on May 31 and June 1, 2012 just days after livestock left the allotment per grazing permit stipulations (May 27, 2012). Wild horse and livestock utilization (all grass species), at 01N04W23, was an average of 8.55%. Additionally, there was very little sign of livestock and it was evident that most of the use was by wild horses. At 01N04W22 (June 1) utilization was 37%.

A utilization and compliance check was completed, by a BLM Rangeland Management Specialist, on August 22, 2012. Utilization, at 01N04W23 was measured at an average of 42.55%. At 01N04W22 utilization was measured at an average of 54.23%. No cattle were in the allotment. Photo sets, below, are paired to show change in utilization from the end of May to the end of August.

Photo set 1: Rats Nest Allotment Utilization, site at UTM 01N04W23, June 1(left) and August 22.

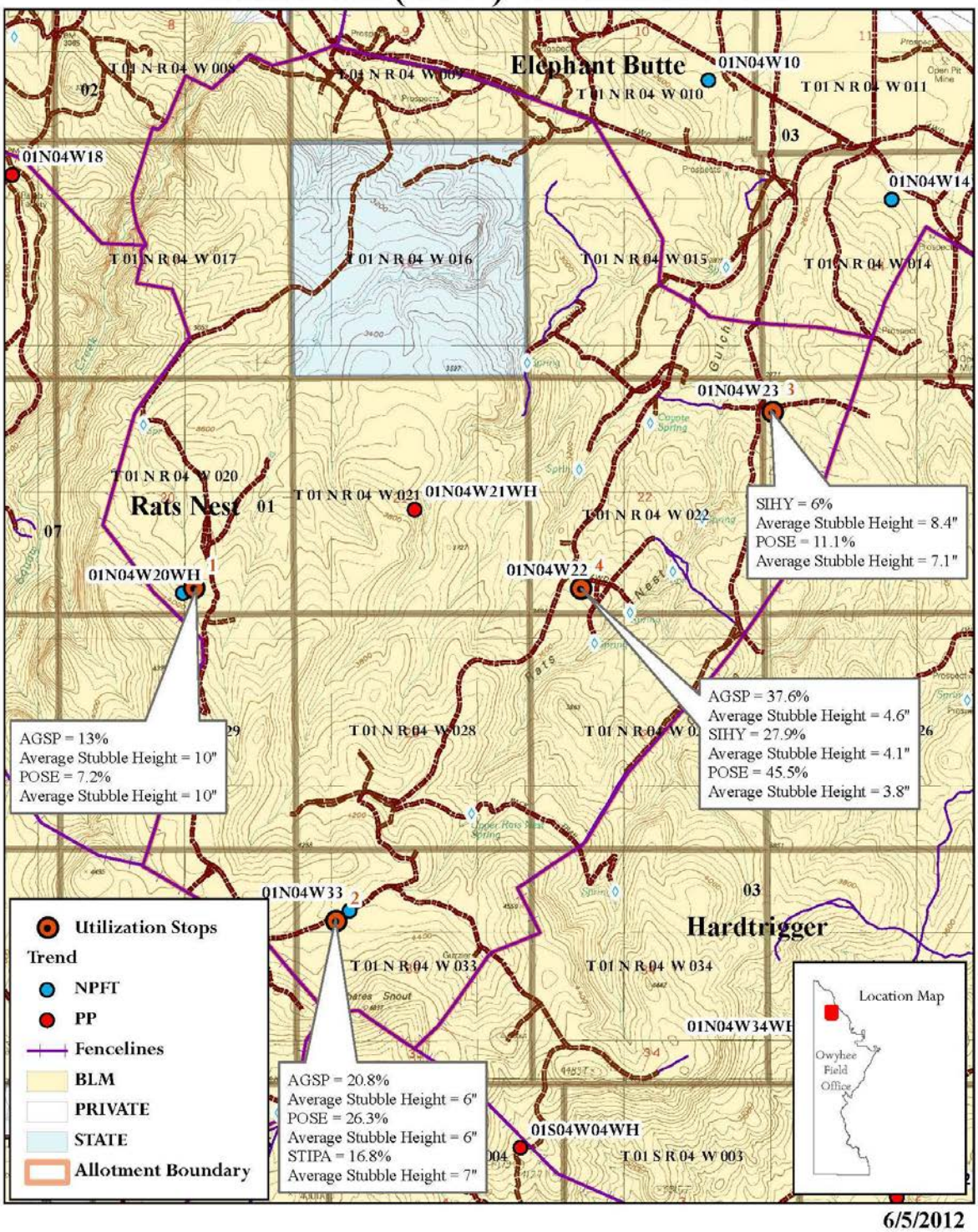
Photo set 2: Rats Nest Allotment Utilization, site at UTM 01N04W22, June 1 (left) and August 22.

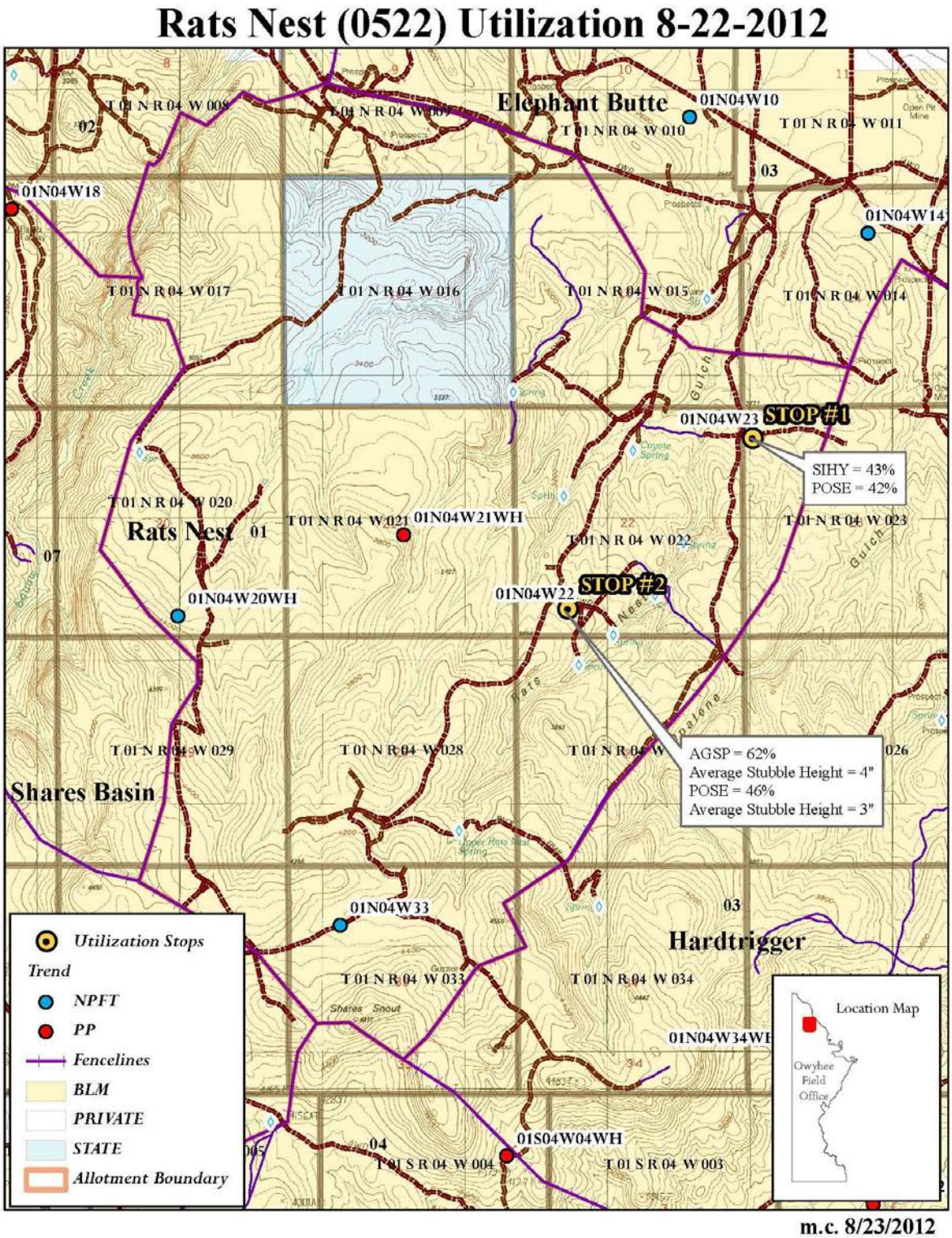
A large band of wild horses was observed at Upper Rats Nest Spring. The spring has been heavily impacted as palatable riparian and upland vegetation adjacent to the spring have been grazed down to the root crown and soils have been impacted. (Photo set 4).

Photo set 3: Wild horses at Upper Rats Nest spring, August 22, 2012.

Photo set 4: Upper Rats Nest Spring, August 22, 2012.

Rats Nest (0522) Utilization 2012




Rats Nest (0522) Utilization 8-22-2012
Elephant Butte
01N04W10
01N04W18
01N04W14
01N04W23
STOP #1
SIHY = 43%
POSE = 42%
Rats Nest
01N04W21WH
01N04W20WH
01N04W22
STOP #2
AGSP = 62%
Average Stubble Height = 4"
POSE = 46%
Average Stubble Height = 3"
Shares Basin
01N04W33
Hardtrigger
01N04W34WE
01S04W04WH
Utilization Stops
Trend
NPFT
PP
Fencelines
BLM
PRIVATE
STATE
Allotment Boundary
Location Map
Owyhee Field Office
m.c. 8/23/2012